

# **Utah Mineral Industry Activity Review 1978**

*compiled by Carlton H. Stowe*

**UTAH GEOLOGICAL AND MINERAL SURVEY**  
*a division of the*  
**UTAH DEPARTMENT OF NATURAL RESOURCES**  
**CIRCULAR 59    PRICE \$1.00    JULY 1979**

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## UTAH MINERAL INDUSTRY ACTIVITY FOR 1978

by Carlton H. Stowe<sup>1</sup>

The mineral industry, in general, had an active year in Utah during 1978. For the third consecutive year the value of Utah's mineral production exceeded the billion dollar mark (\$1,226,173,000). However, in constant dollars (1967 base) the value of mineral production actually declined. Oil production was close to \$345,603,400 - up slightly from 1977's \$319 million. Gross production of natural gas was 80.5 billion cubic feet - down slightly from 80.7 billion cubic feet of 1977. Petroleum Information, Denver, recorded 258 wells drilled in 1978. There were three oil field discoveries and 10 new gas field discoveries. Preliminary estimates placed Utah coal production at 10,105,000 short tons at an average price of \$25. Copper production increased over the previous year along with gold, iron ore, sand and gravel, and others. Decreases were noted in silver, lead, and zinc.

Utah's mineral property valuation had slight increase over the previous year despite declining trends in some of the mining industries as well as in reduced oil and gas production in the state. Mine occupation tax receipts were slightly more than the previous year with 31 companies paying the 1978 tax from some 47 producing properties. There was also a strong increase in monies paid to the State of Utah from mineral royalties, leases and taxes. Total receipts for 1978 amounted to \$23,776,083. Much of this increase resulted from the doubling of oil and gas lease rentals from 50 cents to \$1.00 per acre and not from increased lease activity or increased production. State land receipts were \$8,466,289 from July 1977 to June 1978 (FY 1978).

Oil and gas production figures are preliminary estimates since the Division of Oil, Gas & Mining has not yet issued the final figures for 1978. The Utah Industrial Commission reports coal production for the year at 9,253,000 short tons valued at \$249,831,000. Uranium and vanadium production and value statistics for Utah are not released by the Department of Energy.

Table 1 shows the quantity and dollar value of mineral production in Utah in 1977 and 1978. Figure 1 shows the value of Utah's mineral production in current dollars and constant (1967) dollars. Figure 2 illustrates distribution of land ownership in Utah. Figure 3 shows the annual income from state-owned lands and the rentals and fees from federal lands in the state.

<sup>1</sup>Information Specialist, Utah Geological and Mineral Survey

### OIL AND NATURAL GAS ACTIVITY

While the Thrust Belt regional drilling activity in 1978 dominated oil and gas exploration and development activity in Utah, other areas of Utah had significant drilling programs. Several exploratory wells were completed in the Uinta Basin and Paradox Basin regions. Remote wells were completed in south-central Utah, and several interesting test wells were drilled in the Basin and Range province of western Utah (table 2).

#### Thrust Belt region (Rich, Morgan, Summit, Counties)

Throughout 1978 the Thrust Belt of northern Utah attracted national attention. New oil and gas discoveries were completed, drilling and completion of new exploratory and development wells were underway, and production rates at the Pineview field, Summit County, Utah, were near the 500,000 barrel-per-month level.

#### Exploration Activity

Participants in the 1978 activity of the Thrust Belt include Phillips Petroleum Co., Exxon U. S. A., Texaco, Inc., Mobil Oil, Gulf Oil, Amoco Production Co., Placid Oil Company, Chevron Oil, Union Oil of California, American Quasar Petroleum, Louisiana Land, Cities Service Oil, Atlantic Richfield, Peoples Gas, and others.

The Peoples Gas participation in the Trailblazer project results from the company's initial efforts and success in finding new gas supplies in the Rocky Mountains. The pipeline company, on behalf of its larger customers, agreed in 1976 to fund exploration by the Anschutz Corporation on a spread of 47,000 acres on the Thrust Belt in Wyoming and Utah. The Anschutz gas discovery is the largest thus far on the Thrust Belt. More than a dozen other ventures in the Rockies have had participation from Peoples Gas companies since the Anschutz agreement was made.

Perhaps, the most important of these, in the long run, will be a second agreement with Anschutz in which Peoples Gas Company acquired a 50 percent interest in oil and gas leases covering about 7,000,000 acres along the Thrust Belt, running from Utah and Idaho down to Arizona and the Mexican border. Some preliminary exploration efforts are under-way and a major effort is

Table 1. Mineral production in Utah<sup>1</sup> for 1977 and 1978

Mineral	Unit	1977		1978 <sup>P</sup>	
		Quantity	Value (thousands)	Quantity	Value (thousands)
Clays <sup>2</sup>	thousand short tons	244	\$ 713	246	\$ 777
Coal (bituminous)	ditto	<sub>3</sub>	<sub>3</sub>	<sub>3</sub>	<sub>3</sub>
Copper (recoverable content of ore, etc.)	short tons	194,130	259,357	208,580	276,577
Gem stones		NA	100	NA	100
Gold (recoverable content of ores, etc.)	troy ounces	210,501	31,219	241,000	46,438
Gypsum	thousand short tons	324	2,510	318	1,969
Iron ore (usable), gross weight, thousand long tons		1,932	19,780	2,040	22,513
Lead (recoverable content of ores, etc.)	short tons	10,746	6,598	2,820	1,918
Lime	thousand short tons	209	8,274	220	8,090
Natural gas	million cubic feet	60,696	37,146	<sub>3</sub>	<sub>3</sub>
Petroleum (crude)	thousand 42-gallon barrels	33,113	308,872	<sub>3</sub>	<sub>3</sub>
Salt	thousand short tons	843	10,831	898	13,421
Sand and gravel <sup>4</sup>	ditto	11,895	18,662	12,000	20,000
Silver (recoverable content of ores, etc.)	thousand troy ounces	3,283	15,169	2,882	15,565
Stone (crushed)	thousand short tons	2,765	7,072	2,780	7,300
(dimension)	ditto	6	238	6	239
Tungsten	thousand pounds	27	219	W	W
Zinc (recoverable content of ores, etc.)	short tons	17,759	12,218	3,850	2,387
Combined value of asphalt, beryllium concentrate, carbon dioxide (natural), cement (masonry and portland), clays (kaolin and fuller's earth), magnesium compounds, molybdenum, natural gas liquids (1977), phosphate rock, potassium salts, pumice, sand and gravel (industrial), sodium sulfate, uranium, vanadium, and items indicated by symbol W. . . . .		.XX	172,019	XX	178,044
Total		XX	<sup>5</sup> 910,997	XX	<sup>6</sup> 595,338

<sup>1</sup> Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>2</sup> Excludes kaolin and fuller's earth; value included in "Combined value" figure.

<sup>3</sup> These data now collected by Department of Energy; not available at the time this table was prepared.

<sup>4</sup> Excludes industrial sand and gravel; value included in "Combined value" figure.

<sup>5</sup> Incomplete total; excludes bituminous coal.

<sup>6</sup> Incomplete total; excludes bituminous coal and natural gas, natural gas liquids, and petroleum.

NA Not available.

W Withheld to avoid disclosing individual company confidential data; value included in "Combined value" figure.

XX Not applicable.

#### U.G.M.S. preliminary estimates:

	1978	
Coal	short tons	10,105,000
Marketed production, natural gas	MCF	\$252,625,000
Natural Gas production	MCF	32,606,000
Petroleum*	Bbls	80,524,854
		35,265,653
		345,603,400

\*includes:  
Liquids 3,294,212 bbls  
Oil Shale 2,192 bbls

#### GRAND TOTAL

\$1,226,172,400

Source: U. S. Bureau of Mines Annual Preliminary Report and Utah Geological and Mineral Survey Preliminary estimates, January 1979.

to begin in early 1979.

#### New discoveries

A prolific gas discovery was completed in Rich County by the American Quasar Petroleum Company in 1977. The No. 20-1 Hogback Ridge, 20-13N-7E, 12 miles north of the town of Randolph, flowed 22,400,000 cubic feet of gas daily from the Dinwoody (Triassic) formation from 9,468-9,630 feet through

¾-inch choke. It also flowed 9,967,000 cubic feet of gas per day from the Phosphoria (Permian) formation from 10,070 to 10,234 feet through ¼-inch choke. Total depth was 10,910 feet. Combined calculated absolute open flow rate was 242 million cubic feet of gas per day. Northwest Pipeline Company completed a 7-mile, 10-inch diameter connection to their natural gas pipeline approximately 7 miles to the northeast, and gas began to flow during the week of August 20, 1978, at the rate of

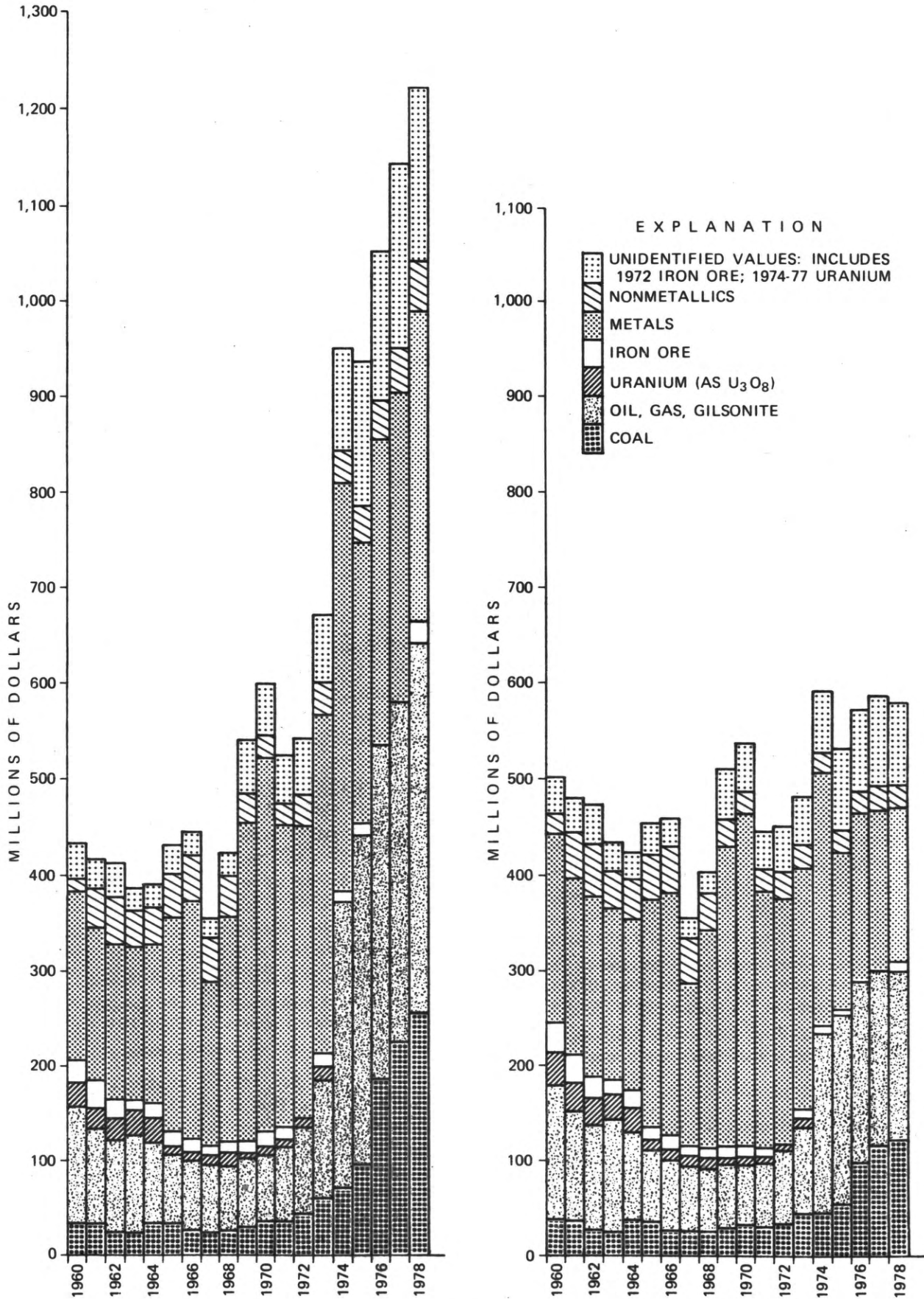


Figure 1. The value of Utah's mineral production in current dollars and constant (1967) dollars.

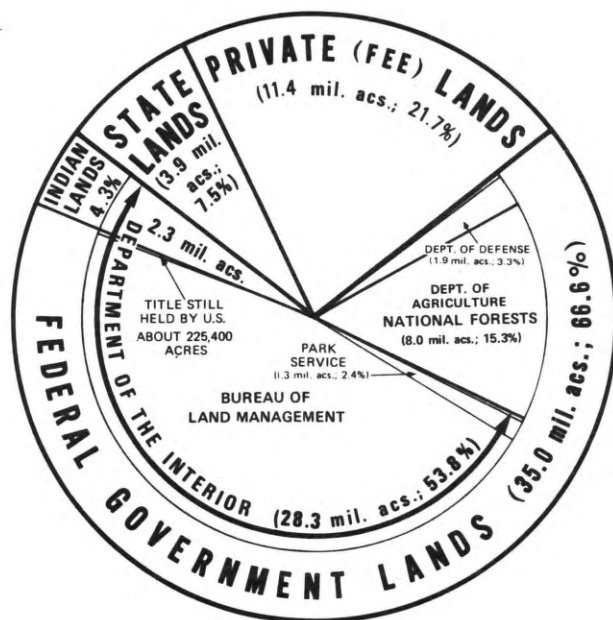


Figure 2. Distribution of land ownership in Utah, 1978.

12 to 14 million cubic feet per day. The discovery well was the fifth test drilled in Rich County and opened the county's first producing area. The importance of the discovery has been dampened by offsetting dry holes to the north and southeast. Marathon Oil was drilling a 15,400-foot test projected to the Devonian 14 miles north of the town of Randolph. The Marathon Thrust Belt test, No. 1-15 South Eden Canyon, 15-13N-6E, is five miles west of the Hogback Ridge field discovery and two miles east of Bear Lake. American Quasar drilled the No. 19-1 Chourmos, 19-9N-6E, to 9,214 feet without reported shows, about 10 miles west of Woodruff, and was drilling another test well, the No. 12-1 Eden, 12-14N-6E, about two miles south of the Idaho line. Its objective was to about 15,500 feet for tests of Devonian formations. It is three miles east of Bear Lake and about nine miles north-north-west of the Hogback Ridge area. American Quasar scheduled a projected 10,000-foot test of Nugget at the No. 7-1 Duck Creek-Federal 7-12N-7E, in Rich County. It is nine miles north of Randolph, about three and a half miles south-southwest of the Hogback field.

Amoco Production set five-inch liner to 15,155 feet at the No. 1 Deseret, 4-6N-8E, in southern Rich County. Total depth is 15,160 feet in the Madison Formation (Mississippian). Sour gas was recovered during testing of the Madison from 14,540 to 14,759 feet, but Amoco reported gas was too wet to measure. The water cushion, mud and an estimated 50 barrels of gas formation water with a hydrogen sulfide content were reversed from the drill-pipe. The well is just west of

the Wyoming state line, about five miles northwest of Evanston.

Attention again focused on the Pineview area in late August 1978 when tests of Cretaceous yielded oil. Oil flowed at the rate of 20 barrels an hour, and gas at the rate of 1,973,000 cubic feet daily, during a drillstem test over a 344-foot interval in a Cretaceous sand at American Quasar Petroleum's 4-3 Pineview, 4-2N-7E, an apparent shallow pay discovery. Tested interval was 2,940-3,284 feet. The well, scheduled to Nugget at about 10,100 feet, is in the southern part of the field, which has established production from Nugget and Twin Creek (both Jurassic).

During October, eight shallow test wells were scheduled to depths of 4,000 feet in Kelvin (Cretaceous) at the Pineview field. American Quasar will operate seven of the wells and Champlin Petroleum scheduled one. The tests are all within a half mile south, east and northwest of the Quasar Petroleum's shallow pool discovery at No. 4-3 Pineview.

Further, Colorado Energetics set pipe to 6,582 feet for tests of Cretaceous at 33-11 UPRR, 11-1N-6E, seven miles north of the town of Oakley. Total depth is 15,015 feet. The well originally scheduled as a 12,500-foot test of Nugget, was repermited to 17,500 feet in Cretaceous. Gas flowed at a maximum rate of 180,000 cubic feet per day through a half-inch surface choke on a drillstem test in Kelvin (Cretaceous) 5,950-6,038 feet. A second test in Twin Creek 13,624-14,043 feet recovered 186 feet of oil and gas cut water cushion, 2,571 feet of slightly gas cut water cushion and 1,093 feet of gas cut mud. The wildcat is eight miles southwest of the Pineview field.

Champlin Petroleum also announced during October 1978 that it had purchased Occidental Petroleum's interests in the Pineview field and the Elkhorn Ridge area as well as the Pineview gas processing plant. Occidental owned approximately a 10% interest in the field. Purchase price was not disclosed.

A fourth pay, third in Jurassic, was found in the prolific Pineview field in late October 1978. American Quasar Petroleum opened the new pool in Stump Sand at the No. 1 Newton Sheep Co., 4-2N-7E. Oil flowed at the rate of 1266 bbls a day, and gas at the rate of 702,000 cubic feet a day, on a four hour test of Stump 4,997-6,012 feet through a 40/64-inch choke. Flowing tubing pressure was 475 psi. The oil was 47 gravity. The well, the Pineview field original discovery, was completed in 1975 flowing oil and gas from the Nugget Formation (Jurassic).

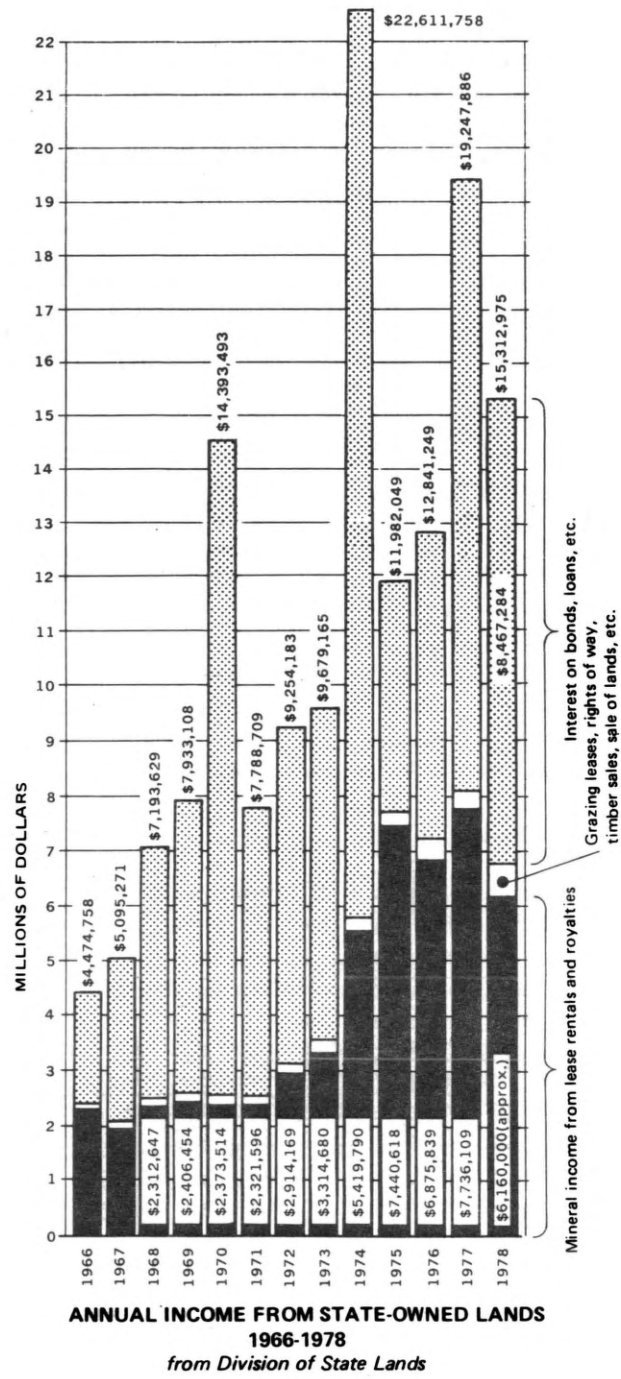
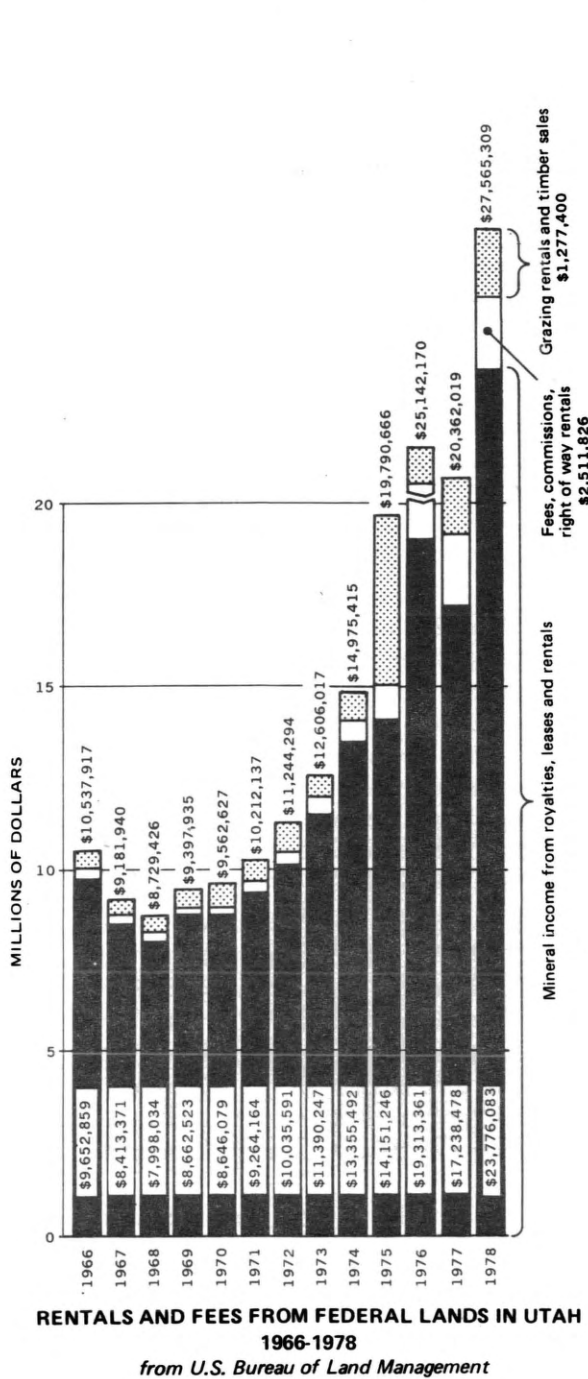


Figure 3. Annual income from federal and state owned lands.

Anschutz Corporation announced an important new gas discovery at the No. 34-1 Anschutz Ranch, nw se 34-4N-7E, seven miles north of Pineview and about 13 miles southwest of Wyoming's Yellow Creek field. Anschutz was completing the well after six intervals in a 700-foot section of Twin Creek flowed at a combined rate of 34,900,000 cubic feet of gas and 872 bbls of condensate per day. All six zones were tested on a 3/4-inch choke. Flowing pressure ranged from 850 to 1,665 psi. Condensate recoveries on the tests averaged

25 bbls per million cubic feet of gas. Overall interval tested was from 6,981 to 7,677 feet.

In late October 1978, American Quasar announced it had completed a third well in the Lodgepole field about six miles southeast of Coalville, producing from a zone that had not yet previously produced in the field. The completed well is the No. 26-1 Blonquist, flowing 1,172 barrels of oil and 412,000 cubic feet of gas daily from 11,057 to 11,348 feet. Producing formation is

## OIL AND NATURAL GAS ACTIVITY

## 1978 Drilling Statistics

Table 2. A tabulation of wells drilled in Utah follows:

	Total	Oil	Gas	Dry	Total Footage	Success Ratio
Wildcat tests	61	3	10	48	429,339	21.3
New Pool and outpost tests	15	5	2	8	120,498	46.7
Field or development wells	165	74	67	24	958,527	85.4
	241	82	79	80	1,508,364	66.8
Stratigraphic tests or service wells	17					
	258					

from Petroleum Information Denver, Colorado

identified as the Watton Canyon Member of Twin Creek at the rate of 128 barrels daily. The second well drilled at Lodgepole, immediately to the west of the field opener, produces from Nugget at 1,048 barrels of oil per day.

A second Pineview well flowed oil at a rate of more than 50 bbls an hour from a Cretaceous formation, and American Quasar Petroleum will complete the No. 4-4S Pineview. Production casing was set at total depth of 3,156 feet. The operator gauged oil in six minutes on a drill-stem test from 2,785 to 2,815 feet. On another test of Cretaceous at 2,823 to 2,913 feet, the well flowed 43 bbls of oil in 110 minutes with gas at the rate of 534,000 cubic feet per day. It is a northwest offset to the No. 4-3 Pineview, where oil flowed at the rate of 20 bbls an hour and gas at the rate of 1,973,000 cubic feet on a test of the Cretaceous sand at 2,940 feet. Colorado Energetics completed a new field discovery some 8 miles southwest of Pineview and about 2¼ miles south of Lodgepole field. The No. 33-11 UPRR, 11-1N-6E flowed 720,000 cubic feet of gas per day from the Kelvin Formation 5,955 to 5,985 feet. It was drilled to 15,015 feet in the subthrust Cretaceous. Pipe was set to 6,582 feet.

The discoveries on the Thrust Belt triggered oil and gas leasing all the way from Montana to southern Utah. The area of most leasing activity was in southwestern Wyoming and adjacent Utah and Idaho. The first involved hundreds of thousands of acres, mostly federal lands. Extensive leasing of private and state lands also proceeded at a brisk pace. Idaho, which does not have any oil production, suddenly found itself involved in a leasing boom and new drilling activity in its eastern

counties. Reports credited Amoco with 600,000 acres in Utah and Wyoming under lease and option. Holdings by Chevron include about 180,000 acres. Louisiana Land, Crest Resources, Rainbow Resources, Emery Coal, Republic Oil and Gas, and Altex Oil are among the companies with leases throughout the Thrust Belt.

Crest Resources, Salt Lake City, Utah, acquired some 600,000 gross acres in Utah and Idaho. Altex Oil, with about 700,000 acres under lease, holds some promising property to the north of Hogback Ridge. Hundreds of thousands of acres have been leased by other companies and lease brokers in all three states.

#### Major Pipeline Plans to Influence Thrust Belt Activity

Nearly 850 miles of new pipeline to move gas from the Rocky Mountain region to midwest and eastern markets are being planned by a group of gas companies under leadership of Natural Gas Pipeline Company of America and a subsidiary of the Columbia Gas System. The venture, to be known as the Trailblazer System, will cost more than a half billion dollars.

New supplies being developed in Wyoming, Utah, Idaho, Nebraska, and Colorado are to provide large volumes of gas for shipment eastward. Proven reserves from these areas are already committed to each of the participants, according to the chairman of Peoples Gas Company of Chicago, parent company of Natural Gas Pipeline. Announcement came at a meeting of the New York Society of Security Analysts in November.

The new line will include three segments, with some of it planned for operation as soon as late 1979. The longest part will extend 450 miles from a point near Beatrice, Nebraska, where it will hook up with the existing Natural Gas Pipeline main line from Amarillo to Chicago, to a junction near Cheyenne, Wyoming. This leg will be owned jointly by NGP and the Columbia subsidiary and will be operated by NGP.

A section in the middle, extending about 300 miles from Cheyenne to Green River in western Wyoming, will be owned and operated by Colorado Interstate Gas and will parallel the company's existing facilities. The western segment, about 100 miles long, will be owned jointly by all three companies and operated by CIG. It will extend westward from Green River to a point near the Ryckman Creek field, northwest of Evanston, Wyoming, then go south into Summit County, Utah to the area of the Anschutz Ranch discovery.

As a result of this expanding exploratory interest, one of the largest onshore speculative seismic programs ever is underway throughout this vast region. Surveys are being conducted by Harvey Seismic Services, Pacific West Exploration Co., Western Geophysical Corporation, Geophysical Service Inc., and others. The far-reaching play involves more than 4,000 line miles of seismic control. There are approximately 10 companies supporting the plans, ranging from independents to the major corporations.

Meanwhile, drilling continues along the producing end of the Thrust Belt in Wyoming and Utah. Chevron U. S. A. is continuing work in Uinta County, Wyoming at Painter Reservoir field and has apparent new pool discoveries in the Whitney Canyon area.

#### Uinta Basin

Phoenix Resources completed the No. 24-1 Antelope Ridge, 24-6S-5W, in Duchesne County, pumping 8 bbls of oil and 2 bbls of water per day from the Green River Formation at 4,832-4,852 feet. It was drilled to 5,692 feet and pipe was set to 5,674 feet. It is a northwest offset to the Burton-Hawks, Inc., discovery completed in 1976 flowing 1,154,000 cubic feet of gas and 170 bbls of water per day from Green River at 2,054 feet. Phoenix Resources also tested an indicated gas producer at the No. 22-1 Wolf Hollow, about two and a quarter miles west of the No. 24-1 Antelope Ridge. Gas flowed at an estimated rate of 500,000 cubic feet daily from 3,956-3,968 feet.

Gulf Oil scheduled 15 wildcats in the area of the W. A. Moncrief apparent discovery about 7 miles west-southwest of the town of Duchesne. The Moncrief 15-1 Gulf Tribal, 15 - 4S - 6W, was drilled to 13,062 feet and plugged back to 8,500 feet for tests through perforations, apparently in the Wasatch Formation. Moncrief's well was drilled without release of information. It is 3 miles south of Cedar Rim field. Moncrief also scheduled new wells in the general area.

About two miles west-northwest of Monument Butte field, Pacific Transmission Supply was conducting tests at the No. 44-36 State. The well was drilled to 7,120 feet and tests of a perforated interval, 5,636-5,652 feet, were underway. In Uintah County, Taiga Energy completed the No. 1 Rat Hole Canyon flowing 314,000 cubic feet of gas per day. It produces from Mancos shale (Cretaceous) at 4,166-4,532. Taiga completed the

1-L-23 Federal in the southeastern area of the county flowing 288,000 cubic feet of gas daily. It also produces from Mancos between 5,416 and 5,804 feet. It was drilled to 5,903 feet. Both wells are about 12 miles north of the San Arroyo gas field. Five new Mancos tests were scheduled in the vicinity by Taiga Energy. Belco Petroleum completed the No. 1-6E Eightmile Unit in western Uintah County. The discovery produced 6 bbls of oil and 1 bbl of water per day, and pumped an average of 12 bbls of oil per day through January. It is a little more than 5 miles southeast of Monument Butte field. Exxon completed the No. 1 Pine Spring Unit, 15-14S-22E, flowing 495,000 cubic feet of gas per day. It produces from Dakota between 9,126 and 9,192 feet.

The Uintah County region had heavy development activity centered in the Natural Buttes region throughout the year. There was also increased exploration in the area north of the White River between Ouray and Bonanza where Ensearch Exploration, Pacific Transmission Supply, and Continental Oil conducted several drilling programs. Chevron indicated it is anticipating between 50 and 60 more locations in the general Red Wash area in the near future. Exxon also increased its drilling program in the Walker Hollow area just north of Red Wash field.

#### Grand County

Continued development work in the Cisco and Cisco Springs vicinity was heavy during 1978. Anschutz Corporation completed a shallow pool discovery just southeast of an unnamed Dakota Formation discovery by the company, pumping 28 bbls of oil per day. The new well, the No. 2 Federal-258, produces from 2,536-2,618 feet. Total depth is 2,766 feet. The discovery well, the Anschutz 1 Federal-258, 5-18S-24E, was completed in 1977 pumping 80 bbls of oil daily from Dakota at 3,928 feet. Cisco Drilling & Development completed a deeper pool discovery well flowing 1,575,000 cubic feet of gas per day at the No. 1 Federal-Cisco. It produces from 2,190-2,214 feet. The success is a southeast offset to the operator's No. 3 Cisco-Federal, which flowed an estimated 600,000 cubic feet of gas per day from 1,859-1,877 feet.

Additional Grand County exploration was scheduled late in the year by Anschutz Corporation at the No. 14-23 Federal-4076, a wildcat well about 18 miles north-northwest of Cisco. It is to go to the Morrison Formation at about 6,400 feet. Carmack Drilling of Grand Junction has scheduled a 1,500-foot Morrison test about 14 miles west-southwest of Cisco.

### San Juan County

Superior Oil completed a confirmation well in the Rockwell Springs area pumping 20 bbls of oil and 10 bbls of water per day. The well is the No. 34-31 Navajo, producing from the Desert Creek Member of the Paradox Formation. Production casing was set to total depth of 5,488 feet. The field discovery, 34-42 Navajo-Tribal, was completed from the Desert Creek Member from 5,351-5,386 feet. A confirmation well was also completed for a calculated flow rate of 13,000,000 cubic feet of gas per day from the Leadville limestone (Mississippian) perforated in a net 124 feet between 9,048 and 9,421 feet. The Little Valley field discovery produces oil and gas from Mississippian. The producing area is 33 miles southeast of the town of Moab.

Another San Juan County discovery was the Sanchez-O'Brien Group, LeClair-Westwood No. 1 Navajo, 9-40S-25E. It was completed for 100 bbls of oil and 44,500 cubic feet of gas daily from Ismay. During 1978, it produced at an average rate of 119 bbls of oil per day.

### Basin and Range

Most significant work in the Basin and Range Province of western Utah during 1978 was the first "offshore" well drilled in the Great Salt Lake. The well was abandoned, and Amoco officials expressed disappointment at the lack of commercial success but were encouraged by the new information the well provided. Drilling confirmed structural interpretations derived from geophysical work conducted in 1973 and 1974. The initial well, 1 Indian Cove-State Unit, 23-7N-7W, Box Elder County, was drilled to a total depth of 12,470 feet in Precambrian basement which was topped at 12,416 feet. Three drill-stem tests in Tertiary intervals were tested through liner cemented at 9,624 feet. Deepest zone test, 9,400-9,450 feet, yielded 1,209 feet of salt water. Recovery on a test at 9,250-9,325 feet was 90 feet of water. The third perforated interval, 8,960-9,020 feet, yielded 620 feet of slightly gas-cut muddy water and 625 feet of muddy water.

The test well was drilled 7 miles offshore with a Parker Drilling Company rig mounted on a 90-by-180 foot barge anchored in approximately 30 feet of water. Location was about 8 miles southeast of Rozel Point and 35 miles northwest of Salt Lake City. The well took 136 days to drill at a cost of slightly more than \$8 million. The barge-mounted drilling rig was moved about 9 miles northwest to a second site. The second well, the Amoco No. 1 State of Utah-D, is programmed to at least 8,000 feet. It is approximately 5 miles southwest of

Rozel Point. Also in Box Elder County, Kenneth Luff drilled and abandoned a 4550-foot test near the north shore of the Great Salt Lake in 28-9N7W about 3 miles north-northeast of Rozel Point. Paleozoic rocks were topped at 4,385 feet.

In Juab County, Placid Oil planned to drill the 1 WXC Barton, a remote wildcat well about 13 miles south-southwest of Levan. The projected depth was not reported.

Cabot Corporation drilled the 1 Cedar City to 5,740 feet, total depth. The unsuccessful well is a mile and a half southwest of Cedar City.

Argonaut Energy abandoned the No. 1 Federal in west-central Utah's Millard County after drilling to 11,266 feet, total depth. The well penetrated an unexpected thick salt section. South of Nephi, Dixel Resources abandoned the No. 1 Gunnison-State at 15,833 feet, total depth. It was not cored or drill-stem tested.

### Wasatch Plateau

A very significant well located just west of the Wasatch Plateau region was the Hanson Oil and True Oil No. 1-A-X Moroni, 14-15S-3E, Sanpete County. The operators drilled to 21,264 feet, 522 feet short of the Utah depth record of 21,786 feet set at a CIG Exploration well in Summit County. The operators report that gas shows found in Cretaceous will be tested. First shows of gas were recorded at 11,744 feet, with the best zone indicated in a 50-foot interval between 11,784 and 11,835 feet in lower Ferron or upper Tununk. It is 21 miles west-southwest of gas production from Ferron in Clear Creek field and immediately southeast of the town of Moroni.

A deep test well is scheduled in the Gordon Creek area by Occidental Petroleum at the No. 1 Unit. It will go to Pennsylvanian at about 12,500 feet. Two wells in Gordon Creek field found reserves of carbon dioxide gas in Moenkopi (Triassic) but were never commercially produced. The field also has shut-in Ferron (Cretaceous) gas production. Oxy's drill site is about 6 miles north of the town of Hiawatha. Teton Energy will drill the No. 36-4 Haley's Siding about 8 miles west-southwest of Price, Carbon County. Objective is the Morrison Formation, expected at about 4,200 feet.

Champlin Petroleum plans an 18,500-foot wildcat in central Utah at the No. 23-17 Bennion Ridge, 11 miles northwest of Scofield in Utah County. It is 13 miles northwest of Clear Creek field.

### San Rafael Swell

Tiger Oil scheduled the No. 41-15 Tiger in 15-18S-7E, a projected 12,500-foot test to Mississippian, on the northwest side of the San Rafael Uplift in Emery County in August. It is in an undrilled township about four miles northwest of Orangeville. Energetics, Inc., scheduled the No. 14-18 Federal, a scheduled 3,990-foot Kaibab (Permian) test in Emery County's Last Chance area. It is about 20 miles south of Emery, approximately 7 miles northwest of Last Chance field. Energetics also scheduled a 2,850-foot test in southeastern Emery County at the No. 14-8 Federal, a mile east and northeast of Last Chance field. The company's 712-17 Federal, a test well scheduled in October, is 21 miles northeast of Torrey. It is scheduled to about 2,785 feet.

### Oil & Gas Leasing

An undisclosed amount of acreage on the Thrust Belt of Utah was part of an overall 763,000-acre spread acquired for \$9.5 million in company stock by Exxon USA in August from the Taurus Corporation of Casper, Wyoming. Most of the leases, approximately 583,000 acres, were reported to be in North Dakota's Williston Basin. Acreage reportedly covers several separate areas, substantially all the assets of the Taurus Corporation.

In early June, more than 182,500 acres in Millard and Juab counties were covered in filings with the federal land office in Salt Lake City. Lands covered an area along a 40 mile, northeast-southwest trend from 12S-6W in Juab County, to 19S-10-12W in Millard County. Marvin Wolf apparently touched off the new activity with applications on approximately 29,500 acres; Estelle Wolf filed on nearly 74,000 acres and Elaine Wolf filed on more than 79,000 acres.

Most significant announcement of the year came in September when Natural Gas Pipeline Company of America, a subsidiary of Peoples Gas Company, reported it had purchased from the Anschutz Corporation a 50 percent interest in a spread of some 7 million acres on the Thrust Belt in Arizona, New Mexico, Utah and Idaho. Terms were not reported. The pact does not involve the Anschutz holdings in the Pineview-Yellow Creek area of Utah and Wyoming.

Oil and gas lease sales were held during 1978 by the State Lands Division, Department of Natural Resources, and by the U. S. Bureau of Land Management. Ensearch Exploration paid \$4,200.00, \$52.50 per acre, for 80 acres on the east side of the Greater Altamont-Bluebell field in the Uintah Basin. Sohio Natural Re-

sources paid \$101.25 per acre for 791 acres within 2 miles west-southwest of Ashley Valley field, Uintah County at a State Lands oil and gas lease sale. Chorney Oil paid \$52.75 an acre for two 640-acre tracts about 6 miles south of the Natural Buttes area at a State Lands sale held in June. On the northwest side of Natural Buttes, Belco Petroleum paid \$280.79 an acre, a total of \$22,463, for 80 acres at a BLM sale in September. In another sale, Belco paid \$61.79 an acre for 640 acres 3 miles south of Natural Buttes.

### 1978 Completed Discovery Wells

#### Grand County

*Anschutz Corporation, No. 2 Federal -258, se se 5-18S-24E. PUMPED: 27 bbls of oil, 40 gravity (natural). PRODUCING ZONE: Mancos 2,536-2,618 feet. Mancos at surface. TOTAL DEPTH: 2,766 feet. MANCOS SHALLOWER POOL DISCOVERY. NEW UNNAMED FIELD. COMPLETED: June 11, 1978.*

Southeast of Anschutz's No. 1 Federal-258, nw se 5-18S-24E., completed 1977 pumping 80 bbls of oil daily from Dakota 3,928-3,945 feet. The new producing area is four miles east of shut-in Dakota gas production in Pear Park field and a similar distance south of Westwater field, which is producing from Castlegate and has produced from Dakota, Morrison and Entrada formations.

*Cisco Drilling and Development No. 3 Cisco Federal, ne nw 27-20S-23E. FLOWED: 1,575,000 cubic feet of gas per day. PRODUCING ZONE: Salt Wash Member of Morrison 2,190-2,214 feet, top at 2,186 feet. TOTAL DEPTH: 2,275 feet. SALT WASH DEEPER POOL DISCOVERY, NEW UNNAMED FIELD. COMPLETED: October 4, 1978.*

The new wells are about four miles north-northwest of the town of Cisco.

*Supron Energy, No. 26-21-23-1 Mobil, se sw 26-21S-23E. FLOWED: 129,000 cubic feet of gas and 36 bbls of water per day. PRODUCING ZONE: Salt Wash Member of Morrison 798-818 feet. TOTAL DEPTH: 1,130 feet. SALT WASH MEMBER OF MORRISON DISCOVERY, NEW UNNAMED FIELD. COMPLETED: December, 1978.*

The well was completed flowing 129,000 cubic feet of gas and 36 bbls of water per day through a 24/64 inch choke. It is a shallow Jurassic gas discovery 1½ miles southwest of the town of Cisco. It is 2 3/4 miles

south of a Salt Wash gas well in Cisco field.

#### San Juan County

*Sanchez-O'Brien; LeClair-Westwood, No. 1 Navajo, nw nw 9-40S-25E.* FLOWED: 100 bbls of oil, 40 gravity, and 45,000 cubic feet of gas per day. PRODUCING ZONE: Ismay, 6,034-6,050 feet, top at 5,904 feet. TOTAL DEPTH: 6,229 feet, plugged back to 6,173 feet. ISMAY DISCOVERY, NEW UNNAMED FIELD. COMPLETED: October 27, 1977.

The discovery was completed in 1977 but information was not released until March, 1978. Not counted as a 1977 discovery. It was put on production in November 1977 producing at an average rate of 199 bbls of oil daily. It is two miles north of the Greater Aneth area. Offsets were scheduled to the northeast and southwest and a test staked  $2\frac{1}{4}$  miles to the east.

#### Summit County

*Colorado Energetics, No. 33-11 UPRR, new se 11-1N-6E.* FLOWED: 370,000 cubic feet of gas per day. PRODUCING ZONE: Kelvin (Cretaceous) 5,995-5,985 feet, top at 5,232 feet. TOTAL DEPTH: 15,015 feet, in subthrust Cretaceous. Plugged back to 6,040 feet. KELVIN DISCOVERY, NEW UNNAMED FIELD. COMPLETED: September 4, 1978.

First drilling done in the township 8 miles southwest of Pineview field and  $2\frac{1}{4}$  miles south of Lodgepole field.

*American Quasar Petroleum, No. 26-1 Blonquist, se sw 26-2N-6E.* FLOWED: rate - 1,172 bbls of oil and 412,000 cubic feet of gas per day, 30/64 inch choke, 6 hours, PRODUCING ZONE: Watton Canyon Member of Twin Creek (Jurassic) 11,057-11,348 feet, top at 10,093 feet (Twin Creek). Total depth: 11,914 feet. Plugged back 11,869 feet. WATTON CANYON MEMBER OF TWIN CREEK DISCOVERY, NEW POOL, LODGEPOLE FIELD. COMPLETED: October 20, 1978.

Third pool established at Lodgepole field.

*American Quasar Petroleum, No. 34-1 Judd, se ne 34-2N-6E.* FLOWED: 1,046 bbls of oil per day. PRODUCING ZONE: Nugget 11,626-11,660 feet. Top at 11,625 feet. TOTAL DEPTH: 11,806 feet. NUGGET DEEPER POOL DISCOVERY, LODGEPOLE FIELD, COMPLETED: March 1, 1978.

The Nugget pool opener is  $\frac{1}{2}$  mile west of Ameri-

can Quasar's No. 35-1 UPRR, se nw 35-2N-6E, a Twin Creek oil well that opened Lodgepole field. The area is 3 miles southwest of Quasar's Elkhorn field Twin Creek discovery and 6 miles southwest of Pineview field.

*American Quasar Petroleum, No. 1 Newton Sheep Co., ne se 4-2N-7E.* FLOWED: rate - 1,266 bbls of oil, 702,000 cubic feet of gas per day, 40/64 inch choke, 4 hours. PRODUCING ZONE: Stump sandstone (Jurassic) 5,997-6,012 feet. OWWO. NEW POOL DISCOVERY, PINEVIEW FIELD. COMPLETED: October, 1978. (OWWO = Old well worked over)

The well is the Pineview field discovery well completed in 1975 flowing 533 bbls of oil and 250,000 cubic feet of gas per day from Nugget at 9,928-9,936 feet.

*Anschutz Corporation, No. 34-1 Anschutz Ranch, nw se 34-4N-7E.* FLOWED: 34,900,000 cubic feet of gas, 875 bbls of condensate per day, 48/64 inch choke. PRODUCING ZONE: Twin Creek 6,981-7,677 (gross) feet, top at 6,446 feet. TOTAL DEPTH: 9,000 feet. TWIN CREEK DISCOVERY, NEW UNNAMED FIELD. COMPLETED: October 18, 1978.

Flowed gas from 6 intervals within a near 700-foot section of the Twin Creek formation. It is 7 miles north of Pineview field and about 13 miles southwest of Wyoming's Yellow Creek field.

*American Quasar Petroleum, No. 4-4S Pineview, se se 4-2N-7E.* FLOWED: 360 bbls of oil and 405,000 cubic feet of gas per day from Cretaceous sand. TOTAL DEPTH: 3,156 feet. PRODUCING ZONE: 2,784-2,832 and 2,862-2,882 feet. CRETACEOUS DISCOVERY, SHALLOWER POOL PINEVIEW FIELD. COMPLETED: December 8, 1978.

The shallower pool discovery is a northwest offset to the American Quasar No. 4-3 Pineview, se se 4-2N-7E where oil and gas flowed on a test of Cretaceous sand. That well is to be completed in Twin Creek, the established pay sand in the field.

#### Uintah County

*Belco Petroleum, No. 1-6 Eightmile Unit, nw ne 6-10S-18E.* SWABBED: 6 bbls of oil per hour, 40% water cut, PRODUCING ZONE: Green River 4,234-4,248 feet, top at 1,780 feet. TOTAL DEPTH: 7,995 feet, plugged back to 4,473 feet. GREEN RIVER DISCOVERY, NEW UNNAMED FIELD. COMPLETED: October 23, 1977.

The well was completed in 1977 but information was not released until March, 1978. Not counted as a 1977 discovery. It produced an average of 24 bbls of oil and one bbl of water per day in November, 1977 and an average of 12 bbls of oil per day through January 1978. It is a little more than 5 miles southeast of Monument Butte field and 4 miles northwest of Uteland Butte field.

*Exxon USA, No. 1 Pine Spring Unit, ne sw 15-14S-22E.* FLOWED: 495,000 cubic feet of gas per day. PRODUCING ZONE: Dakota 9,126-9,192 feet, top at 9,109 feet. TOTAL DEPTH: 9,700 feet. DAKOTA DISCOVERY, NEW UNNAMED FIELD. COMPLETED: January 21, 1978.

The Pine Spring Unit discovery well is 2¼ miles east of a Wasatch oil and gas well in sw ne 17-14S-22E. It is 4½ miles southeast of Seep Ridge field.

*Exxon USA, No. 1 Crooked Canyon, nw ne 20-14S-23E.* FLOWED: 143,000 cubic feet of gas per day, 48/64 inch choke. PRODUCING ZONE: Dakota 9,016-9,142 feet (gross). TOTAL DEPTH: 9,728 feet, plugged back to 9,291 feet. DAKOTA DISCOVERY, NEW UNNAMED FIELD. COMPLETED: January 12, 1978.

*Taiga Energy, No. 1-L-23 Federal, sw ne 23-14S-24E.* FLOWED: 288,000 cubic feet of gas per day, 19/64 inch choke. PRODUCING ZONE: Mancos B, 5,416-5,804 feet (gross), top at 5,415 feet. TOTAL DEPTH: 5,903 feet plugged back to 5,855 feet. MANCOS 'B' DISCOVERY, NEW UNNAMED FIELD. COMPLETED: April 14, 1978.

The well is 3½ miles southwest of a Mancos gas discovery drilled by Taiga in nw se 8-14S-25E. That well flowed 314,000 cubic feet of gas per day from 4,166-5,532 feet. The Mancos discoveries are about 12 miles north of San Arroyo gas field.

*Taiga Energy, No. 1 Rat Hole Canyon, nw se 8-14S-25E.* Flowed: 314,000 cubic feet of gas per day, 32/64 inch choke. PRODUCING ZONE: Mancos 4,166-4,532 feet. Mancos top at 2,852 feet. TOTAL DEPTH: 4,950 feet, plugged back to 4,878 feet. MANCOS DISCOVERY, NEW UNNAMED FIELD. COMPLETED: November 19, 1977.

Although the well was actually completed in 1977, information was not released until March, 1978. Not counted in 1977 discoveries. It is 12 miles north of San Arroyo gas field.

## 1978 Apparent Discovery Wells\*

## Carbon County

*Pacific Transmission Supply, 21-22 Federal, ne nw 22-12S-15E.* COMPLETED: 12-12-78. IPF 178 MCFGPD, 36 BWPD. PRODUCING ZONE: Mesaverde 6,818-6,936 feet, top at 6,432 feet. TOTAL DEPTH: 7,000 feet. Plugged back to 6,953 feet. (Completion data reported 1-11-79). (MCFGPD = million cubic feet of gas per day; BWPD = barrels of water per day).

## Duchesne County:

*W. A. Moncrief, No. 15-1 Gulf Tribal, ne ne 15-4S-6W.* Confidential test well. TOTAL DEPTH: 13,062 feet. Plugged back to 8,150 feet.

Fifteen additional well-site locations staked in vicinity 6 to 12 miles southwest of Duchesne.

*Pacific Transmission Supply, No. 44-36 State, se se 36-8S-15E.* TOTAL DEPTH: 7,120 feet. Testing 4,635-5,562 feet.

The well is 2 miles west-northwest of Monument Butte field,, Green River (Eocene) oil and gas production.

*Pacific Transmission Supply, No. 32-29 PTS-Federal, sw ne 29-8S-17E.* TOTAL DEPTH: 14,245 feet, plugged back to 6,600 feet. Testing 6,322-6,370 feet. COMPLETED: 10-2-78. IPS 15 BO, 6 BWPD.

The well is 1 3/4 miles northeast of Monument Butte field, 7 miles south of Myton. (Completion reported 1-11-79).

## Garfield County

*Shell Oil, No. 1-10A Harvey-Federal, nw nw 10-32S-1E.* TOTAL DEPTH: 8,728 feet. Waiting on completion equipment.

A remote exploratory well originally projected to Elbert (Devonian) 24 miles north of Kaibab (Permian) oil production in Upper Valley field, 9 miles east of Antimony.

## Rich County

*Amoco Production, No. 1 Deseret, nw nw 4-6N-8E.* TOTAL DEPTH: 15,160 feet. Testing zones, not identified. The Thomas Canyon area well is 5 miles northwest of Wyoming's Yellow Creek field and about the same distance northwest of Evanston.

\*Wells carried in progress reports not officially completed as of December 31, 1978.

## Sanpete County

*Hanson Oil and True Oil, 1A-X Moroni, se nw 14-15S-3E. TOTAL DEPTH: 21,264 feet. Plugged back for tests of Tununk (Cretaceous) at about 11,744 feet. The well is 21 miles west-southwest of gas production from Ferron in Clear Creek field. It is just southeast of Moroni.*

## Uintah County:

*Gulf Oil, No. 1 Uinta Test, nw ne 16-8S-21E. TOTAL DEPTH: 1,741 feet, plugged back to 1,695 feet. PRODUCING ZONE: Uinta, 1,548-1,586 feet. Shut-in.*

Gulf has 3 wells in the southwest portion of Great Red Wash field where production is from Green River.

*Continental Oil, No. 34-2 Conoco-Mountain Lion, ne se 34-8S-21E. TOTAL DEPTH: 10,250 feet, plugged back to 10,210 feet. Testing, unidentified zone.*

*Coseka Resources, No. 1 Dry Burn Unit, nw se 29-13S-25E. TOTAL DEPTH: 5,796 feet. Testing, unidentified zone.*

The well is on the 24,921 acre unit approved in March, 1978 which is operated by Pacific Transmission Supply Co.,

*Coseka Resources, No. 1 Sweetwater Canyon, sw nw 14-14S-24E. TOTAL DEPTH: 6,026 feet. Waiting on completion equipment.*

The well was formerly operated by Taiga Energy. It is a mile north of the operator's Mancos gas discovery in sw ne 23-14S-23E. That well was completed for 188,000 cubic feet of gas per day from Mancos between 5,416 and 5,804 feet.

*Coseka Resources, No. 14-16 Main Canyon Unit, ne nw 16-15S-23E. TOTAL DEPTH: 9,000 feet (approx.) Testing unidentified zone.*

The well, in the southern Uinta Basin, is 4 miles north-northeast of Fence Canyon field.

## UTAH MINERAL OPERATIONS

## Asphalt products

Asphalt companies in Utah report about 100,000 tons of asphalt valued at nearly \$8 million were pro-

duced in the state during 1978. Sales were mostly for road oil and paving material with lesser amounts for roofing and other miscellaneous uses.

## Beryllium

Brush Wellman Inc., operator of the only operating beryllium extraction plant in the free world, commenced operation of a new extraction section of their plant at Delta, Utah during the year. The facility processes Utah bertrandite ore and beryl from many areas of the world.

Actual production and value figures for production of beryllium have been withheld by the company. Trends in production and consumption of beryllium ores in 1978 were unchanged from those of 1977, according to the Bureau of Mines.

## Brick

Interstate Brick Corporation added a multi-million dollar kiln and manufacturing facility to its West Jordan plant, designed to increase production capacity by 56 per cent. The unit, 20 feet wide and 400 feet long, is one of the widest in the United States and will produce 40 million bricks annually. Interstate's Salt Lake County Cottonwood clay pits are in the Big Cottonwood mining district. Clay, fireclay and quartzite are produced from the Circle "M" properties. The firm also produces quartzite from properties located in Murray, and clay from the Smokey Joe open pit and Long Canyon and Powell clay pits in the North Tintic district of Utah County.

## Cement

Severe shortages of cement first developed on the West Coast in late 1977 and as the 1978 construction season started shortages spread to the Great Plains and Midwest. The demand for cement in Utah exceeded the area's annual production capacity. Low inventory levels were caused by an unusually moderate winter which extended the construction season. Transportation, labor, and plant operating problems also curtailed cement supplies.

Finished portland cement was produced by Portland Cement Company from its Parley's Canyon properties. The company operates a limestone and shale quarry in Parley's Canyon and has a Salt Lake City plant.

Cement is also produced by Ideal Basic Industries

Inc., at the Devils Slide quarry in Morgan County. The facility, with an annual capacity of 360,000 tons, is a wet process, two-kiln plant.

Estimates place Utah production near 630,000 tons during the year. The Bureau of Mines lists 162 plants in 40 states which produced 79.1 million tons of portland cement during 1978.

#### Clay and Shale

Output of common clay and shale in Utah rose from 1977's 244,000 tons to 246,000 tons in 1978. It was worth \$777,000, a value increase over 1977's \$713,000. Nationally, output rose six per cent to 56 million tons an all time high. Improved construction rates resulted in increased demand for construction materials in Utah (brick, lightweight aggregate, vitrified clay pipe, clay floor and wall tile, etc.) all manufactured from common clay and shale. The leading 8 firms in Utah produced from 14 properties.

#### Coal

Seventeen coal companies operate some 30 mines in Utah. In addition, a surface mining facility is operating in south-central Utah.

According to figures released by the Utah Industrial Commission in early 1979, 1978 coal production reached a total of 9,252,802 tons. Original estimates of 10 million tons by the UGMS were prior to full assessments of the 1977-78 strike and its impact as well as the severity of problems that were encountered during the year within the steel industries.

Utah's increase in coal production is due to the electrical power market demand. In 1970, only 18.4 percent of Utah coal was used to generate electricity. The best estimates indicate this figure was 60 percent of annual production in 1978.

In September, 1978, BLM offered the first coal lease in Utah in 4 years. Swisher Coal Company was the high bidder at \$125 per acre for 440 acres in the Huntington Canyon area. The offering resulted from a compromise between parties in a June lawsuit brought by the Natural Resources Defense Council which had stopped issuance of coal leases by the U. S. Department of Interior. BLM estimates about 3.3 million tons of coal will be mined from the lease. Swisher Coal is owned by General Exploration Company, Dallas, Texas. During 1978, four mines were operating and produced approximately 470,000 tons of coal. The company employs 160 miners. A fifth mine is planned for production in 1979

in the upper Huntington Canyon.

In October, 1978, Coastal States Energy was high bidder at a BLM sale with bids of more than half-a-million dollars to mine coal on federal land in Sevier County. The company submitted three bids of \$26.75, \$112.56 and \$227.37 per acre. Their high bid on 2,632 acres totaled \$598,433.29. Other bidders were Joe Lyon Jr., Salt Lake City, \$66.66 per acre (for a total of \$175,449.12); Monolith Portland Cement Company, Glendale, California, \$32 per acre (\$84,224), and Emery Coal, Inc., Salt Lake City, \$31 per acre (\$81,592). Deposits on the Coastal States lease are limited to the upper Hiawatha coal seam which contains about 13,700,000 tons of recoverable coal. The area is within the boundaries of the Manti-LaSal and Fishlake National Forests.

Additional coal lease offerings in Utah are contemplated by the BLM within the next few months. 476.41 acres in Carbon County (Kaiser Steel Corporation, applicant), 40 acres in Emery County (John Bell, applicant), 1,172.77 acres in Carbon County (Braztah Corporation, applicant) and 120 acres in Carbon County (Kanawha-Hocking, applicant).

Coastal States Energy Company, subsidiary of Coastal States Gas Corporation, announced signing of a 22-year agreement with the Sierra Pacific Power Company of Reno, Nevada to supply 17.5 million tons of low-sulfur coal to Sierra Pacific's Valmy, Nevada electric generating plant. The coal is to come from Coastal State's Southern Utah Fuel Company mine near Salina. The agreement represents sales revenue in excess of \$240 million at current price levels. Railroad deliveries of coal are scheduled to start in July, 1981. The Southern Utah Fuel mine produced more than a million tons of coal in 1978 and expansion operations were underway to increase production. During August, Coastal States Energy officials announced an agreement with Energy Fuels Corporation and Routt County Development, Ltd., to acquire approximately 6,400 acres of federal coal leases in Carbon and Emery counties known as the McKinnon properties. They are located west of Clear Creek, astride Carbon, Emery and Sanpete county border lines. Coastal disclosed plans to develop underground mines on the properties where potential production capacity is estimated to be more than 5 million tons of low sulfur steam coal annually. The cost of initial development mines under consideration would be in excess of \$65 million, with production scheduled to start in 1982. Estimates by two independent engineering firms placed total reserves of coal under the leases at approximately 300 million tons in seams ranging from 4

feet to more than 25 feet. Recoverable reserves from three major seams are estimated at more than 100 million tons. Based on core samples, the coal has a gross heating value of about 12,000 btu per pound and contains approximately 0.5% sulfur.

California Portland Cement Company's coal subsidiary, Soldier Creek Coal Company, employs 115 people at its Soldier Canyon mine 25 miles east of Price. During 1978 production was near 510,000 tons. Coal is shipped to the company's cement factories at Colton and Mohave, California and Rillito, Arizona. A property in Emery County was recently acquired and California Portland is developing it for opening in 1981. It is to be known as the Hidden Valley mine.

McCulloch Oil, through its subsidiary Braztah Corporation, operates underground coal mines and related facilities in the Spring Canyon, Castle Gate, and Kenilworth area of Carbon County. Coal, from the Nos. 3 and 5 mines during 1978, was shipped by unit train to eastern power plants owned and operated by American Electric Power Company, Inc. Braztah employs over 500 people at its Utah operations.

The Trail Mountain Coal Company's Trail Mountain properties in the Huntington area, Emery County, produced slightly more than 23,000 tons of coal in 1978. It is owned and operated by the Fetterolf Group of Somerset, Pennsylvania.

Kaiser Steel Corporation continued expansion programs from its Sunnyside mines in Carbon County. The firm produced more than 500,000 tons of coal during the year with continuous miner and long wall mining equipment. Nearly all of its production is shipped to the Fontana Steel mill in Fontana, California. Kaiser has 430 people employed at its mines. The original Sunnyside mine was opened in 1898 and was followed by the operation there in 1902 of the largest beehive coking plant in the U. S. under one supervision. The ovens were closed in 1958.

U. S. Fuel Company operates the No. 4 and 5 King mines in Carbon County near Hiawatha southwest of Price, with about 300 employees. Coal is mined by six continuous mining machines, currently from two seams in a multi-seam formation.

The American Coal Company awarded a contract to the Industrial Sales and Marketing Corporation for construction of a railroad siding at its Wilberg mine near Orangeville. The mine supplies coal to Utah Power and Light Company. Work on the \$200,000 project was

started in November. The Wilberg mine produced 244,287 tons of coal in 1977 and approximately 460,000 tons in 1978. American Coal has nine mines and employs some 1,100 people. Nearly 2.5 million tons of coal were produced in 1978.

The Utah Public Service Commission in November gave permission for Utah Power & Light Company to build two 400,000 kilowatt coal-fired generators at a cost of about \$667 million. The two units are scheduled for operation in 1983 and 1985 and will bring total capacity of the utility's Hunter plant in Emery County to 1,600 megawatts.

Utah Resources International, Inc., Salt Lake City, and Phelps Dodge Corporation, New York, filed with the Governor's Interagency Power Plant Siting Task Force early in the year, an application to construct a 400-megawatt coal-fired power plant near Escalante. The Garfield Power Project, about 10 miles south of Escalante, near Carcass Canyon, would be a mine-mouth operation, inasmuch as the two firms have approximately 70,000 acres of state coal leases in the region. In November, The Sierra Club filed suit in U. S. District Court seeking to force the Interior Department to use its water rights to protect recreation and scenery in southern Utah. The immediate target of the suit was the planned Garfield Power Plant project. Officials of the Sierra Club stated that energy projects proposed for the area were actively seeking a significant portion of the flow of the Escalante River. The Club said the area should be given the protection of official wilderness designation.

Utah Coal and Chemicals Corporation executed an agreement with C&W Coal Producers Corporation to explore for and mine coal on 920 acres owned by Utah Coal and Chemicals in the Helper-Price area of Carbon County, during December. C&W Coal Producers are to be the operators of the properties and are to develop the properties as a workable productive mine. Under the agreement, C&W will invest up to \$1 million to explore and place in production. After re-payment of the initial investment, Utah Coal and Chemicals will receive 40 percent and C&W will receive 60 percent of the proceeds from the coal sales.

The Atlas-Dirty Devil Mining Company, operating from Green River, started its first trainload of coal from its loading facility in the area during November. Coal is being shipped to Nevada Power Company. The unit-train consists of some 70 carloads, each carrying about 120 tons of coal. Coal is mined at the properties 25 miles northwest of Hanksville and trucked to Green

River. C&C Coal Ltd., a West Virginia firm is contractor on the operation.

Non-Ferrous Metals:  
Copper, Gold, Lead, Silver and Zinc

Total production value of metals was \$465 million, a 10 percent increase over 1977. Copper production increased nearly 7 percent. Substantial gains were made in production of molybdenum and gold. Lead and zinc production decreased considerably as a result of the shutdown of the state's two lead-zinc mining operations. There was also a substantial decrease in silver production although the dollar value remained high.

In mid-1978 the Utah Copper Division of Kennecott Copper Corporation shut down the last of its old reverberatory furnaces at its smelter near Magna, and completed the conversion from conventional smelting to the Noranda (semi-continuous) smelting process. Most of the gases emitted from the three new Noranda reactors and the copper converters are treated in sulfuric acid plants to recover sulfur dioxide. All emissions from the smelter are now discharged through the new 1,200-foot stack which replaced the two 400-foot stacks previously used. Kennecott's smelting process plant and pollution control systems cost in excess of \$280 million.

Development of the underground mine and concentrator at Carr Fork, about 25 miles west of Salt Lake City, continued on schedule by the Anaconda Company. The mine is to produce ore with an average grade of about 1.8 percent recoverable copper. Production is scheduled to start in late 1979, building to 60,000 tons of copper per year as market conditions warrant.

5-M Incorporated, Hurricane, Utah, filed an application for open pit and underground copper and silver mining and milling operations in Washington County with the Division of Oil, Gas and Mining during the year. Approval was given for their operations at Silver Reef, located in the Leeds area, about 12 miles northeast of St. George.

The lead-zinc mining and milling operations at the Park City Ventures Ontario mine in the Park City district, Wasatch County, closed in early 1978. The closure affected about 350 mine and mill workers. A company spokesman said that high costs caused by water and rock problems forced the shutdown. Park City Ventures, a 60-40 joint venture of the Anaconda Company and Asarco, Inc., had been operating the mine under lease from United Park City Mines Company since 1971.

Utah's last remaining lead-zinc mining operation, Kennecott's Tintic Division Burgin mine near Eureka, closed in July 1978. Kennecott leased the Burgin property from Chief Consolidated Mining Company and the Tintic group, composed of South Standard Mining Company, Eureka Standard Mining Company and Ama-Arizona, Inc. The Burgin mine has yielded substantial production since Kennecott began operations in 1963, but a diversity of problems including large volumes of hot brackish water, internal heat, and unstable ground conditions made mining unprofitable, particularly with current depressed zinc prices. Kennecott's operations continue at the Trixie mine, a profitable gold and silver producer in the same general area. The company retained possession of its 750-ton-per-day mill and has made it available for treating ores from lessee operations in the district.

The U. S. Bureau of Mines reports that Utah produced 241,000 ounces of gold in 1978. Utah ranks fourth in production of silver in the United States.

#### Fluorspar

Fluorspar production from mines in Juab County has declined considerably in the past few years. No figures are available.

#### Gem Stones

Gem materials are produced in Utah by both amateur and professional collectors. The gem industry, for the most part, is operated by individuals, rather than by large companies. For this reason, production information is incomplete, and the location of individual deposits is often vague. The Bureau of mines places a value of \$100,000 on gem stone production in the state during 1978.

#### Geothermal Energy Resources

Important but largely undeveloped geothermal energy resources exist throughout Utah. The most significant to date are those located in the Roosevelt Hot Springs region northeast of Milford in Beaver County. Here, groundwater at temperatures greater than 240°C (465°F) has been found by Phillips Petroleum. It is anticipated that the Roosevelt Springs region may ultimately produce 500,000 kilowatts or more of electrical power. Plans for construction of the first power plant in the area were announced early in 1978 by Rogers International of San Francisco. The power is to be purchased by Utah Power and Light Company.

During 1978, O'Brien Resources, Amax Explora-

tion Company, Thermal Power Company and the VTN Corporation announced plans for a joint venture to establish a 55-megawatt geothermal power plant in the Roosevelt Hot Springs area, to be in operation by 1982. The U. S. Department of Energy sponsored \$12 million loan is jointly funded by the Bank of Montreal (California) and by an institutional investor arranged by Merrill Lynch, Pierce, Fenner & Smith, Inc.

Phillips Petroleum remained active in 1978 with its drilling program in the Roosevelt area. Getty Oil did additional exploration work in the region. Mountain States Resources Corporation, Salt Lake City, announced it had acquired a 1,945 acre tract near Roosevelt, adding to its interests on some 12,000 acres in Sevier County.

#### Gilsonite

The Division of Oil, Gas and Mining approved a gilsonite permit in Uintah County for Ziegler Chemical & Minerals Corporation, to open an underground modified open stope mine at their Ute-32 gilsonite mine in sec. 32, T. 11S., R. 25 E., in the Evacuation Creek area some 50 miles southeast of Vernal.

About mid-year, American Gilsonite Company announced construction plans for a new processing plant at their Bonanza properties. Facilities are to be consolidated and replaced at an estimated cost of about \$3,500,000. A new processing plant is designed to clean, dry, pulverize, screen and package raw gilsonite and prepare it for shipment to various markets.

#### Gypsum

There were 318,000 tons of gypsum produced in Utah during 1978, valued at \$1,969,000. This is a slight decrease from that recorded in 1977 of 324,000 tons.

The two largest gypsum operations in Utah are by U. S. Gypsum and Georgia Pacific Corporation, in Sevier County. There is also a gypsum open-pit near Nephi, Juab County; a mill located in the White Mountain area near Fillmore, Millard County, and deposits in the Levan area of Sanpete County.

#### Iron Ore

Iron ore production reached 2,040,000 tons, the highest since 1965's 2,139,000 tons. Value for 1978 was \$22,513,000. Almost all of Utah's iron ore production is from the Iron Springs district west of Cedar City in Iron County.

Currently, three major producers are operating in Iron County. CF&I Steel Corporation is owner of the Comstock, Duncan and Blowout mines within the Pinto district and the McCahill-Thompson and Alluvial properties in the Iron Springs area. United States Steel Corporation operates the Desert Mound and Mountain Lion mines, and Utah International Inc., operates the Black Iron, Wilson, Iron Apex, Great Western, Excelsior group, Smith & Pittsburgh et al, and the Lindsay Hill mines.

#### Lime (Limestone)

Plans for a 500-ton-per-day quick lime plant south of Delta in Millard County were announced by Steel Brothers Canada, Ltd., of Vancouver, B. C., Canada. The plant will produce quick lime principally for use in flue gas scrubbers at powerplants and other industrial plants. Limestone ore for the plant will be mined by open pit from a deposit 6 miles to the west in the Cricket Mountains. Construction on the \$7 million plant will begin in 1979 and start up is expected in 1980. The firm initially will employ 28 at the mine and lime plant. The Canadian Company's operation in Utah will be handled by its subsidiary Continental Lime, Inc., of Utah.

Drilling was started for limestone and allied material for a possible new cement plant near Learnington in Millard County during the year. The Martin Marietta Corporation contracted with Stansbury Mining Corporation, Salt Lake City for building of a 400,000 ton annual capacity cement plant employing about 50 people. The contract provided that Martin Marietta would do the drilling and engineering phases on the property to determine the extent of the deposits.

The Division of Oil, Gas and Mining approved an application made by Mountain Maid Inc., for a surface lime mining operation about 15 miles west of Delta, Millard County. The mine will be named Last Chance and is in sec. 20, T. 17 S., R. 10 W.

Utah Marblehead Lime Company announced construction of a \$1.1 million pollution control facility at its Tooele plant in the Lakeside mining district. The facility is designed to improve the collection of particulate matter from its limestone operations. Utah Marblehead Lime is a subsidiary of General Dynamics Corporation, a Chicago based firm.

Lime production in 1978 increased in Utah from 209,000 tons in 1977 to 220,000 tons valued at \$8,090,000.

### Magnesium Compounds

Two of the nation's four producers of primary magnesium metal, NL Industries, Inc., Rowley, Utah and the Great Salt Lake Minerals & Chemical Corporation of Ogden, are located in Utah. Both produce magnesium compounds, primarily for basic refractories, from the Great Salt Lake brines.

### Molybdenum

Molybdenum is produced by Kennecott Copper Corporation as a byproduct recovery from copper ore at Bingham. Although production information is not released by Kennecott, industry sources say about 6.5 million tons of concentrate are produced yearly.

During 1978, Phelps Dodge Corporation announced the discovery of a molybdenum prospect in Beaver County. Four drill holes encountered molybdenum mineralization of 0.29 percent to 0.38 percent at depths of 3,000 to 5,000 feet. An agreement was signed with Getty Oil and North American Exploration to form the Pine Grove Association, for joint exploration and evaluation of the property. The planned mining operation will be by underground methods.

The Utah Mining Association reported that Moly Minerals, a newly-created exploration company, was beginning drilling programs on claims at Cherry Creek, west of Eureka, in the West Tintic district. E. J. Long-year Company is under contract to do the work.

### Oil Shale Projects

Near the close of 1978, TOSCO Corporation (formerly the Oil Shale Corporation) Los Angeles, received permission from the Utah Division of Oil, Gas and Mining to sink a 12 foot-diameter, 2,400 foot shaft on its Sand Wash project properties 35 miles south of Vernal. TOSCO has leases on 5 tracts of State of Utah land totalling 14,688 acres. The company is in the second year of an 8-year plan under terms of a unitization agreement with the State of Utah to prepare the leases for eventual commercial development. Initial field work will take 18 months to 3 years and will be followed by experimental mining. About 8 acres of one lease will be taken up by the operation, mostly to stockpile the mined rock. Shale samples are to be sent to TOSCO's research center at Golden, Colorado where a pilot plant will extract oil. The company has an above-ground process called TOSCO II for processing shale at the Golden plant. TOSCO estimates a 47,000-barrel-per-day plant processing 66,000 tons per day of raw

shale will cost about one billion dollars. The proposed plant will employ six 11,000-ton per day modules along with other equipment to extract petroleum liquids, crude shale oil, gases and by-products from crushed oil shale rock. The plant cost also includes utilities, facilities for product storage and loading, and disposal of spent shale (the rock residue left after the oil is extracted).

Environmental studies are now being conducted at the Sand Wash Project site to acquire information for the environmental impact statement for the commercial scale plant. Environmental studies include information on re-vegetation of spent shale, meteorology, air quality, water resources and surveys of flora and fauna. TOSCO has established a field headquarters in Vernal for the operation.

The Laramie Energy Research Center is investigating modified in-situ techniques on shale in thin beds located deep underground in the Cowboy Canyon area, 5 miles southeast of Bonanza. An 80 foot thick bed crops out in the canyon 500 feet below the rim. The Research Center will mine horizontal retorts after removing part of the ore. A vertical shaft could be used to gain access to deep beds that are not exposed.

Geokinetics Inc., Concord, California has produced nearly 5,500 barrels of oil from oil shale deposits in the past two years and trucked crude to the Plateau Refining Company's refinery in Roosevelt for processing. The company uses an in-situ method of extraction adapted to thinner beds of high grade shale lying close to the surface. A hole is drilled in the overburden down to the shale and then subsurface explosions are set off to break up the shale in the 'retort' area. Holes at either end of the retort permit air to pass through the fractured shale bed. Combustion is started at the "air intake hole" and heat from the burning shale causes a release of oil from adjacent broken shale. The oil flows to the bottom of the retort and is pumped up a well drilled for that purpose. The overburden ranges in thickness from 30 to 100 feet. To date retort areas have been relatively small, the largest being 120 feet wide by 150 feet long. New methods are being applied to create a 200 x 200 foot retort area which would be more commercial. The operation, employing an average of 30 employees, is south of Vernal in the Book Cliffs area and is funded by the U. S. Department of Energy.

### Perlite

Two companies in Utah, the Pax Company of Salt Lake City and the Georgia-Pacific Corporation's Gypsum Division at Sigurd, are presently producing perlite.

A surface mining notice of intent was filed with the Division of Oil, Gas and Mining for operations to mine perlite, to be called the Cudahy Mine about 40 miles southwest of Delta, east of Black Rock. Mountain Maid, Inc., Fillmore, filed the notice for sec. 3, T. 24S., R. 9W., in Millard County.

#### Potash

The U. S. Bureau of Land Management approved Buttes Resource's permits covering 51,157.58 acres for potash prospecting some 18 miles north of Moab west of the Canyonlands Airport. Buttes' test holes drilled on the acreage during 1978 were being evaluated and feasibility studies were being conducted.

Texasgulf, Inc. installed a scrubber to remove potash fines from their dryer stack at their Cane Creek plant facility west of Moab. About 99 percent of the dust in the stack is removed by the unit. Potash recovered by the scrubber is expected to pay for about 90 percent of the power used to run the scrubber.

A fire in Kaiser Aluminum & Chemical Corporation's concentrator at its Bonneville Ltd plant, Silver Islet mining district near Wendover, caused a shut-down in September. Reconstruction was underway at yearend and the plant was expected to be operational by March, 1979.

#### Pumice (volcanic cinders)

Millard County's operations yielded total pumice supply for Utah in 1978. Volcanic cinders were the main product. Utah Pumice Company operates the Stone King, Feather, Rock and other properties northeast of Black Rock; Fillmore Products Inc., produces their Red Dome and New Discovery properties west of Fillmore, and Ed Nelson operates pits in the Fillmore vicinity.

#### Salt

Salt production was 898,000 tons, valued at \$13,421,000. This was an increase over the 843,000 tons of 1977.

Great Salt Lake Minerals & Chemicals Corporation began construction of a new salt plant at Ogden. The facility will triple the company's present volume of processed salt, and allow for an expanded product line, upon completion in 1979.

#### Sand & Gravel

Approximately 70 sand and gravel operations in Utah produced nearly 12 million tons of assorted

industrial and construction products valued at slightly more than \$20 million during the year.

Late in the year, Fogle Red-E-Mix Company announced the purchase of the Salt Lake Valley Sand and Gravel Company for approximately \$2.1 million. At the same time, expansion plans were announced to include some \$50,000 in expenditures for new equipment and operation lines on acquired sites, including construction of a concrete pick-up terminal in the southern area of Salt Lake County.

A new operation started in Garfield County. Consolidated Mining & Milling Company, Orem, filed the notice with the Division of Oil, Gas & Mining. Pits are in the Escalante area.

#### Selenium and Tellurium

Although production figures are not reported, Kennecott Copper Corporation's refinery at Magna produces selenium as a by-product from processing electrolytic copper refinery slimes to recover gold and silver. Tellurium is also recovered from these slimes by additional processing.

#### Stone (Crushed & Dimension)

Both crushed and dimension stone production in the state during 1978 were about the same as in 1977. In 1978, 2,780,000 tons of crushed stone and approximately 6,000 tons of dimension stone were produced. 1977's production was 2,765,000 tons of crushed stone and 6,000 tons of dimension stone.

Five companies quarried dimension stone; leading companies were Star Stone Inc., from properties in Box Elder County, and W. H. Hansen Stone Quarries, Inc., from Summit County properties.

Ten companies crushed stone at 24 quarries for cement (38%), fluxstone, rip-rap, and other uses. U. S. Steel Corporation, Ideal Basic Industries, and Utah Portland Cement Company were leading producers. Others include Bali-Hai Stone, Millard County; Horman Construction, Summit County; Southern Pacific Transportation, Lyle Stokes, Strong Company, and Thomas American Stone Company, all from Box Elder County properties; and the Utah Scenic Stone Corporation from Washington County properties.

#### Tungsten

Utah's production figures for tungsten are not

reported for 1978. However, since overall production in the U. S. rose 20 percent during the year, it is thought that Utah's production amounted to considerably more than the 27,000 pounds valued at \$219,000 in 1977.

Producers in Utah are located in five counties with Tooele County leading production. During 1978, Tooele County produced approximately 9,000 pounds of tungsten from Star Dust Mines - C & P Leasing and Abracadabra Exploration Company, located in the Gold Hill and Wendover areas.

#### Zirconium

Western Zirconium, Inc., a wholly owned subsidiary of Westinghouse Electric Corporation, announced plans to build a plant facility west of Ogden capable of refining between three and four million pounds of zirconium per year. Costs were estimated at about \$50 million for construction. The company acquired 1,000 acres at a site 12 miles west of Ogden in the Little Mountain area. About 100 acres will be used for initial buildings and approximately 200 for evaporation ponds. Westinghouse reported that the remaining acreage is considered an investment for the future. The plant is scheduled to employ 430 people and will have an estimated \$1 million monthly payroll. Zircon sand from Australia will be processed at the facility. It is used to contain nuclear fuel in water-cooled nuclear power systems. Part of the ore produced is expected to be sold to the chemical industry.

Zircon silicate is found in Utah in ten counties, but commercial production has not been established in Utah.

#### Uranium

U. S. uranium concentrate production in 1978 was 18,500 tons of  $U_3O_8$ , an increase of 3,600 tons over 1977. The Department of Energy does not release production figures for Utah but it is estimated that Utah's 1978 ore production was somewhat more than 1,950 tons of concentrate valued at \$58 million.

Average price of uranium during 1977 and 1978 for contracts was around \$43.65 per pound. Market type prices for the first quarter of 1979 averaged \$44.65. The U. S. Department of Energy reported that uranium drilling in Utah in 1978 increased a million feet to slightly more than 5 million feet of hole drilled. Figure 4 and table 3 show production figures since 1904.

Rio Algom Corporation mines and processes about 22,000 tons of ore a month at its mill south of Moab in

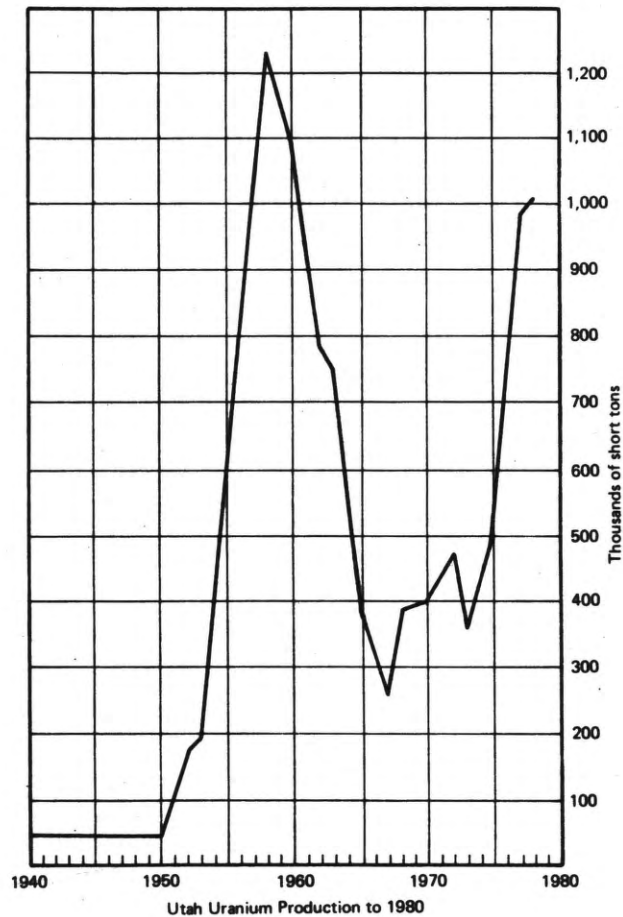


Figure 4. Utah Uranium production to 1980.

the Lisbon Valley area. The company has long-term contracts with the Duke Power Company of North Carolina. There are 250 people employed at the mine and mill.

Atlas Minerals employs 415 people in uranium mining and milling in the state and processed an average of 1,300 tons of uranium and uranium-vanadium ores daily through its new circuits at the Moab mill during 1978. Uranium operators in Grand and San Juan counties delivered between 475,000 and 500,000 tons of uranium ore to the Atlas mill during 1978. Some 185,000 tons of vanadium ore were processed.

Plateau Resources, Ltd., announced in August that, subject to environmental clearance and receiving authority from the Nuclear Regulatory Commission, it would construct a \$30 to \$35 million uranium mill in Garfield County, about 20 miles north of Bullfrog Basin. The company has two mines in development with a third in the planning stages. The mines will supply ore to the planned 750-ton-a-day mill. A company town for the

Table 3. Uranium Production of Utah

Year	Ore Produced (short tons)	Value
1904-36		1,000,000
1937-44	108,000	500,000
1945-47		
1948-49	13,504	248,825
1950	44,219	953,430
1951	61,058	1,539,199
1952	176,209	4,224,971
1953	194,035	5,557,993
1954	394,000	10,731,776
1955	607,170	16,984,021
1956	926,273	25,214,342
1957	1,075,789	32,542,617
1958	1,239,767	38,610,000
1959	1,210,654	37,310,000
1960	1,089,757	27,843,000
1961	1,098,783	25,734,000
1962 <sup>1</sup>	781,955	23,653,000
1963	743,792	23,852,000
1964	761,180	26,385,000
1965	377,989	9,014,000
1966	236,860	9,797,000
1967	254,538	10,300,000
1968	386,683	13,175,000
1969	298,746	6,824,000
1970	398,094	6,742,000
1971	412,246	8,959,000
1972	470,513	9,425,000
1973 <sup>2</sup>	358,920	12,745,000
1974	423,271	13,970,966
1975	485,205	23,314,071
1976	858,889	33,382,604
1977 <sup>3</sup>	980,508	48,726,269
1978 <sup>4</sup>	1,000,000	58,160,000

1. Mineral and Water Resources of Utah, U.G.M.S. Bulletin 73, 1964, p. 126 (1904-62)

2. Utah Mineral Industry Statistics Through 1973, U.G.M.S. Bulletin 106, 1975, p. 77 (1963-73).

3. Data compiled from records of Utah Tax Commission. (1974-77).

4. Estimated (1978)

present 250 employees, "Ticaboo", will eventually have a population of over 2,000. The townsite is about four miles to the south of the mining and milling operation.

Energy Fuels Nuclear, Inc., announced plans to construct a mill about six miles south of Blanding. The mill will be adjacent to the company's sampling facility now in operation. The mill will handle between 1,500 to 2,000 tons of ore per day and employ about 80 full time employees. Energy Fuels Nuclear, Inc., has three mines in the vicinity and plans to develop two others in the near future.

Brush Wellman and Plateau Resources announced a joint venture agreement for exploration and development work on prospective uranium properties covering

some 16,000 acres. A byproduct uranium recovery circuit at its Delta beryllium mill is expected to be completed by the end of 1979.

Nuclear Dynamics Inc., entered into an agreement with Frontier Resources, Ltd., and Plateau Resources Ltd., on properties in eastern San Juan County. Nuclear Dynamics and Frontier Resources will contribute about 29,000 acres of uranium leases to the joint venture, with Plateau Resources providing the management and the first year's funding.

Mountain States Resources Corporation and Anschutz Uranium Corporation announced exploration drilling would start on 180 uranium claims in Emery County. The claims, belonging to Mountain States, are called the Sinbad-Freeway Prospect and cover some 3,700 acres. Mountain States also acquired 671 unpatented uranium claims from private holders totaling some 14,420 acres. These, called the Freeway and Ferron groups, are also in Emery County. Acquitaine Mining Corporation also has interest in the program.

Geosurveys, Inc., Polaris Resources, Inc., and Energy Fuels Ltd., noted encouraging results from their exploratory drilling program on a portion of nearly 35,000 acres near Topaz Mountain in Juab County. Drilling delineated approximately 68,000 tons of uranium ore reserves at an average grade of 0.07 percent  $U_3O_8$ , or 95,000 pounds of uranium oxide. Drilling in the vicinity of the Old Yellow Chief mine was expected to be completed during 1978.

Canyonlands Uranium Corporation announced that Energy Fuels, Ltd., exercised an option to purchase a group of state and federal mining claims known as the Pete Mining properties. They are in the lower Montezuma Canyon area of San Juan County. Purchase price was a million dollars. Energy Fuels determined that the Pete claims have proven reserves of 120,000 pounds of uranium oxide. Energy Fuels operates ore-buying stations at Blanding and Hanksville and has applied for permission to construct a 2,000 tons-per-day mill six miles south of Blanding.

Mineral Energy and Pechiney Kuhlmann Development Company signed a joint operating pact under which the Minatome Corporation, represented by Pechiney, will explore and develop all of Mineral Energy's uranium properties in southern Utah not effected by prior agreements with other companies. Mineral Energy also signed an agreement with Emery Uranium Company to explore for uranium on 100,000 acres in southeastern Utah.

Geo-Energy Resources announced signing a lease and option agreement with Idaho Mining Company in June to explore and develop 50 uranium claims owned by Geo-Energy Resources in San Juan County. Lease terms require Idaho Mining to spend \$125,000 during the next 15 months on exploration and development of the properties. A minimum of \$50,000 also must be expended on the property each year thereafter as long as the lease is operative. The Fire-Fly group of claims in La Sal Creek, Paradox Valley mining district, has produced in excess of 78,000 tons of uranium ore.

Dorchester Gas Company, Dallas, Texas, conducted a drilling program on 30 uranium claims owned by Big Indian Uranium Company along the Lisbon Fault in San Juan County near Rio Algom's mining and milling complex in the Lisbon valley area. Dorchester will do the exploration work and Big Indian Uranium will share expenses on a proportional basis.

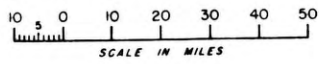
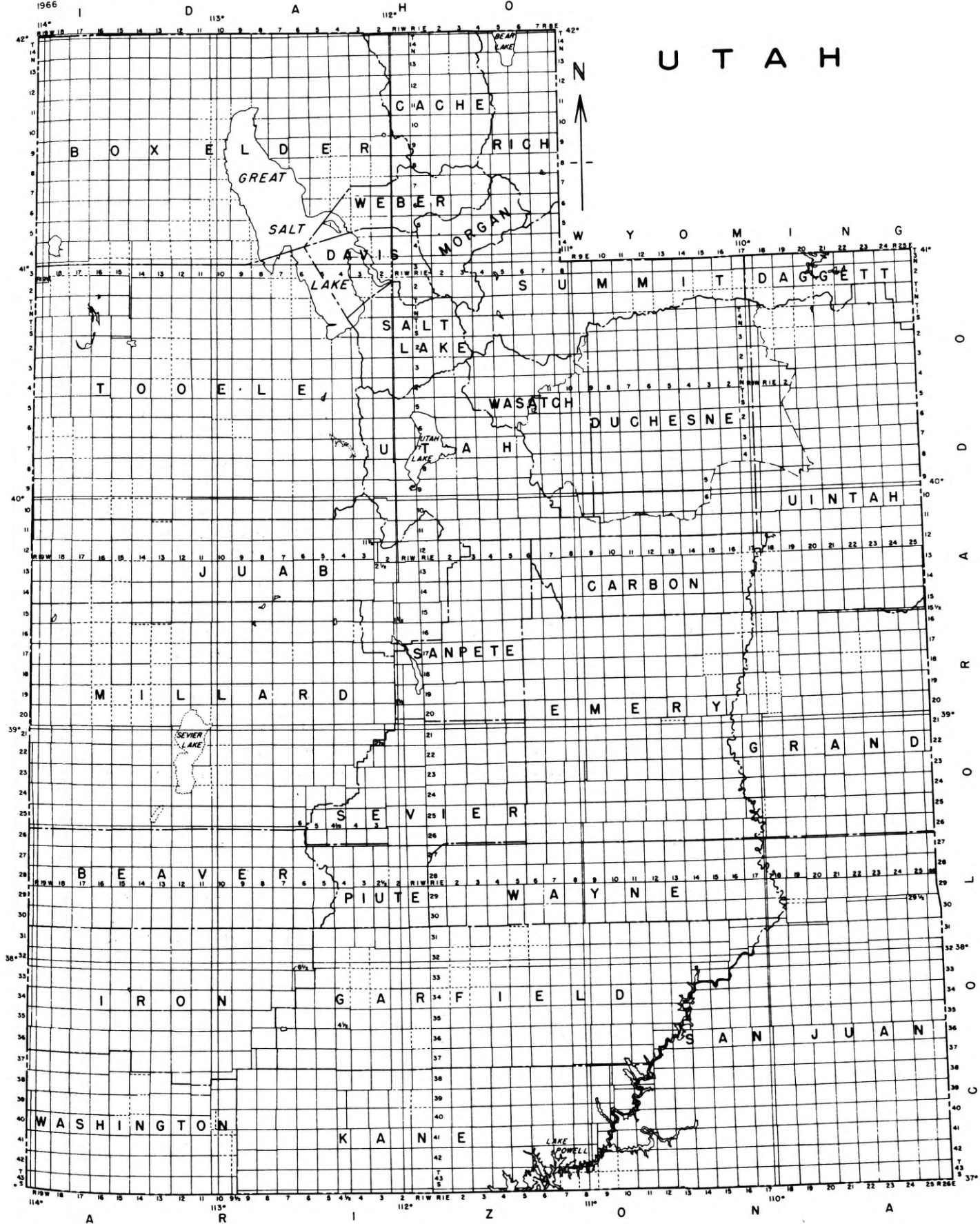
The Delta mine in Emery County will undergo extensive development work. In July, 1978, Utah West Mining and Development Inc., announced it will do additional mining for Mineral Resources Inc., owner of the property. The mine currently produces at the rate of 1,000 to 2,000 tons monthly.

An announcement was made by Energy Resources Corporation during the year that it had entered a joint venture with Hunt Oil Company to acquire approximately 2,120 mining claims on federal lands near Blanding. Some 44,500 acres are involved in the transaction. The Division of Oil, Gas and Mining approved a notice of intention by Homestake Mining Company to do underground mining of uranium at the LaSal mine in San Juan County. Atlas Minerals received approval to operate the Big Indian mine and to conduct room and pillar mining operations on portions of section 10, T. 30 S., R. 24 E., in San Juan County. Minerals Recovery Corporation was granted approval to commence open pit and underground mining in sections 35 and 36, T. 30 S., R. 25 E., San Juan County; and Five-J Mining Company, Moab, will do underground mining at its Chess Ridge mine in San Juan County.

The Brush Wellman, Inc., revealed that much of their 9,000 acres of bertrandite properties contained small amounts of uranium. A new uranium processing circuit was under study for the plant. It would cost about \$1 million and would have a capacity to produce between 10,000 and 40,000 pounds of uranium oxide per year.

Account No. 016103  
Approval No. 7900259

# U T A H



# UTAH GEOLOGICAL AND MINERAL SURVEY

606 Black Hawk Way  
Salt Lake City, Utah 84108

THE UTAH GEOLOGICAL AND MINERAL SURVEY is a Division of the Utah Department of Natural Resources and operates under the guidance of a 7-member Board appointed by the Governor from industry and the public-at-large. The Survey is instructed by law to collect and distribute reliable information concerning the mineral resources, topography, and geology of the state, to investigate areas of geologic and topographic hazards that could affect the citizens of Utah, and to support the development of natural resources within the state. The *Utah Code Annotated, 1953 Replacement Volume 5, Chapter 36, 53-36-1 through 12*, describes the Survey and its functions.

The Survey publishes bulletins, maps, a quarterly newsletter, and other publications that describe the geology of the state. Write for the latest list of publications available.

THE SAMPLE LIBRARY is maintained to preserve well cuttings, drill cores, stratigraphic sections, and other geological samples. Files of lithologic, electrical, and mechanical logs of oil and gas wells drilled in the state are also maintained. The library's collections have been obtained by voluntary donation and are open to public use, free of charge.

THE UTAH GEOLOGICAL AND MINERAL SURVEY adopts as its official policy the standard proclaimed in the Governor's Code of Fair Practices that it shall not, in recruitment, appointment, assignment, promotion, and discharge of personnel, discriminate against any individual on account of race, color, religious creed, ancestry, national origin, or sex. It expects its employees to have no interest, financial or otherwise that is in conflict with the goals and objectives of the Survey and to obtain no personal benefit from information gained through their work as employees of the Survey. For permanent employees this restriction is lifted after a two-year absence and for consultants the same restriction applies until publication of the data they have acquired.