

# Plant Raises Mine Production

Western States Minerals Corp. increased production of an old mine by 80% by producing a unitized jig preparation plant and buying all new mining equipment.

*Dan Jackson, western editor*

Western States Minerals Corp. (WSM) installed a preparation plant at its first coal mine primarily to raise the productivity of the mine.

WSM had to deal with an 8 to 14-in.-thick dirt parting in the middle of the 12-ft I seam in its J. B. King underground mine, near Salina, Utah. Instead of dealing with the parting separately, WSM will mine it along with the coal and eliminate it in the preparation process.

WSM purchased the J. B. King mine in March, 1976. Since then, the company's Denver headquarters management and engineering teams have conducted feasibility and industrial engineering studies on mining methods and equipment, coal preparation and markets. With all the results in, Western State's management began charting its course and setting goals for its first venture into the coal industry while simultaneously developing a work force through limited production.

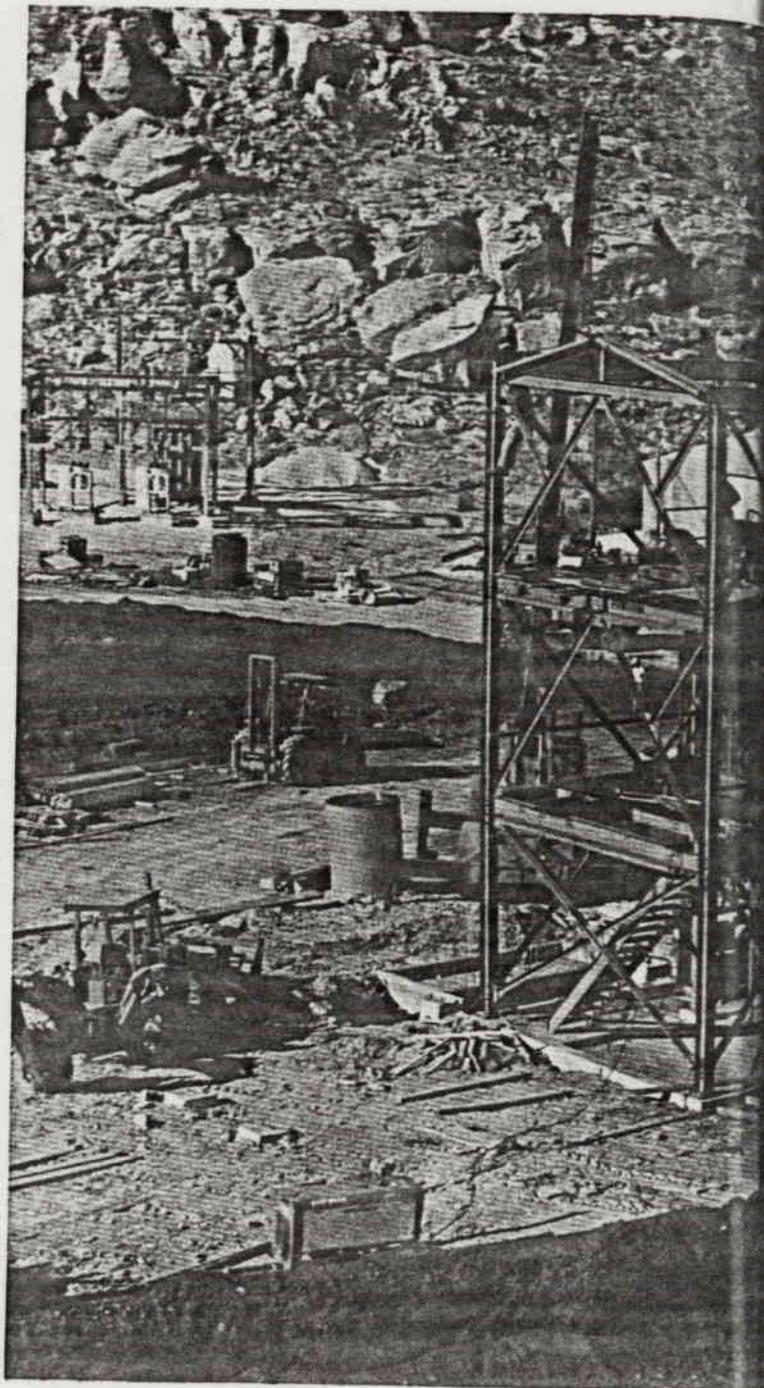
The first priority for a mine that had been worked only seasonally for a number of years was to equip it with modern mining equipment, including a Joy 15RU cutting machine with a 15-ft-long cutter bar; Wagner LHDs with 8-cu-yd buckets; Schroeder coal drill; Stamler feeder/breaker; and Long-Airdox belt conveyor drives and tail sections. This equipment is in-place and producing at a rate of 800 tons per shift with a nine-man crew, or approximately 23 tons per manshift for the entire mine. Mine superintendent Clifford Snow says that, "We expect to see some 1,200-ton shifts when we smooth out a few of our production cycles."

Consideration is presently being given to a continuous miner section that could increase production from 200,000 to 400,000 tpy. The continuous miner section would be mined by room-and-pillar and the conventional section will be for mine development.

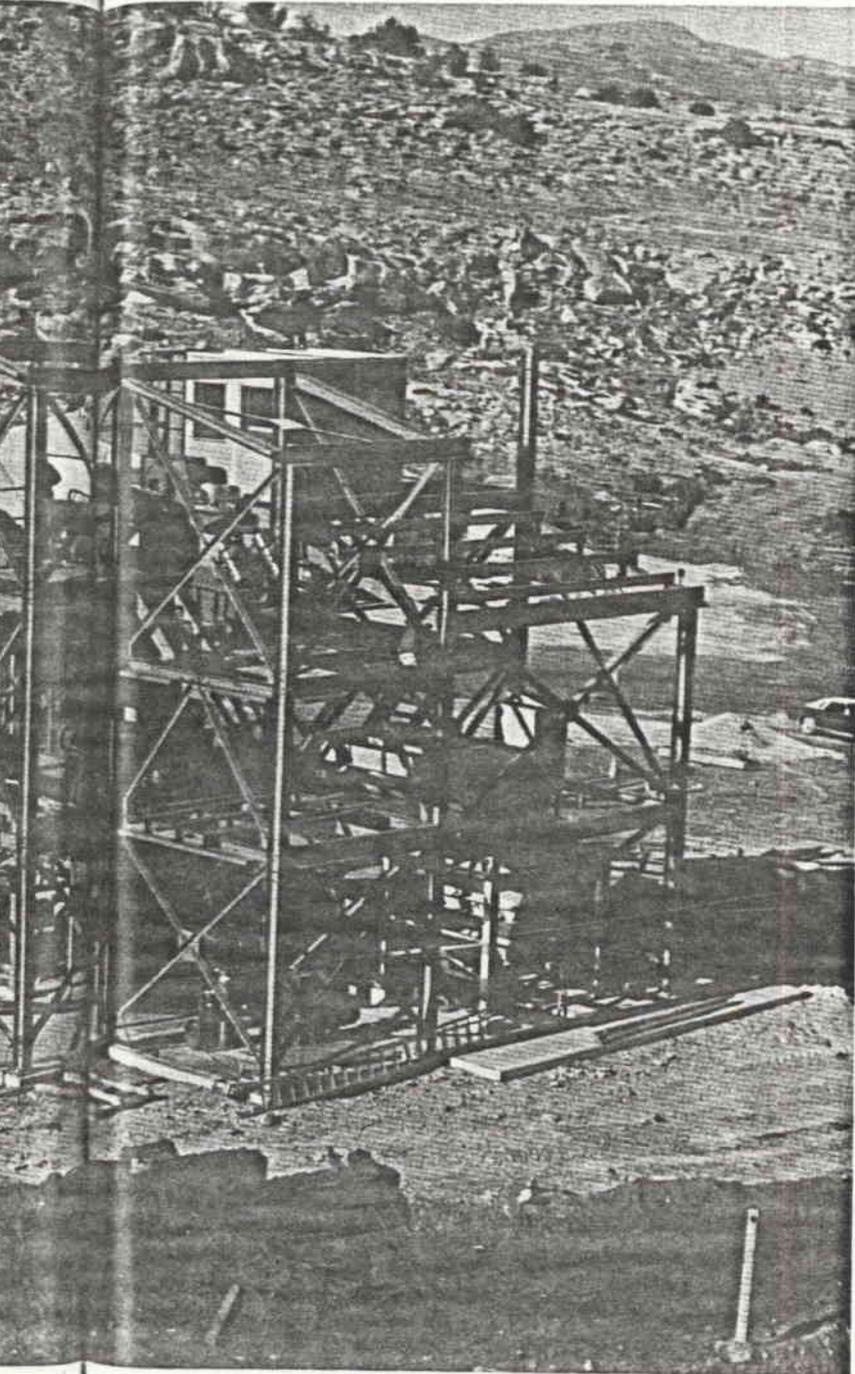
The final priority, although by no means the least important, is the installation of the Jeffrey Unitized preparation plant. In the final analysis, it is credited with making it possible to increase production more than 80%.

The I seam mined by Western States, the only company mining this seam in Utah, has an average thickness of 12 ft. As for other assets, the seam is methane free, level and dry. It also has a maximum cover of 150 ft. On the debit side, the seam contains an 8 to 14-in. dirt parting near the middle.

This is where the preparation plant plays such an important role at WSM. Without it, and to produce a quality coal, mining was carried out in two cycles. The dirt parting was cut, loaded and conveyed out of the mine separately, then the coal was mined. Removing the parting alone required 3



Western Energy's unitized prep plant, housed in a pre-engineered building, was erected in less time than would be needed for a conventional plant.



hours each shift. Production under these conditions was 300 to 425 tons per shift.

With the preparation plant now in operation, the coal and parting are mined at the same time, placing the burden of removing the impurities on the preparation plant.

Channel samples of the seam show a Btu value of 11,200-12,200, 10-12% ash, approximately 1.4% sulfur and 6-7% moisture. Most of these figures improve with coal cleaning, with the Btus going as high as 12,500, sulfur dropping to less than 1% and ash to less than 8%. Moisture remains about the same.

#### **Simplicity, low cost highlight plant**

For Western States, the installation of the preparation plant represented the final step in making its first venture into the coal industry a success. And Jeffrey's Unitized coal preparation plant fit well into the scheme of things.

It is a compact, 150-tph plant requiring minimum capital outlay. It produces two clean-coal products to meet contemporary requirements for lower ash and sulfur and higher Btu values, according to Bill Sikes, mining engineer. WSM will sell 80% of its production to utilities and 20% for industrial stokers.

The plant's simplicity and the pre-engineered building the plant occupies made it possible to erect the plant within eight months. In this instance, the plant was constructed by WSM's own forces.

The plant is designed to process -4-in. x 0 coal that is presized by a grizzly screen and Jeffrey flextooth crusher located ahead of a two-compartment, 150-tph jig washer. A vibrating feeder withdraws presized coal from a 4,000-ton open-storage area to a conveyer that takes it to the washer. Washer reject passes over a dewatering screen prior to discharging onto the refuse conveyer.

Clean coal from the washer goes to a double-deck vibrator equipped with 1¼-in. and ¾-in. screens. Top product (+1¼ in.) goes to a flextooth crusher for reduction to -1¼ in. The -1¼ x ¾-in. material from the bottom screen reports to a CMI (VC-48) centrifugal dryer.

Underflow (-¾ in. x 0) from the clean coal screen goes by gravity to a sump to be pumped to 8-in. Krebs cyclones. The cyclone product then reports to sieve bends and finally to a second CMI (EB-36) dryer before going to storage.

Minus 28-mesh material from the sieve ends reports to a 10-tph Lamella thickener. All ¾-in.-plus clean coal goes to the stoker storage area and the -¾ in. x 0 goes to a separate fine-coal storage area.

Stoker and fine-coal products can be loaded separately or blended. The stoker coal also can be oil treated as it is loaded into trucks. WSM serves companies in Utah, Washington, Arizona, Nevada and California. Coal shipped by rail must be hauled by trucks to a Union Pacific railroad siding north of Gunnison, Utah, or D&RGW siding at Aurora, Utah. Single and double haulage trucks are used to haul coal. Single-unit capacity is about 25 ton, double units, 40.

### On the mining side

Mining the I seam with conventional equipment, and with the continuous miner when it goes into production, is performed by driving seven-heading entries and rooms 20 ft wide, with crosscuts and headings on 50-ft centers.

In the 12-ft-thick seam, about 1 to 2 ft of top coal and 1 ft of bottom coal are left to maintain good roof and bottom conditions. The top, consisting of laminated shale, deteriorates when exposed to air and the soft fire-clay bottom becomes unmanageable when wet. A height of 9 to 10 ft is maintained in all headings.

### Power/communications/water

Western States' property, at an elevation of 6,350 ft, is located some 15 miles south of Emery, Utah, a town of about 300 persons and 38 miles southeast of Salina, which has a population of 3,000. WSM's workforce comes primarily from these towns.

WSM recently built a 15-mile, 25,000-v power line from Emery. Power was previously generated at the mine.

Until April of this year, the company had been without telephone service. Messages were relayed by radio to WSM Aurora office during the construction of the preparation plant as well as for mining. The company now has a microwave telephone system.

WSM's water supply for the plant and mine comes from three, 200-ft-deep wells. Water is pumped through 4,000 ft of 4-in. pipe to a 100,000-gal storage area constructed within the mine. Underground storage was chosen to keep down cost and also to prevent freezing during winter months.

### Eying the future

The J. B. King mine is Western States' first full-scale mining venture. Other coal properties have been acquired and are presently being considered for development. WSM is also involved through its subsidiary, Coalex Energy Corp., in coal gasification and has acquired gold and silver properties in the west with its gold operation put into production in September, 1978. Because the mine is the company's first, management is dead set on making it a success. They have left nothing to chance. The preparation plant, for example, places the company in the unique position of being the operator of the western-most bituminous coal preparation plant in the U.S. serving the industrial stoker and utility markets, giving it an edge in contract negotiations.

In addition to the I seam, the property also contains the F seam that lies about 160 ft below the I seam. Thickness of this seam is 8 ft. Plans call for developing this seam within two years. Access will be by slope. Combined, these two seams can supply long-term contracts.

## Flow Sheet for Western States Minerals Coal Prep Plant

