COMPARISON OF HEATING VALUES OF VARIOUS FUELS

	Moist. Percent	B.t.u./lb. (dry)	Wt./unit (lbs.)	B.t.u./lb. (wet)	B.t.u. Per Unit 2/	B.t.u./2000 lbs.	kw. hr/ton 3/
Fir & Hemlock, Mixed 1/	47.90	8,970	4,160	4,670	19,420,000	8,320,000	2437.7
Fir & Hemlock, Mixed 1/	40.70	9,050	4,160	5,360	22,340,000	10,720,000	3142.0
Fir Hogged Fuel 1/	45.65	8,590	3,790	4,660	17,680,000	9,320,000	2730.0
Yellow Pine Hogged 1/	51.58	9,370	4,530	4,530	20,550,000	9,060,000	2655.0
Yellow Pine Sawdust 1/	45.33	9,140	4.050	4,980	20,200,000	9,960,000	2919.0
Coos Bay Coal	16.0	11,880	- - -	9,950	- - -	19,900,000	5830.0

1/ Data from "A Discussion of the Properties and Economics of Fuels Used in Oregon", Engineering Experiment Station, Oregon State College.

2/ Unit equals 200 cu. ft.

3/ 1 B.t.u. equals .000293 kw. hr.

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

23 October 1946

To: F.W.Libbey
Re.: Southport mine geology

According to the map supplied me, the 400 north gangway of the Coast Fuel Corporation (formerly Southport) mine is now in about 2500 feet, on a 1° (not 1%) slope. The elevation at turning is 22.3 feet, hence a projection north for 2500 feet on this slope would give an elevation of 66 feet at the face, to which must be added a 5 foot jump, which occurs a hundred feet from the face, to make an elevation of 71 feet at the face.

Assuming the correctness of the surface survey,(which was done by plane table under difficult conditions) the coal penetrated in the hand drill holes immediately ahead of the gangway (Holes numbered 40 to 44) has an elevation of the top of the coal of about 127 feet. Subtracting the 5 foot thickness of coal, this gives a difference in elevation between the coal at the face and the coal in the drill holes, of 46 feet.

The accuracy of the surface survey is checked in part by an east-west projection from Hole F (located 500 feet east of the face) where the bottom of the coal is at an elevation of 16 feet. The dip from 16 to 71 feet over that distance plots out very close to 6°, which is the average dip of the coal in much of the mine.

The surface topography above the face in the gangway includes two steep-sided E.N.E. trending gulches, the southern gulch may coincide with the direction and position of the 5 foot jump in the gangway; the northern may represent a 46 foot jump which hypothetically should be intercepted within the next 200 feet beyond the present gangway face.

Signed: John Eliot Allen
Geologist

SAMPLE OF COAL TAKEN FROM
SOUTHERN PACIFIC CAR 95343

Moisture	9.20
Volatile	45.56
Fixed carbon	37.71
Sulphur	.48
Ash	7.05

Date: March 15, 1946

Nut and stove B.t.u. 10,050

@ 24 = 61176
@ 24.5 59952
@ 25 58729

1,453,700 CU FT ORIG
1.01 CORR. FACTOR
1453700
14537000
1,468,237.00 ADJ CU FT

```
      61,176
24 ) 1468237
     144
      28
      24
      42
      24
      183
      168
       157
```

```
      58,729
25 ) 1468237
     125
      218
      200
       182
       175
        73
        50
        237
```

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  61176
  58729
2 ) 119905   59,952
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COAST FUEL CORPORATION.

PRODUCTION COSTS. MARCH.1946

PRODUCTION 1500 tons

FACE OPERATION AND CONVEYING	COST PER TON			
Labor, Machine cutting	.11			
Labor, Machine Loading	.35			
Material & Supplies	.13			
Powder & Caps	.115			
Maintenance, Equipment	.18	total	.89	
TRANSPORTATION INSIDE				
Labor, Motormen	.09			
Maintenance, Equipment	.15	total	.24	
VENTILATION & DRAINAGE				
Labor, Pumpmen	.18			
Labor, Bratticemen	.02	total	.20	
INSIDE, GENERAL.				
Wages, Foremen	.12			
Wages, Electrician	.113			
Wages, Timbermen	.101			
Lamp Rental, Engineering	.023			
Timber & Caps	.103	total	.46	Total Mine Costs Inside 1.79
PREPARATION & TIPPLING				
Labor, tipple crew	.37			
Material & Supplies	.03			
Maintenance, Equipment	.02	total	.42	
HOISTING & DUMPING				
Labor, car dumping	.085			
labor, Hoist Men	.07			
Maintenance	.005	total	.16	
GENERAL				
Power	.09			
Royalties	.165			
Car & Truck Loading	.175			
Waste Disposal	.02	total	.45	Total Mine costs Outside 1.03

COAST FUEL CORPORATION.

PRODUCTION COSTS. MARCH,1946 — PRODUCTION 1500 tons

FACE OPERATION AND CONVEYING	COST PER TON				
Labor, Machine cutting	.11				
Labor, Machine Loading	.35				
Material & Supplies	.13				
Powder & Caps	.115				
Maintenance, Equipment	.18	total	.89		
TRANSPORTATION INSIDE					
Labor, Motormen	.09				
Maintenance, Equipment	.15	total	.24		
VENTILATION & DRAINAGE					
Labor, Pumpmen	.18				
Labor, Bratticemen	.02	total	.20		
INSIDE, GENERAL.					
Wages, Foremen	.12				
Wages, Electrician	.113				
Wages, Timbermen	.101				
Lamp Rental, Engineering	.023				
Timber & Caps	.103	total	.46	Total Mine Costs Inside	1.79
PREPARATION & TIPPLING					
Labor, tipple crew	.37				
Material & Supplies	.03				
Maintenance, Equipment	.02	total	.42		
HOISTING & DUMPING					
Labor, car dumping	.085				
labor, Hoist Men	.07				
Maintenance	.005	total	.16		
GENERAL					
Power	.09				
Royalties	.165				
Car & Truck Loading	.175				
Waste Disposal	.02	total	.45	Total Mine costs Outside	1.03
				TOTAL DIRECT MINE COST PER TON	2.82
GENERAL AND ADMINISTRATIVE					
Insurance, Workmen	.105				
Janitor, Watchman	.09				
Legal & Auditing	.01				
Light & Power, Office	.002				
Miscellaneous, General	.022				
Postage	.012				
Salaries, Officers	.466				
Salaries, Office	.172				
Stationery & Printing	.003				
Taxes O.A.B.	.035				
Taxes Fed. Unempl.	.010				
Taxes Fed. Misc.	.017				
Taxes State Unemp.	.096				
Telephone & Telegraph	.066				
Taxes Personal Prop	--			total General and Administrative	1.10
				TOTAL OVERALL COSTS PER TON	$ 3.92

JANUARY 1946 PRODUCTION 4000 tons	
Direct Mine Costs	3.21
General and Administrative	.83
TOTAL OVERALL COSTS Per Ton	4.04

The above figures include all taxes, interest, legal, etc. and are very accurate with the exception of Amortization, and Depreciation figures which are not included

COAST FUEL CORPORATION
Production Costs, March 1946

Production 1500 tons

	Cost Per Ton			
Face Operation and Conveying				
Labor, Machine cutting	.11			
Labor, Machine Loading	.35			
Material & Supplies	.13			
Powder & Caps	.115			
Maintenance, Equipment	.18	Total	.89	
Transportation Inside				
Labor, Motormen	.09			
Maintenance, Equipment	.15	Total	.24	
Ventilation & Drainage				
Labor, Pumpmen	.18			
Labor, Bratticemen	.02	Total	.20	
Inside, General				
Wages, Foremen	.12			
Wages, Electrician	.113			
Wages, Timbermen	.101			
Lamp rental, Engineering	.023			
Timber & Caps	.103	Total	.46	Total Mine Costs Inside 1.79
Preparation & Tippling				
Labor, tipple crew	.37			
Material & Supplies	.03			
Maintenance, Equipment	.02	Total	.42	
Hoisting & Dumping				
Labor, car dumping	.085			
Labor, Hoist men	.07			
Maintenance	.005	Total	.16	
General				
Power	.09			
Royalties	.165			
Car & Truck Loading	.175			
Waste Disposal	.02	Total	.45	Total Mine Costs Outside 1.03
				TOTAL DIRECT MINE COST PER TON 2.82
General and Administrative				
Insurance, Workmen	.105			
Janitor, Watchman	.09			

SOUTHPORT MINE
COAST COAL CORPORATION, OREGON

by
Joseph Daniels
Mining Engineer

Location, History, General

The Southport Mine of the Coast Fuel Corporation is situated in Coos County, Oregon, 6.4 miles south of the city of Coos Bay. The mine portal is in the SE¼ of Section 22, and the present workings are largely in the NW¼ of Section 23, Township 26 South, Range 13 West. Highway No. 101 passes within 1/2 mile of the portal, and the property is reached by an access road. The Southern Pacific Railway parallels the main highway, and Isthmus Slough, an arm of Coos Bay, roughly follows the direction of the highway and railroad line. The highway elevation at the access road is approximately 20 feet.

The road to the loading bunkers extends along a creek valley which narrows near the tipple, limiting the space available for plant structures. The mine portal is above the roadway at elevation of approximately 71.5 feet. Water from the creek is used for washing purposes. Ample mine timber is available tributary to the operations.

The property, comprising some 600 acres in Sections 14, 15, 22, and 23, is a leasehold right for a period of 10 years, having a sliding scale royalty ranging from 20 cents to 9 cents per ton of shipped coal on a production basis beginning at 1000 tons per month.

The Coast Fuel Corporation acquired the property in July 1944 and proceeded to extend the then existing slope in Section 22. About April 20, 1945, the first coal cutting machine was put into operation along the entry some 150 feet inside the slope.

The immediate officials of the company whom I met during the examination are T. O. Teon, president; J. E. Gardiner, vice president; H. W. Bennett, general manager; and Frank Churchich, mine foreman.

Southport Coal Bed

The bed worked at the Southport Mine in Sections 22 and 23 consists of two benches of coal separated by a band of soft shale; the main roof and floor are sandstone, with a thin band of shale interposed between the coal and the enclosing sandstone. The total bed thickness reported by various observers in the past ranges from

4 feet 4 inches to 5 feet 1½ inches; with total coal thickness of the 2 benches varying from 3 feet 11 inches to 4 feet 4½ inches. The center shale parting varies from 7 to 10 inches: Two measurements made in the present mine on April 29, 1946 are as follows:

Face Section in Working Room about 1000 feet from Slope

Roof, sandstone	
Shale, sandy	1"
Coal	21"
Shale, soft	7" to 8"
Coal	32"
Floor, brown shale underlain by sandstone	
Total thickness of bed	5' - 2"
Thickness of coal	4' - 5"

Face Section on Entry 1880 feet from Slope

Roof, sandstone	
Shale, hard	3"
Coal	13"
Shale, soft	9" (variable)
Floor, sandstone	
Total thickness of bed	4' - 8"
Thickness of coal	3' - 8"

The seam shows deviations in the thickness of the coal benches, not only in the active portions of the present mine, but also in the older, abandoned workings. The figures reported may be regarded as typical.

The firm sandstone walls are characteristic of the bed. Examination of the long "tunnel" or drift in Section 22 and some of its accessible adjacent openings shows practically no subsidence; a few falls of sandstone roof were observed; and simple timbering appeared to be sufficient for support. These observations lead to the expectation that excellent roof conditions will be met in future workings until greater depths are mined.

The general structure of the bed, so far as can be determined from the field examination and study of maps and reports, indicates a general strike N. 20 degrees to 25 degrees E. and a dip of 8 degrees to 10 degrees to the southeast. The present slope is driven north of the true dip; the main entry is driven on a general course N. 20 degrees to 25 degrees E.

Some minor rolls and small faults have been encountered in the present workings and also have been reported as existing in the earlier operations. This is not disturbing, as such conditions are characteristic of Pacific Coast coal fields.

The continued extension of the bed to the east and south of the present workings to Highway No. 101 and thence easterly for some distance may be postulated, thus assuring a large area of virgin ground and a corresponding ample reserve of coal for future operations.

The coal is classified as Subbituminous A in rank.

Mine Development

The mine is opened from the surface by a single, partly timbered slope, 6 feet by 14 feet, driven approximately N. 85 degrees E., across the dip of the bed, within the enclosing sandstone walls. It is reported that this slope was originally begun in 1943 by former operators who wished to avoid some faulted ground existing in workings entered from portals south of the present mine. They appear to have driven the slope for approximately 200 feet and to have turned an entry to the north to reach some coal near the "old portal". Under the present management, the slope has been extended to a distance of approximately 480 feet where a sump was left for drainage purposes. Above the sump two entries have been driven northeasterly for a distance of approximately 1880 feet. The lower entry, at elevation 23 feet, constitutes the main haulage and working level; the upper is the air course. Near the slope the latter entry is connected by some irregularly driven openings in the bed to connect with the fan at the surface.

The grade of the main slope is 8 degrees to 10 degrees, and the entries have been driven on a slight grade to favor movement of loaded cars and aid drainage. At the time of my visit a sump was being driven below the main entry inside of the slope for water storage purposes.

The main entry has been driven wide enough for a single track, bottom and top rock have been removed to give clearance for cars and trolley wires. Space for parting tracks has been provided near the slope turnout.

A few rooms have been turned off the main entry and driven nearly to the gangway above in the old workings. I was informed that sufficient barrier space has been left as protection. The mine map indicates a lift or length of 250 feet from the entry to the old workings.

The room necks are driven 12 feet wide to the counter gangway, a distance of 40 to 45 feet, then widened to 35 feet for full face length. Pillars 15 to 20 feet wide separate the individual rooms, and crosscuts are reported to be spaced at 60 feet intervals. Rooms have been opened in groups leaving solid coal in each "block" which later will be opened by rooms. Part of the current production of the mine is obtained from the rooms, adjacent to the solid blocks.

The mine entry can be driven northerly from its present face for an estimated extension of 700 feet. Somewhere near this distance the entry is expected to intersect a valley or ravine in the northwest quarter of Section 23, whose elevation at this point is the same as that of the entry. When this outcrop intersection is reached new ventilating conditions will be established and the operations on this level will be limited. It is desirable to extend this entry as soon as possible to open new minable ground.

The foregoing outline covers the developed and partly mined area that represents the Southport Mine as it is today. A considerable portion of the expenditures of the Coast Fuel Corporation is represented by the slope extension, the entries, crosscuts, return air openings, - all of which are regarded as development necessary for full-scale operation. The mining of room coal has been necessary to secure production other than from development openings as well as to work out a mining system on a mechanized basis. The net result has been the development of a small mine on one level. Sufficient work has been done to test and prove structure, extent and character of the coal bed, workability, and other factors that are inherent in a venture of this kind.

Mine Operation

In the earlier operations in this district the conventional room-and-pillar system employing hand methods for mining and loading coal was used. Output was low, costs high, and profitable operation doubtful and uncertain. The only alternative was adoption of a systemized plan employing mechanized methods of cutting, drilling, loading, and transportation, coordinated to secure maximum production at lowered working costs. Capital sufficient to purchase and install equipment; skilled men must be available or trained; and competent management are imperative factors. Successful mines in this area of Oregon could not exist under the old handicaps. Recognizing these facts, the Coast Fuel Corporation took over this property in July, 1944 with the definite objective to produce coal in the modern manner.

The Southport Mine is now carrying on under a modernized program. At the time of my examination two chain coal cutting machines, Goodman types 112 and 512, electrically operated, were employed. One was being used in regular production of coal in a room about 1000 feet from the slope; the other was employed in development work advancing a room neck at the face of the entry. Two shaker conveyors of the pan type removed the mined coal at the face of these operations; the first from the room into mine cars on the entry; the second from the face and along the entry to mine cars. A third piece of equipment in which a drag conveyor moves the coal in a fixed trough was being built for trial underground. Drilling for blasting is done by an Ingersoll-Rand jackhammer and a Chicago Pneumatic rotary drill, both operated by compressed air. (Compressed air is supplied from a compressor at the surface, Worthington, 6" x 6" x 5", 2-stage type, driven by 50 horsepower motor, delivering air at 100 pounds pressure.) Transportation on the entry is by electric trolley-type motor.

Permissible explosive, Monobel AA, fired by electric blasting machines, is used to break the coal after undercutting and drilling.

Systematic single-stick timbering is carried along the pan lines and along the ribs of the coal for support.

I was informed that 2 to 2½ cycles per shift of cutting, drilling, blasting, and loading can be maintained under present conditions along the 35-foot room faces, and that with additional cars and some other needed equipment, this figure can be exceeded.

The roof and floor conditions are very favorable for mining. Undoubtedly improvements in speed and in coordination of the various stages will increase production and lower costs. The present operations appeared to me to be conducted in workmanlike and approved manner. The mine foreman is experienced in mechanized mining and its applications, and is skilled and competent. He has, in addition, been successful in training men to carry on the newer methods of producing coal.

Haulage and Transportation

Coal at the face is shovelled or loaded into a pan type shaker conveyor which moves it the necessary distance and loads it directly into mine cars. As previously pointed out, two of these units are in operation.

Mine cars are of 1.60 tons rated capacity but are loaded to 2 tons. Not enough cars are available to keep up with output of the working faces under optimum conditions and thus bottle-neck delays

result. The low-height type of car now employed is satisfactory, but increased height and capacity might be considered in connection with future developments.

Track is 36-inch gauge, well laid, of medium weight steel, and the road-bed is in good condition.

One 10-horsepower electric locomotive, trolley type, operating on 150 volt, d.c. current, made at the mine, is used for transportation along the entry. A motor-generator set is installed on the entry to supply current for this equipment.

Cars are hoisted from the entry to the surface by a 36 inch x 18 inch single cylindrical drum hoist operated by a 50-horse power motor and using a 3/4-inch rope.

While the transportation system is adequate for small output, it is not flexible enough nor is there sufficient equipment for efficient operation. More mine cars are necessary, additional parting space on the entry will be required for passing track and for car storage, and there is needed additional electrical cable and wire, not only for the haulage system but also to extend power lines to the present inside faces as well as to future extensions of the entry.

Additional height on the entry and on the slope would permit higher cars of increased capacity to be handled.

For future improvement of hoisting a modern mine hoist equipped with controls should be considered. The single rope system might be replaced by a partially balanced method when the slope is extended to a second level. This will involve a wider slope. On the other hand, if a single rope system is to be retained, a higher slope will permit the use of larger cars. Also, some thought should be given to placing the hoist in such a position that it can serve to deliver cars to a storage yard on the surface as well as to the tipple.

Ventilation and Drainage

The property, like its earlier predecessors, has been regarded as a non-gassy mine. Electric safety lamps, however, are used, presumably because of their convenience and superior illuminating quality. The company has 50 of these available for use.

In the general absence of inflammable gas there has been a tendency to minimize ventilating methods as a means of diluting and sweeping away this element. However, coal dust is a potential danger even in the absence of gas, and coal cutting machines produce large

quantities of dust. Fumes and smoke from blasting also require attention. A small blower fan was available near the face of the entry for dissipating smoke after blasting, but it was not connected to tubing for direct use at the face. A 14-inch surface fan operated by a 5-horsepower motor serves as a general exhauster, but no data are available about its performance. Under all the circumstances prevailing, it seems desirable to recommend that the ventilating system of the entire mine be improved. The suggestion is made that a new return course be driven from the back entry to the surface to replace the present irregular openings, or that some other opening be driven to take care of the situation until the present entry is extended to the outcrop.

For future extension of the mine to the second level, double entry slopes with airway connections to a surface fan are imperative.

Drainage appears to be a minor matter at this time. Two small pumps at the bottom of the slope handle water reaching this point, and the sump now being constructed will serve as additional storage. It must be remembered that as the mined areas become larger, more water will probably be encountered.

Operating Costs

No attempt was made in the short time spent at the property to make any detailed study of operating costs, although the matter was the subject of considerable personal discussion. Brief consideration was given to some of the operating reports at the mine office. The daily report for January 2, 1946 reveals the following information:

Prepared coal output, tons	182
Total man shifts	49
Tons per man per shift	3.7
Labor and supplies, cost	$540.70
Direct mine cost, per ton	$ 2.91

For the month of January, based on 20 working days and 4000 tons of coal sold, the direct cost per ton is $3.47, which does not include expenditures for development work on the main and counter entries. The corresponding figure for February appears to be $2.90.

So many factors and assumptions are involved that it is difficult to arrive at a figure for an average estimate. Market demand, number of days operated, development work conducted in addition to regular mining fluctuate widely in an operation such as this, and until regular,

normal periods of winning coal from room faces and pillar recovery can be attained, no basic figures can be worked out. Again, the matter of allocating expense other than direct mining is a contributing item in determining the ultimate cost.

In the state of Washington where mining conditions are very variable, and where competition with wood, oil, gas, electricity, and outside coal are typical of the situation in Oregon, a wide range of costs and realization exists. For detailed figures made available for public use the only source of information is from the annual reports of the state mine inspector. The largest mechanized operation in the state is that of the Northwestern Improvement Company at Roslyn, whose output goes into industrial and domestic use as well as the major consumption by the Northern Pacific Railway. The figures for 1945, together with those of two other producers in the same field, are reproduced below:

Company and Mine	Total Production	Total Employees	Days Operated	Average Daily Output Per Man Shift (tons)	Coal Value at Mine
Jonesville Coal Co. No. 4	5,489	16.4	104	3.21	$4.60
N.W.I. No. 3	187,296	160.6	295	3.95	4.73
N.W.I. No. 5	160,084	136.9	297	3.94	4.73
N.W.I. No. 9	156,032	119.4	297	4.43	4.73
Roslyn Cascade Coal Co.	145,702	125.2	296	3.93	5.26
Average	655,603	558.5	291	4.04	$4.85
State average (48 mines)	1,369,921	1,354	273.6	3.15	$5.00

Surface Plant

Surface structures such as tipple and washery, bunkers, shops, office, warehouse, compressor, oil house, etc. are grouped in a relatively narrow valley and hillside near the mine portal. Topographic conditions are not favorable for adequate level space on which to lay out the buildings and other necessary structures, and they have been crowded close to the mine portal. It may be possible by rock filling and by excavation to secure some additional space for future growth and to provide track storage for mine cars, hoist house, etc. It would be a decided advantage to have a large raw coal storage bin to serve as an equalizer between the mine and the washery, also additional bunker space for washed coal, washery refuse, and rock.

The present washery, consisting of preparatory screens, picking

belt, jig, sizing screens, and bunkers, is reported to have a capacity of 40 tons per hour. The equipment has had to be compressed into a limited space. An equalising pocket of ample size for controlling feed to the jig would enable washing to be regulated to better advantage. Jig discharge is now manually controlled and consequently is subject to the limitations of human attention. So far as could be determined from superficial examination, the jig is doing an effective job of removing rock from the mine feed, and the quality of the washed coal product is high. Other data available to me indicate that the coal is being satisfactorily prepared for market consumption and is meeting normal specifications for grade.

For future expansion an additional jig can be added, particularly if provision is made for loaded car tracks and larger raw coal storage, supplemented by a feeder bin ahead of the jigs. It may thus be possible to simplify the present layout and take better care of the disposal of washery waste and rock to cut down the cost of their removal.

Sludge sizes of coal should be impounded for future recovery and utilization, and consideration given to the possibilities of fires in the storage piles.

Water supply for the washery is obtained from the creek in the valley, supplemented by mine water as occasion arises. Present plans contemplate a dam across the creek to impound the water and increase storage reserve. It may be desirable to install some kind of settling cone for clarifying water in the washery.

Surface Transportation

Bunkers of limited holding capacity receive the lump, prepared nut-pea, and stoker sizes for discharge to trucks for local sales and for delivery by rail shipment. The lower road permits easy access to these bunkers. The company has a 6-ton truck which makes regular trips to a loading ramp and 5-car siding between the main highway and the tracks of the Southern Pacific Railway one-half mile from the mine. This arrangement appears satisfactory for the tonnage now produced and shipped, but may be inadequate for any increased demand that may come with a growing market.

The company management is investigating the economics and possibilities of water transportation from Isthmus Slough or Coos Bay to Portland and other market territory that could be reached by barge. In earlier days coal was shipped from Coos Bay to San Francisco and it is entirely within reason to look to tidewater points as possible markets. So far as could be observed, conditions will permit direct loading of barges at points close to property. Since the coal is

subbituminous, and coals of this rank weather and break easily and are liable to fire spontaneously unless carefully stacked and piled, certain precautions will have to be taken to protect shipments.

General

A mine map on scale of 100 feet to one inch, together with plan of surface structures, is a valuable addition and a great help in carrying out planning and operations. This should be made at an early date.

Although the mine is comparatively small and other considerations of greater moment have faced the management, questions of safety should be given more attention. Such a program, begun now, will ultimately reflect itself in better conditions for men and plant, and will be much less expensive than the cost of enforced measures compelled by an emergency.

/s/ JOSEPH DANIELS

May 13, 1946