5M CORPORATION
Hurricane, Utah

NARRATION
of
PROPOSED ACTION

John Henry Mine
Kaiparowits Plateau

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MINERALS
MINING
MILLING
MELTING

and
MANUFACTURING
of
METAL PRODUCTS – MINI MILLS – MINING EQUIPMENT

INCORPORATED

NARRATION
of
PROPOSED ACTION

John Henry Mine
Kaiparowits Plateau
Kane County, Utah

12 August 1975

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NARRATION OF PROPOSED ACTION

It is the intent of 5M Corporation to initiate coal production from holdings on the Kaiparowits Plateau as expeditiously as possible. As resident coal dealers in the Washington County area, the principal source supply of coal to fulfill our marketing needs has heretofore been obtained from coal mines in the Salina, Utah, area. During recent years, this source supply of coal has become increasingly difficult to obtain. As you are aware, many Utah mines have been bought from local producers by outside interests, and at a time of generally increasing coal demand. This situation, coupled with other economic and political forces associated with coal in general, now poses two specific problems for 5M Corporation:

(1) For the small coal dealer, it is near impossible to obtain reasonable coal commitments from coal producers at a contract price inclusive for one winter's season. Price changes and availability are too volatile, and the small coal dealer who depends upon contracted sales for much of his sales volume is at a loss to estabish a contract price, or even to guarantee delivery.

(2) There is no assurance of coal availability from our source of coal producers over any extended time period.

Added to these coal procurement problems, our existing

short and long term requirements and contracts for coal have expanded and increased to the point that we now feel it economically feasible to enter into the development and operation of our own coal holdings.

Therefore, 5M Corporation is requesting an early approval of the Rights-of-Way and Tresspass Applications involving the south half of Section 35, T. 41 S., R. 3 E. in order to gain access to our Utah State Mineral Lease No. 19359, Section 2, T. 42 S., R. 3 E. 5M Corporation is now prepared to initiate coal production on Section 2 in support of existing coal market requirements, subject only to Federal clearances necessary to commence access road construction and preparatory mining operations. Following is a delineation of general information and proposed actions to be taken by 5M Corporation in the pursuance of this objective:

A. HOUSING:

The mining program for the John Henry Mine, as contemplated and envisioned by 5M Corporation, begins with the responsibility for adequate housing for miners, truckers, administrative and management personnel. Much preparation already has been accomplished in this area by 5M Corporation in association with the Consumers Agency Incorporated, a lands development company of Provo, Utah. (Dee R. Taylor, A.I.A. Architect).

Housing and personnel accommodations will be provided on properties now owned and having State and County approvals for sub-division development at Church Wells and Glen Canyon City, as well as at other locations on

the East Clark Bench. Accommodations with facilities installed are now available for handling approximately 40 trailer units. Additional facilities for 200 trailer units will become available concurrent with increasing employee demand. Shopping and service centers, public and private dwellings, schools, shops, etc., are also programmed for construction as part of a carefully planned community development.

B. ROADS:

It is approximately 22 miles to the mine site from Glen Canyon City in a general North by North East direction. Roads access is over Kane County, Bureau of Land Management, and National Park Service roads. 5M Corporation has under request to the Bureau of Land Management for the right to make road improvements and changes over the last 6 1/2 miles.

It is expected that a continuous road maintenance program will be necessary from Glen Canyon City to the mine site. Much of this roadway in the past has served as an access road for Resources Company to their Experimental Mine, and to the site of the proposed Nipple Bench Generatng Plant. Other interests in the area, such as drilling programs and horticulture experimentation, also have made use of these roads. It may be expected this traffic will continue with increasing regularity as development of the Kaiparowits materializes. Hopefully, with such developments, it may be expected that maintenance of the road network

would come by participation from:

5M Corporation
Bureau of Land Management
Resources Company
State of Utah
Parks and Recreation
Other

C. TRANSPORTATION OF PERSONNEL:

It is proposed by management to bus mine workers and other personnel from the housing areas at Church Wells and Glen Canyon City to the site of the John Henry Mine.

The Mine Superintendent and certain key executive personnel will require personal vehicles for independent travel in connection with pre-shift mine safety examinations, emergency travel, and priority administrative functions.

D. WATER:

Initial water requirements are to be provided by truck and tanker from private wells in the Church Wells area (Consumers Agency Incorporated - see A, above). Separate storage facilities at the mine site will provide for utility and mining needs, as well as for cullinary use. A minimal utility source of water may be augmented and reclaimed from seepage and from mining operations.

Later, if necessary, well water may be developed from a source in the John Henry Canyon fault. Also, with the development of the Kaiparowits Power Project, some water usage may become available from the pipeline serving that facility, particularly should 5M Corporation become a

principal supplier of coal for the project.

E. POWER:

Short range power requirements are to be generated on site by one or more portable generators as required. Long range requirements may be provided by the Kaiparowits Power Project, or by other utilities projected for joint use in the area.

F. COMMUNICATIONS:

An internal sound powered telephone system is to connect all working areas in the mine to the outside through a telephone interface. Outside communications by radio or telephone will connect to a radio transmitter on top of the plateau near the mine site, and connecting to Mountain Bell Telephone through a radio-telephone interface to Glen Canyon City.

G. MINING, SUPERVISORY, & ADMINISTRATIVE PERSONNEL:

Startup is projected for 15 mining and supervisory personnel per shift for the first 60 - 90 days. During this period, it is planned to schedule two production shifts; and one, 4-man maintenance shift. In addition, outside personnel will consist of 4 operators, working three shifts per day. The normal work week is to be five days.

Personnel requirements during First Phase operations (first 12 months) are projected up to 125 employees, concurrent with expansion of production. Second Phase (up thru 4 years) will necessitate personnel increases between 300 and 400 employees.

H. MINING PLAN & EQUIPMENT:

Mining is to be a multi-seam, underground operation in order to realize the maximum yield of coal. The Mining Plan calls for a 7-heading entry, with crosscuts on 100 foot centers. These entries will provide for ventilation, escape ways, and supply and haulage.

Room and Pillar methods of coal extraction will be used initially. First Phase operations will employ conventional mining with face drill and shooting techniques. Other equipment will include cutters, loaders, diesel powered, rubber tired, teletram haul trucks, and rubber tired, front-end loaders.

I. SUPPORT FACILITIES - Underground:

Facility areas to be provided underground will include machine and repair shops, parts supply for both mechanical and electrical equipment, as well as spaces for incidental mining and storage needs.

J. SUPPORT FACILITIES - Outside:

Outside buildings and support facilities are to be mobilized units and readily transportable. This includes administrative offices, personnel change rooms, scale house and scales. Temporary facilities will be constructed for portable electric generating plants, fuel tanks, powder storage facilities, and water storage. Septic tanks with leach lines will be installed as specified by the Utah Department of Health.

K. VENTILATION:

Surface-installed, suction type fans will direct the

flow of air by means of stoppings, overcasts, undercasts, regulators, seals, ventilating, and man doors. The ventilation system to be installed within the mine will be according to specifications and approval of MESA, (Bureau of Mines).

L. TIPPEL:

Crushing, cleaning, sizing, and storage facilities are to be located convenient to the entries of the mine. (See Appendix (A), "Location MAP").

M. COAL CLEANING FACILITY:

Coal marketing and utilization requirements may necessitate the installation of coal cleaning and processing facilities at the mine site. Such processing facilities removes the reject wastes from the coal and increases the BTU values of the coal per ton. Selecting the coal cleaning and processing equipment to do this job is largely determined by conditions under which the coal is mined, and generally fall into one of two categories, i.e., wet processing methods versus dry Airjig cleaning. Selecting a wet chemical flotation process requires the handling and reclaiming of the spent solutions used in the process, as well as the containment and resolution of the chemical wastes.

Mining conditions contemplated at the John Henry Mine greatly favor dry Airjig cleaning. It may be expected this method will find favor in most of the upper seams of the dry formations of the southern Kaiparowits Plateau region. Reject wastes are retained in dry state without the application of water and chemicals, and consist of a

carbonaceous fire clay material mixed with mine rock, generally sandstone, shale, or mudstone.

Airjig equipment and in-place installation is much compacted in comparison to other coal cleaning methods - requiring as little as 100 X 200 square feet at the John Henry Mine. On the other hand, the compact, portable unit provides highly efficient dry separation of 1 1/4 in. to 0 in. coal up to 100 T.P.H., with feeds containing up to 8% surface moisture.

Each Airjig unit measures approximately 58 inches wide, 60 inches high, and 32 feet long. Three such units installed side by side in a confined work area, and operating through a 24 hour period, will produce 7200 tons of clean coal ready for market.

Mechanical operation of the Airjig unit involves a high volume of air produced by two electric powered, belt driven, fans. The high volume air is forced through a small channel, equipped with flutter valve control, and creating an intermittent air flow of up to 400 pulsations per minute. The pulsating air flow impacts on individual cells and imparts the force needed to lift the coal above the heavier reject material which continues down the incline bed for conveyance to the reject area. In principle, the technique is much that of a specific gravity, dry air separation.

The Ridge Airjig is a most successful, patented machine having a long standing track record in the eastern United States coal fields. Success of the Airjig here in Utah

was achieved during the 1960's by the Koal Creek Coal Company, Cedar City, Utah, owned and operated by Grant C. Tucker. (See Appendix (B)).

N. DUMP AREA - REJECT MATERIAL:

Reject materials to be removed in coal cleaning operations at the John Henry Mine will not be a wet slime and tails product possessing offensive chemicals and solutions as often result from the wet chemical flotation methods used at some coal mines.

5M Corporation proposes, instead, to use a dry Airjig method for up-grading coal. The reject material will consist of a fire clay, which at times may be carbonaceous, and mine rock, usually sandstone, shale, or mudstone. These reject materials are to be placed in an area designated as "Reject Area" on the map attached. (See Appendix (A), "Ancillary Facilities & Reject Area MAP"). This area is ideally suited for massive dump and stockpile of these dry materials. The capacity of the dump area is approximately 1.3 million tons. (See CALCULATION - Appendix (A), "Ancillary Facilities & Reject Area MAP"). Should future development require additional space, a supplemental reject area may be provided approximately 1500 feet to the east. (See Appendix (A), "Location MAP").

The Dike, as shown on the map, will retain the reject material in the reject area and keep it from washing off the hillside into the creek below. The Dike is to be built in successive stages over a period of time so always to have at least 5 to 10 feet of freeboard in which to contain the maximum projected rainfall and runoff.

Initial materials for construction of the Dike will be obtained principally by use of the shallow alluvial material now covering the bottom and sidehill of the reject area. Removal of these top materials exposes an impervious bedding of dark, grey bentonite and carbonaceous clays. The reject materials should, therefore, present an appearance and posses a soil chemistry equal to or better than the existing strata and topographical color naturally occurring in the reject area.

Reject materials from the cleaning plant will be deposited in the reject area by benching methods, starting first on the hillside at the same level as the cleaning plant output. All reject materials are to be compacted and contained from entering the drainage area.

O. COAL LOADING:

A front-end, rubber tired, diesel loader will convey coal from the stock pile to truck and trailers. The latter, in turn, will be pulled by diesel truck to the rail head, generator plants, or place of destination.

P. TRANSPORTATION OF COAL:

Production of coal is programmed to reach 2,000 tons per day as rapidly as possible (within 60 to 90 days). This quantity production is necessary to accommodate to unit train capacities; that is, 100 railroad cars at 100 tons per car, or 10,000 tons per week. Trucking of coal may be to railroad headings at Flagstaff, Arizona, and Moapa, Nevada. Also, to the distribution yard at Hurricane, Utah, for further distribution to Washington

County schools, Dixie College, public sales, and others.

Q. SAFETY:

All operations will be conducted in a manner as approved by MESA (Bureau of Mines), particularly as relating to such things as dust control, gases, ventilation, roof bolting, certification, etc. All mining personnel will wear safety protective clothing at all times, and be trained in and hold first aid safety certificates and mine rescue cards.

KOAL KREEK preparation plant comprises three sections: raw-coal receiving hopper, followed by breaking and air cleaning section and then by a cleaned-coal storage section consisting of a 3-compartment bin, being equipped with a roof when this photo was taken. The raw-coal hopper also has three compartments to keep the coal from the three mines served by the plant separate.

Air Cleaning, Diesel Haulage Move Koal Kreek Ahead

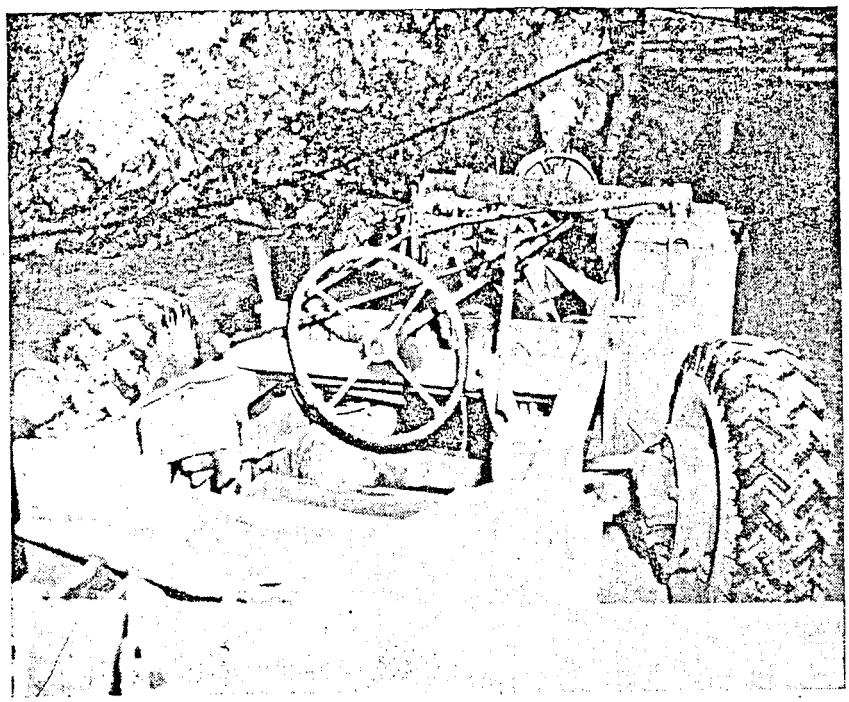
A FIRST FOR THE INDUSTRY, as well as a first for the West, is the score recently marked up by the Koal Kreek Coal Co., of Cedar City, Utah. Its industry first is the design, construction and operation of the first rubber-tired diesel-powered tractor, or locomotive, pulling trail cars and operating to the face. Its western first lies in the fact that it is now operating the farthest-west air cleaner in the industry —and the first to be installed this far west in the United States. This cleaner, in addition to improving the quality of the Koal Kreek output, will also process the output of two other mines on a custom basis.

Koal Kreek is a father-and-son partnership. Guy C. Tucker, the father, an electrical engineer, has operated coal mines in the area since 1930. Grant Tucker, the son, a civil engineer, began following in his father's footsteps in 1948. Their present operation was taken over in 1952 from other owners, and is located some 9 mi up Cedar Canyon from Cedar City. The opening is into the mountainside under towering cliffs. As an incident to operation, a slide in 1959 took off all the surface facilities and went on across the state highway into the canyon. The present mine tipple therefore dates back to that time.

Production comes from the Coal Creek seam with a thickness of 5½ to 6 ft. It rises 4% on the average to the southwest, and is underlaid by 3½ ft of laminated rock below which is another bed of coal. The top is so outstandingly good as to make it necessary to give thought to keeping the mine force from growing too casual about it. A number of thin bands and partings, plus the bottom rock, result in a high ash in the raw state, which led to the decision to go to air cleaning.

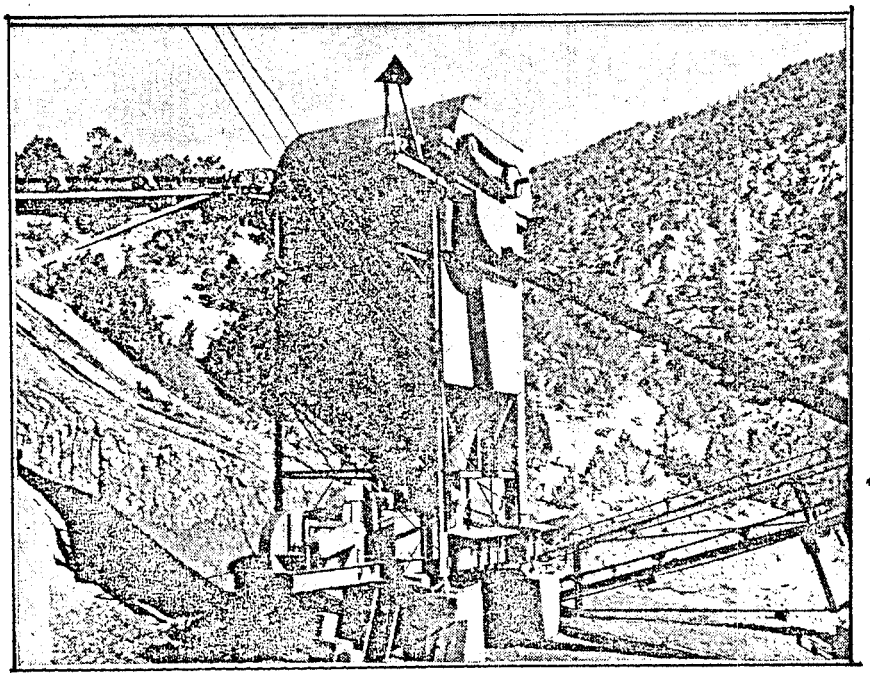
Diesel Haulage

When the mine was taken over in 1952 it was a hand-loading operation. Conversion to a mechanized property started in that year, using Goodman G-15 shakers. The coal was hauled in 1½-ton rail cars, 36-in track gage, by a 4½-ton battery locomotive. The next step was to install an 8 BU loader, still retaining, however, rail haulage. Dumping was handled by rotary equipment, and in an attempt to overcome some of the shortcomings of rail service, cars up to 20 ft in length were designed and built at the mine.



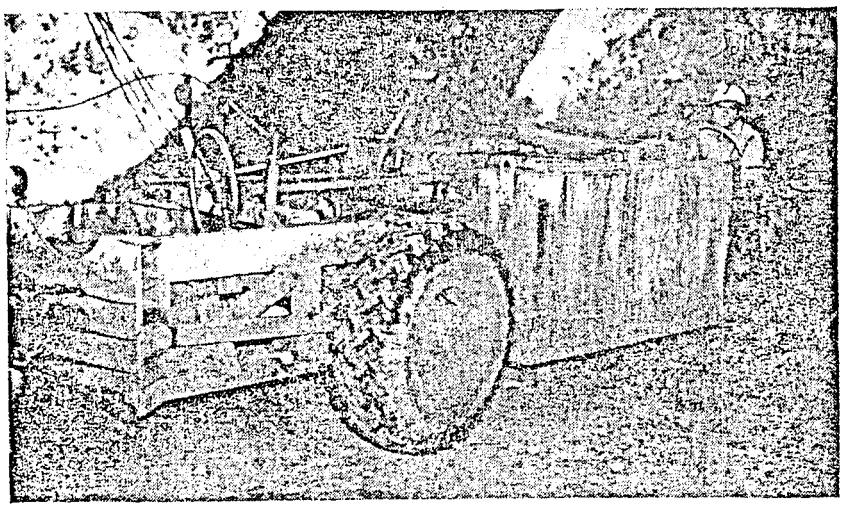
KOAL KREEK rubber-tired diesel locomotive, designed and built at the mine to pull 5-ton dropbottom trail cars, features a 40-hp diesel engine, torque-converter transmission with 4-speed gear, and 4-wheel drive and power-assisted steer, plus mine-designed scrubber. Keith Pollock, operator, occupies one of the two cabs—one at each end for ease of operation in either direction. The one-way haul is 5,000 ft from the face to the dump outside.

BREAKING AND CLEANING UNIT —an outdoor-type installation—includes rotary breaker at the top reducing all feed to ¾×0, air cleaner at the ground level and between the two a 25-ton surge hopper.

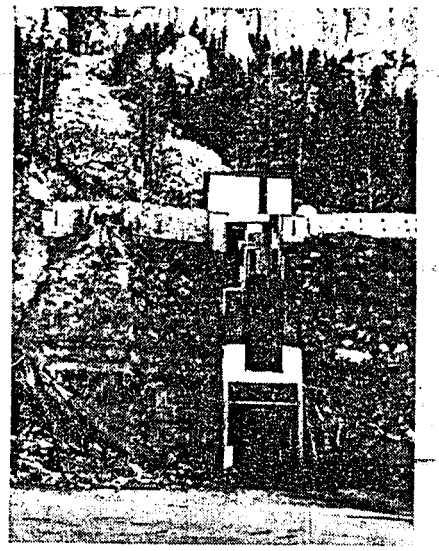


But loading into rail cars was a burden on the operation in spite of all the steps that could be taken. Offtrack haulage on rubber was seen as the only way out, the big problem being to obtain or build equipment that would be inexpensive and yet do the job. A battery-powered rubber-tired locomotive for pulling trail cars was built early in 1960, but it too had its limitations, and in view of studies of the situation and a review of experience elsewhere it was decided that diesel-powered equipment was the best answer to the problems of low cost, high capacity and flexibility. Consequently, the changeover to diesel power was made in August, 1960.

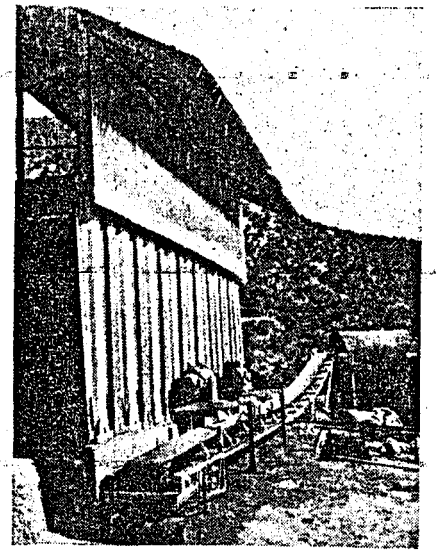
The Koal Kreek locomotive was the joint design of the Messrs. Tucker, with help from other members of their staff, including James Zuball, foreman and safety engineer, who contributed the majority of the ideas for the scrubber. Gross weight of the locomotive is 4½ tons, and it normally is em-



THREE-SECTION SCRUBBER on diesel locomotive was developed to employ circulating water with additive and then to route exhaust through lava rock bed and activated charcoal. No carbon monoxide has ever been detected in the exhaust.

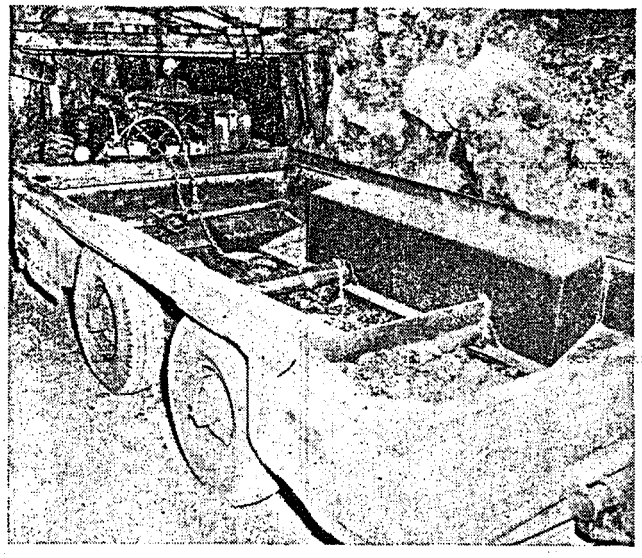


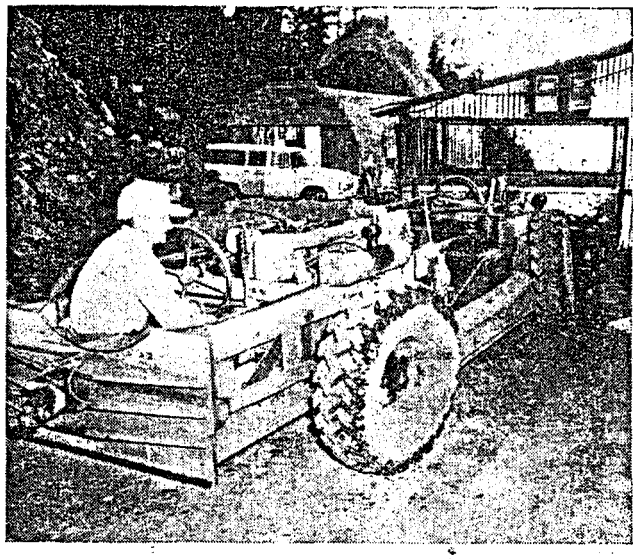
MINE PORTAL and raw-coal storage bin are at the base of towering cliffs. Boulders left are remains of slide that cleaned off the old tipple in 1959.



SEPARATE FEEDERS—one yet to be installed—move the coal out of the three raw-coal storage compartments onto transfer belt to cleaning unit.

KOAL KREEK PARTNERS, posing with their air cleaner, are Grant Tucker (left) with his father, Guy C. Tucker, also diesel-locomotive originators.





TRAIL CAR is pushed across rails over hopper for bottom dumping. Heavy pipe side rails guide it into position. The dumping setup will be revised to handle 3-car trips on a pull-through basis, rather than the present single-car trips.

ployed in hauling one 5-ton-capacity bottomdump trail car, also designed and built at the mine, at a maximum speed of 15 mph. It can pull three cars, in which case the top speed drops to 10 mph.

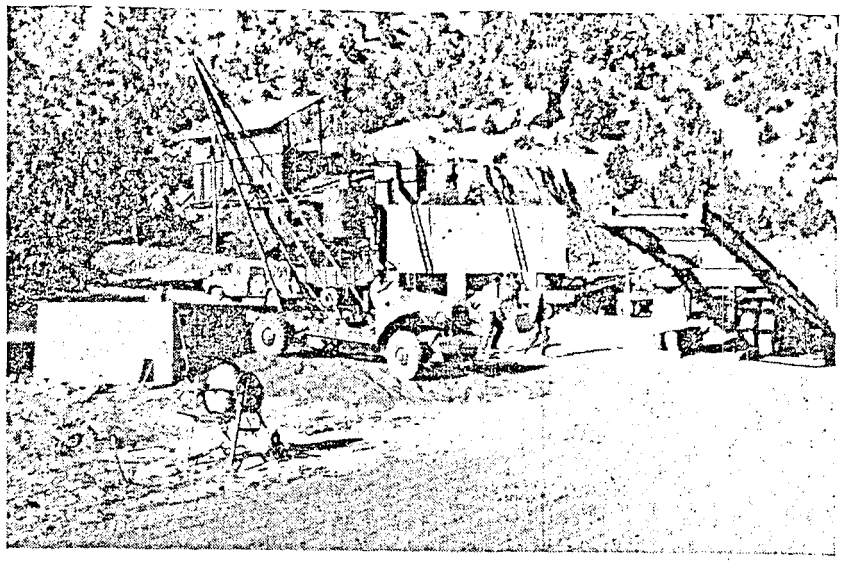
The unit is double-ended with duplicate controls so that it need not be turned to trail in the reverse direction. It is powered by a 4-cylinder 40-hp Deutz diesel engine and is equipped with Lincoln-car-type torque converter and 4-speed Ford transmission. All four wheels drive and all four wheels steer, with power assist. Tires are 9.00 x 16. At the time the material for this article was gathered, the locomotive had operated 2,000 hr and had used 900 gal of No. 1 diesel fuel.

The Messrs. Tucker and their associates took the exhaust question with the utmost seriousness, though convinced of the intrinsic safety of the diesel unit from the toxic- and noxious-fume- and gas standpoints, as well as spark and flame emission. The scrubber therefore was designed to operate on circulating water with caustic-soda additive. After the solution, the exhaust goes through a lava-rock bed and then through activated charcoal.

The aim was to get an exhaust that would show no carbon monoxide at the exit from the scrubber and the practical minimum of other exhaust products. No carbon monoxide has ever been detected in the exhaust port.

The second major safeguard against physiological effects is plenty of ventilating air up to the working face. At Koal Kreek, therefore, with five men working inside, the fan delivers 35,000 cfm, and coursing is conducted so that the minimum in the last crosscut in the active working place is 10,000 cfm.

As a further check on whether or not use of the diesel would have any physiological effect, all five men constituting the normal mine force,



SCALE INSTALLATION, shown here in its preliminary stages, will complete the facilities at the Koal Kreek Coal Co.'s new preparation plant, near Cedar City, Utah.

including the locomotive operator, were checked by a physician at the end of 1 yr of experience. Among other things blood samples were taken at the pit mouth as they came off duty at the end of the shift. No carbon-monoxide was found and other tests were negative.

Production and efficiency results were equally impressive. With the battery-powered locomotive, average output was 16 cars, or approximately 80 tons of material. The change to the diesel unit jumped output to 23 to 24 cars. A further increase since that time has resulted in an output of as much as 35 cars per shift with a one-way haul from face to dump outside of around 5,000 ft. The average at the time the material for this article was prepared was 145 tons per shift. The room-and-pillar system is employed, and recovery in pillar work is 95%.

Air Cleaning

Though a high degree of efficiency was being obtained, the mine product, as noted, ran quite high in ash, the average for R-O-M being 29%. Even though the market was accepting the coal, it was highly desirable to get the ash down, thus giving the consumer a better break and building goodwill. Needed was a low-cost, uncomplicated and efficient unit, and after investigation of the possibilities the Messrs. Tucker felt that the Ridge Airjig was the best answer for them. They placed a contract early in 1961, and in view of the prospects they could see also became the agents for the manufacturer in the western states.

The Airjig is the heart of a new plant some 2½ mi down the canyon from the Koal Kreek mine. A 55-tph unit was purchased to provide ample capacity not only for the Koal Kreek tonnage but also to process on a custom basis coal from two other neighboring operations: the Tucker Coal Co. and the Webster Coal Co. The finishing touches, including installation of a 51-ft 8-in-long truck scale, were being put on the plant at the time the material for this article was gathered. When completed, the investment will be slightly under $100,000.

Preliminary experience with the Airjig indicates that there will be no difficulty in achieving the goal of 8% ash, at which level the heat content is 12,900 Btu on an as-received basis with 3% moisture. Normally, the plant will process 200 tons of coal per day for Koal Kreek, and up to 100 tons per day for each of the other two. The plant was designed by the Messrs. Tucker and installed by the mine force, including construction of the major equipment units—air cleaner excepted.

From the size standpoint the entire output of the plant is ¾x0 except for a certain portion dedusted at ⅛ in for those who want a dedusted product. This arises from the fact that there is a heavy concentration of coal-burning equipment in the market area, since there is no natural gas and relatively little oil used for heating. Some 98% of the coal-burning units are stokers, and only about 200 tons of lump move into the market in any one year.

Coal from the three mines is kept completely separate all the way through from dumping to final binning for truck loading. It is brought in in trucks, and is dumped into a 3-compartment raw-coal bin. Each compartment holds 50 tons and is equipped with its own chain-type feeder discharging to a belt leading to the cleaning section. The bin was constructed in part of old shaker pans set vertically into the ground.

The transfer belt from the bins feeds to a mine-made rotary breaker, where all the coal is reduced to ¾ in. Mine rock and fireclay rejected in this operation go to a small 15-ton refuse bin for truck disposal along with the cleaner reject. The ¾x0 coal from the breaker drops into a 25-ton steel hopper immediately over the Airjig.

The entire breaker-cleaner unit is an outdoor-type installation. The jig could operate with normal efficiency with a feed surface moisture of 10%. The top for coal in the area, however, is around 7%.

Cleaned coal goes to the bin assigned to the particular company originating it. Each bin is one compartment of a 3-compartment unit with a total capacity of 175 tons. A small trommel-type screen above the bins handles the dedusting when desired by the purchaser. The clean-coal bin unit thus is the third section in a plant consisting of a receiving hopper, breaking and cleaning unit, and cleaned-coal storage. Rounding out the facilities are the scales weighing shipments, and the refuse bin. Plant layout results in a generally downhill flow.