

E. D. Appolonia Consulting Engineers, Inc.

APPENDIX E

CONSTRUCTION PROGRESS REPORTS

E. D'APPOLONIA

CONSULTING ENGINEERS, INC.

15 DUFF ROAD
PITTSBURGH, PA. 15235

February 22, 1971

TELEPHONE
(412) 242-5107

Project No. 70-108

Mr. Alex Molinski
Chief Mining Engineer
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania
State Project No. SL-107-4

Progress Period
December 29, 1970 through January 31, 1971

Dear Mr. Molinski:

This report summarizes the progress of construction at the Ernest Mine Complex facilities for the above progress period. Enclosed for your information are copies of our Daily Diary which summarize the daily construction activities. Also enclosed is Table I which outlines the percent completed for each work area.

Cummings Shaft

Some clearing work around the shaft perimeter has been completed. A drainage ditch is being widened and lowered in the front of the shaft to facilitate construction of the barrier walls.

E-4 Boreholes

This area has been cleared and leveled to provide a suitable working surface for plugging the E-4 boreholes. A ditch has been constructed to Crooked Creek from the boreholes. No attempt has been made as yet to seal and install valves in the boreholes.

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Mr. Alex Molinski

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Crooked Creek Borehole

The exploratory excavation located the borehole adjacent to Crooked Creek. Sand Surveys, Inc., calipered the borehole to determine the depth and diameter for plugging. The attached caliper log shows an 8-inch diameter borehole extending 99 feet from ground surface into the mine shaft. The casing is set in a concrete cap at the surface but it has not been determined if the entire casing is grouted down to the mine.

The elevation of the water in the borehole is presently at approximately El. 1016, which is about the same as the water elevation at the E-4 boreholes. The contractor, M. F. Fetterolf Coal Company, plans to break into the casing below El. 1016 to permit flow from the borehole in an attempt to lower the elevation in the E-4 boreholes. We do not concur with the contractor's plan to open the casing at the lower elevation since the eight-inch diameter borehole cannot discharge the mine water at the same capacity as the E-4 boreholes, and hence would not substantially lower the water level.

Fulton Run Shafts

The bulk of the construction activity has been concentrated in the Fulton Run area, sealing Fulton A and Fulton B shafts. The location of Fulton B was determined by exploratory excavation and assistance from the local townspeople.

Fulton A shaft is an air shaft which, apparently, is concrete lined for its full length to the mine. The shaft has been backfilled and test pit excavations within the shaft revealed water at El. 1000, while groundwater outside of the shaft was recorded at approximately El. 1010. The shaft was overexcavated inside and outside to determine the extent of the concrete liner. A reinforced concrete seal was placed over the shaft walls at El. 1012. Three feet of clay backfill was compacted over the concrete shaft and the entire area brought to grade (El. 1022). The center of the shaft has been temporarily referenced to the adjoining topography. After the piezometers are installed, a final survey will be conducted.

Fulton B shaft is a timber-lined shaft filled with clay, "red dog" and other debris. A reinforced concrete mat was installed to hydraulically seal the shaft. The seal extended horizontally a minimum of two feet beyond the shaft perimeter into the decomposed, clay shale rock. A three-foot-thick, compacted clay blanket was placed over the top of the concrete and the entire area backfilled to grade (approximately El. 1050). To reach suitable soil for embedding the concrete seal, it was necessary to excavate 10 feet below the previously estimated excavation bottom (El. 1038). A more accurate estimate of the excavation bottom was not possible since the exact location of Fulton B shaft was not known.

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Mr. Alex Molinski

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February 22, 1971

During the investigation for Fulton B shaft, two more boreholes were uncovered. These boreholes will be located on the as-built drawings. One borehole was calipered and the results are enclosed. The second borehole was plugged with decomposed timber, and the contractor plans to ream this hole for calipering and eventual sealing. This borehole has a six-inch diameter inner casing and an eight-inch diameter outer casing. It has not been determined whether grout was placed in the annulus. The scope of work has been expanded to include calipering and sealing of the two boreholes. Revised work item tabulation sheets have been prepared by us and submitted to the Department of Environmental Resources for review.

The third air shaft was not encountered during the exploratory excavation. Local residents informed the contractor that Fulton A and B were the only known air shafts in the area and a third shaft did not exist. There is no further work planned for this item.

A ten-inch diameter, vertical steel pipe has been discovered near Fulton A shaft. Work relating to the pipe was not included in the original "Scope of Work," as outlined in the Technical Specifications. Preliminary exploration of the pipe indicates that it is embedded in a concrete mat about 18 inches below ground and then runs horizontally under an adjoining garage. The garage was described by local residents as an old lamp house. Further investigation will be required to determine if the pipe is hydraulically connected to the mine.

General Comments

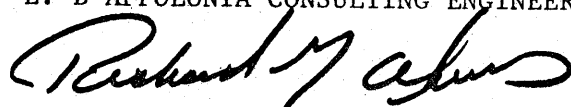
The contractor has cleared several access roads to the E-4 boreholes and the Crooked Creek borehole. Since portions of the road are outside the easements shown on the design drawings, the contractor purchased additional easements from the local owners to perform the work.

Considering cold weather and wet conditions, the contractor's work to date has been satisfactory.

The next progress period should include work on Cummings Shaft and the E-4 boreholes. Starting time for construction of the water transfer pipe between the E-1 and E-2 mine openings is not known.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw

Encl.

cc: Mr. G. Mandel
Mr. J. Buscavage

CONSTRUCTION PROGRESS
 ERNEST MINE COMPLEX
 STATE PROJECT/SL-107-4

Item	Work Area Description	% Completion (1971)											
		Jan.		Feb.		March		April		May		June	
		Total Bid Cost (1)	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0										
B	Mine Openings; E1 Barrier Mine Openings; E2 Barrier	0	0										
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0										
D	Mine Opening, E3 Barrier	0	0										
E	E4 Boreholes	0*	10										
F	Borehole in Creekside DDH No. 44	0	0										
G	Borehole in Crooked Creek	14	10										
H	Fulton A Shaft	66	100										
	Fulton B Shaft	87	100										
	Possible Third Shaft 2 - 8" Dia. Boreholes	-	5										
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0										
TOTAL JOB COMPLETION		17%	-										

NOTES:

- (1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.
- (2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.

E. D'APPOLONIA

CONSULTING ENGINEERS, INC.

15 DUFF ROAD
PITTSBURGH, PA. 15235

March 19, 1971

TELEPHONE
(412) 242-5107

Project No. 70-108

Mr. Alex Molinski, Director
Bureau of Mining Restoration
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania
State Project No. SL-107-4

Progress Period
February 1, 1971 through February 28, 1971

Dear Mr. Molinski:

This report summarizes the work completed at the Ernest Mine Complex for the above progress period. Copies of the daily diary are enclosed for your general information. Also included is Table I which summarizes the percent completion for each work area.

Cummings Shaft

Most of the construction has been in the Cummings Shaft work area. The excavation around the Cummings Shaft extended approximately nine feet below original ground surface (El. 1068).

The "broken-out" wall section, where acid mine water is presently discharging, was apparently opened with explosives prior to or following the cessation of mine operations. As a result, numerous cracks in the shaft walls are present. The cracks were observed after the excavation around the shaft was completed. It was necessary to remove several loose cracked blocks from the existing wall and this caused a lowering of the water level in the shaft from approximately El. 1061 to El. 1056 (see diary entry for February 11, 1971). There were no cracks noted below an

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CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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March 19, 1971

old horizontal construction joint at El. 1056. To ensure that seepage of acid mine water could not occur through the old wall and beneath the new wall, the excavation was extended a minimum of three feet below the old horizontal construction joint. Since the construction joint did not extend completely around the shaft perimeter, this additional excavation was not required in all areas.

The excavated material consisted mostly of shale rock fragments and clayey silts. Although most of the material appeared to be fill, the bottom of the excavation was considered suitable to support the new walls and provide an adequate seal against leakage of acid mine water from within the shaft to the surrounding soils. Rock was not encountered within the excavated zone.

The contractor is constructing the new wall in approximately five-foot vertical lifts with six-inch PVC water stops installed at each construction joint. The acid mine water discharging from the shaft is being diverted through an 18-inch diameter steel pipe placed in the broken-out portion of the existing shaft wall. The diversion pipe has a two-inch welded cutoff collar inside and outside to prevent seepage along the pipe-wall interface. After the new wall and appurtenances are completed, the pipe will be permanently closed by grouting. The contractor has placed approximately 12 cubic yards of concrete for the new wall.

E4 Boreholes

In an attempt to retard the flow at the E4 Boreholes, the contractor tried unsuccessfully to install a four to five-foot long pipe of slightly larger diameter around the existing 16-inch diameter borehole. Since the static elevation head of the acid mine water is approximately two to three feet higher than ground elevation, it was thought the pipe would permit the water to reach equilibrium and therefore stop the flow for a long enough period to complete the borehole work. Unfortunately, the pipe did not satisfactorily seal the water from seeping beneath the pipe extension. However, the contractor plans to reattempt this method prior to sealing the E4 Boreholes.

The contractor and representatives of E. D'Appolonia Consulting Engineers met with Pennsylvania Drilling Company to discuss methods for sealing the E4 Boreholes (see diary, February 3, 1971). To reduce the cost of purchasing commercial packers, Pennsylvania Drilling Company proposed to fabricate packers which would satisfactorily seal the boreholes for installation of the pipes and valves. If the flow at the E4 Boreholes can be stopped using the method described above, an even less expensive scheme such as a concrete basket could be used to complete the E4 Borehole work.

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CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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March 19, 1971

The E2 Mine Opening

The pump house at the E2 Mine Opening has been demolished and some dewatering is being attempted using a six-inch centrifugal pump. The water level at the opening has dropped approximately one inch in two days of pumping.

General Comments

The progress of all work has been slow due to wet site conditions. Four complete work days were lost due to poor weather. To improve production, where feasible, the contractor will increase his construction forces and equipment at the present work areas and will begin construction at the remaining work areas.

Within the next progress period, the contractor will begin sealing the E4 Boreholes, Fulton Run Boreholes and the Crooked Creek Boreholes, and will begin installing piezometers.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw

Encl.

cc: Mr. G. Mandel
Mr. J. Buscavage

CONSTRUCTION PROGRESS
 ERNEST MINE COMPLEX
 STATE PROJECT/SL-107-4

Item	Work Area Description	% Completion (1971)											
		Jan.		Feb.		March		April		May		June	
		Total Bid Cost (1)	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80								
B	Mine Openings; E1 Barrier Mine Openings; E2 Barrier	0	0	0	0								
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0	33	10								
D	Mine Opening, E3 Barrier	0	0	0	0								
E	E4 Boreholes	0*	10	0	10								
F	Borehole in Creekside DDH No. 44	0	0	0	0								
G	Borehole in Crooked Creek	14	10	0	0								
H	Fulton A Shaft Fulton B Shaft Possible Third Shaft 2 - 8" Dia. Boreholes	66 87 - 0	100 100 - 5	66 87 - 0	100 100 - 5								
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0								
TOTAL JOB COMPLETION		17%	-	24	-								

NOTES:

(1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.

(2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.

E. D'APPOLONIA
CONSULTING ENGINEERS, INC.

15 DUFF ROAD
PITTSBURGH, PA. 15235

April 14, 1971

TELEPHONE
(412) 242-5107

Project No. 70-108

Mr. Alex Molinski, Director
Bureau of Mining Area Restoration
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania
State Project No. SL-107-4

Progress Period
March 1, 1971 through March 31, 1971

Dear Mr. Molinski:

This report summarizes the construction activities at the Ernest Mine Complex for the above progress period. The enclosed Table I is the estimated percent completion continued from the previous January and February progress reports. The calipering record for the second borehole at Fulton Run, and copies of the daily diary are also enclosed.

Cummings Shaft

Construction of the new reinforced concrete wall continued at Cummings Shaft. The second lift extended the new wall six (6) feet higher to El. 1066. This lift is continuous around the old shaft. The existing shaft wall was not plumb, requiring forming the new wall at a thickness varying from 9 to 15 inches in order to provide a minimum wall thickness of 9 inches and with a plumb outside finish (see the discussion in diary, February 19, 1971). Because of extensive cracking, the west wall was completely removed. The new wall was formed to the thickness of the old wall plus the 9-inch outside wall, or a total wall thickness of 36 inches. The 18-inch pipe used to temporarily divert the mine drainage was placed in the second lift. The total concrete for the second lift was 35 cubic yards.

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Mr. Alex Molinski

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April 14, 1971

The third and final lift was approximately 5 feet high to El. 1071.47, or 3.15 feet above the old wall at El. 1068.32. The 12-inch diameter stainless steel outlet pipe and 3-inch cutoff collar was installed at invert El. 1061.57. Along the north side where the old wall had been removed, the new wall was overlapped approximately three inches onto the old wall to facilitate forming along the diagonal break. Where the old wall is still intact, the new wall has a thickness of 12 inches around the top. On the west side, the wall thickness was reduced to 24 inches for the third lift. The concrete volume for the third lift was 30 cubic yards.

The west side of the new wall has a broad-crested weir, four feet wide by six inches deep to serve as an emergency overflow should the water continue to rise in the shaft.

The total volume of concrete for the Cummings Shaft was 77 cubic yards or 17 yards above the original contract estimate. This is due to replacing concrete that had to be removed from the cracked portions of the west wall and the uneven nature of the old shaft wall around the remaining sides.

The temporary 18-inch pipe was sealed by 2 steel plates with gaskets held by a threaded rod. The pipe was then grouted with a non-shrink grout, and a concrete block placed over the pipe on the outside wall face (see sketches in diary, March 30, 1971). The water in the shaft has not reached the invert elevation of the 12-inch stainless steel pipe.

The inside concrete surfaces that will be exposed to mine acid water have been coated with "Dura-Kote," a trade name for an acid resistant concrete coating. The chain-link fence is installed and the area around the shaft has been graded. The drainage channel from the shaft and valve housing to the creek has been backfilled and shaped to permit flow.

Fulton Boreholes

The two boreholes at the Fulton B Shaft were sealed during the progress period. The inside casing in both boreholes was removed, the bottom plugged and the boreholes sealed with a cement-water grout. It was interesting that the 6-inch pipe removed from the borehole was in good condition, despite exposure to acid water and its apparent age. A concrete cap was placed on top of the boreholes, using excess grout from the plugging operation.

Crooked Creek Borehole

The borehole adjacent to Crooked Creek was reamed, plugged and grouted during the progress period. The access to the work area was very difficult due to muddy conditions. All equipment had to be towed to and from the work area by a tractor. A cement-grout cap, approximately 1.5 feet square, was placed at the top of the borehole.

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CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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April 14, 1971

E-2 Mine Opening

The contractor has tried unsuccessfully to dewater the E-2 opening with a six-inch diesel pump and a three-inch electric pump. The water level had dropped about one inch during several days pumping.

A cave-in was noted in the roof of the E-2 opening. Due to the large volume of pooled water at E2 and the necessity of removing the caved portion of the E2 drift, it will be necessary to revise the construction of the concrete barrier and 18-inch pipe. A proposal to remove the caved-in section and change the dewatering technique is being developed for your review and approval. Plans to seal the two drifts normal to the E-2 shaft will also be included.

E-3 Mine Openings

At E-3, the contractor has prepared an access road to the site and is controlling the drainage from the two openings. Work began at the intact E-3 opening but was stopped by the State Mine Inspector, Mr. Gerald Kephart, on March 24, 1971 (see daily diary). Mr. Kephart's primary objection was inadequate safety practices by the contractor, M. F. Fetterolf Coal Company. In particular, he indicated that when working near any mine opening, a certified gas detection lamp (bug-lamp) operator must be present at the opening at all times to detect methane gas or "blackdamp." An electronic methane detector has been used for the borehole work and will be used at the mine openings in addition to the "bug-lamp."

The contractor arranged for Mr. Mike Phillips, the State Mine Inspector from Jennerstown, Pennsylvania, to conduct a three-hour lesson to his construction forces on the operation and maintenance of the lamp. Mr. D. Rowlison of our office also attended. The contractor will have a lamp at each mine opening for all future work.

E-1 Mine Opening

The mine inspector would not enter E-1 until adequate ventilation was provided. It has been suggested that some savings in time and money can be realized by closing the valve at Cummings Shaft and determine if water discharges from E-1. Investigation and removal of any barriers within the mine could be eliminated. However, prior to initiating this scheme, approval from the Department of Environmental Resources would be required since the water would be discharged into the adjoining McKee Run. Also, to facilitate construction of the pipe and concrete barrier, the valve at Cummings would have to be reopened until flow has stopped at E-1.

E. D'APPOLONIA

CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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April 14, 1971

DDH-44 Borehole

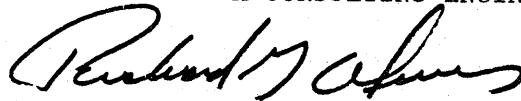
The contractor conducted exploratory excavation at the location of Borehole No. DDH-44. A tractor-mounted backhoe excavated an area 50 feet by 25 feet by one foot deep. Uncovered areas were examined with a hand spade and no evidence of a borehole was found. Several local residents stated they had no recollection of a borehole in the area. No further investigation is planned but the area will be monitored when the project is complete. Sealing the borehole is not critical since the ground surface elevation is approximately 28 feet above the E-3 discharge opening.

General Comments

As in the previous construction periods, adverse weather has hindered the contractor's progress. The first week of the month was nearly completely lost due to heavy snowfalls. Wet, muddy conditions seriously hampered the work at E-4. The bulk of the work at Cummings is complete. Anticipated work in the future will be at E-1, E-2, E-3 and the piezometer locations. The E-4 area is still very wet and work should begin when the area has dried.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw

Encl.

cc: Mr. G. Mandel
Mr. J. Buscavage

CONSTRUCTION PROGRESS
 ERNEST MINE COMPLEX
 STATE PROJECT NO. SL-107-4

Item	Work Area Description	% Completion (1971)											
		Jan.		Feb.		March		April		May		June	
		Total Bid Cost (1)	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80	99	99						
B	Mine Openings; E1 Barrier	0	0	0	0	0	0						
	Mine Openings; E2 Barrier E2A and E2B Drifts	0	0	33	10	57	20						
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0	0	0	0	0						
D	Mine Opening, E3 Barrier	0	0	0	0	27	20						
E	E4 Boreholes	0*	10	0	10	0	10						
F	Borehole in Creekside DDH No. 44	0	0	0	0	3 ⁽³⁾	100						
G	Borehole in Crooked Creek	14	10	0	0	100	100						
H	Fulton A Shaft	66	100	66	100	66	100						
	Fulton B Shaft	87	100	87	100	87	100						
	Possible Third Shaft	-	-	-	-	-	-						
	2 - 8" Dia. Boreholes	0	5	0	5	100	100						
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0	0	0						
	TOTAL JOB COMPLETION	17%	-	25%	-	42%	-						

NOTES:

- (1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.
- (2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.
- (3) No borehole found, cost is for exploratory work only.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.

E. D'APPOLONIA
CONSULTING ENGINEERS, INC.

15 DUFF ROAD
PITTSBURGH, PA. 15235

May 12, 1971

TELEPHONE
(412) 242-5107

Project No. 70-108

Mr. Alex Molinski
Bureau of Mining Area Restoration
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania
State Project No. SL-107-4

Progress Period
April 1, 1971 through April 30, 1971

Dear Mr. Molinski:

This report summarizes the construction accomplished at the Ernest Mine Complex for the above progress period. The enclosed Table I is the percent completion of each work item continued from previous monthly progress reports. Also enclosed are caliper records for the two plugged boreholes at E-4.

Cummings Shaft

The work at Cummings Shaft is complete. The stainless steel valve was installed, and the protective housing constructed. The valve was closed April 26, 1971, after the water level had risen to the level of the outlet pipe (El. 1061) to observe if water discharges at E-1. The water in Cummings Shaft is rising about 18 inches per week.

E-1 Mine Opening

No work has started inside the E-1 opening, but some preparation has been done outside including removing rails and ties near the opening and regrading at ground surface. The rail portion of the bridge across McKee Run adjacent to E-1 has been removed for the transfer pipe and its supporting structure.

E. D'APPOLONIA

CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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May 12, 1971

E-2 Mine Opening

At E-2, the contractor has cleared the area of the cave-in. Further work on the opening is contingent upon delivery of the water transfer pipe, and approval of the change order for E-2 which was submitted to the Ebsburg office on April 21, 1971.

The two drifts normal to the E-2 opening, E-2A and E-2B, are part of the proposed change order. Both of these drifts have been excavated, the walls, floor and roof removed and the excavated area backfilled with clay placed in 12-inch layers, and compacted with a sheepsfoot roller. The compacted backfill was continued to approximately three feet above the drift roof, and the remaining excavation filled and compacted by bulldozers to the original ground surface.

E-3 Mine Openings

The concrete barrier and gate were installed at the intact E-3 opening. The installation was made as shown on the plans, with two modifications:

- a. As shown on the attached Fig. 1, the construction joint (shear key and PVC waterstop) was moved from the barrier-footing joint to the footing-entry pad joint. This was done at the contractor's request to facilitate forming.
- b. The second modification is the depth of embedment into the opening sidewalls. The drawings specified two feet of embedment. Due to the hardness of the rock in the opening, a three-inch deep notch was placed which will give adequate anchoring of the concrete barrier to the sidewall as well as provide satisfactory seepage protection.

In accordance with the recommendations of the State Mine Inspector, Mr. Gerald Kephart, a gas detection lamp was employed at the opening whenever work was underway. An electronic gas detector was also used. No methane was detected, but blackdamp was found. At times, the oxygen level dropped to 16 percent, and extra precautions were taken when men were working at the entry.

At the collapsed E-3 shaft, the contractor excavated the material above the shaft in search of competent rock into which the concrete seal could be embedded as specified on the plans. Suitable rock was not found until 80 feet of the mine heading had been uncovered. The rock at that point was the entrance to a room that had been removed in the mining operation. It was decided that the concrete barrier would have to be larger than planned and would serve no useful purpose at that location. A well-compacted clay backfill would

E. D'APPOLONIA

CONSULTING ENGINEERS, INC.

Mr. Alex Molinski

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May 12, 1971

be an adequate seal because low water pressure is expected at the collapsed shaft. The timber walls, roof and floor were removed and a clay seal placed in one-foot lifts and compacted with the LS 4000 backhoe. The volume of excavation greatly exceeded the estimate; 1280 cubic yards excavated vs. 200 cubic yards of soil and 200 cubic yards of rock estimated.

E-4 Boreholes

The contractor uncovered Borehole No. 3 whose exact location was not known. The borehole was completely plugged and required reaming and calipering. Borehole No. 4, which was partially plugged, required reaming and calipering and Borehole No. 1 was reamed.

Piezometer Installation

Two drilling rigs from Pennsylvania Drilling Company arrived on the site during the last week of the progress period and are drilling for piezometer installations at Cummings Shaft and E-2.

General Comments

The contractor has had excellent weather during the progress period which has enabled him to complete the excavation and backfill at E-2A, E-2B and the collapsed E-3 shaft with a minimum of difficulty. The backfill was placed at the natural water content, and a very stiff impermeable seal constructed. The E-4 area has dried considerably and access by four-wheel drive vehicles is possible.

The contractor has had difficulty securing the pipe specified for the E-1 to E-2 transfer pipe and delivery is expected in mid-May. The pipe for the E-4 boreholes is expected at about the same time.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.


Richard G. Almes

RGA:isw

Encl.

cc: Mr. G. Mandel
Mr. J. Buscavage

CONSTRUCTION PROGRESS
ERNEST MINE COMPLEX
STATE PROJECT NO. SL-107-4

Item	Work Area Description	% Completion (1971)											
		Jan.		Feb.		March		April		May		June	
		Total Bid Cost (1)	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80	99	99	103	100				
B	Mine Openings; E1 Barrier	0	0	0	0	0	0	47	25				
	Mine Openings; E2 Barrier E2A and E2B Drifts	0	0	33	10	57	20	56	30				
C	Water Transfer Pipe Between E1 and E2 Mine Openings	-	-	-	-	-	-	0	100(4)				
		0	0	0	0	0	0	3	10				
D	Mine Opening, E3 Barrier	0	0	0	0	27	20	131	100				
E	E4 Boreholes	0*	10	0	10	0	10	23	25				
F	Borehole in Creekside DDH No. 44	0	0	0	0	3(3)	100						
G	Borehole in Crooked Creek	14	10	0	0	103	100						
H	Fulton A Shaft	66	100	66	100								
	Fulton B Shaft	87	100	87	100			.03	100				
I	Possible Third Shaft	-	-	-	-	-	-						
	2 - 8" Dia. Boreholes	0	5	0	5	96	100						
J	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0	0	0	18	30				
	Remove Barrier in E1	-	-	-	-	-	-	-	-				
TOTAL JOB COMPLETION		17%	-	25%	-	42%	-	50.4	-				

NOTES:

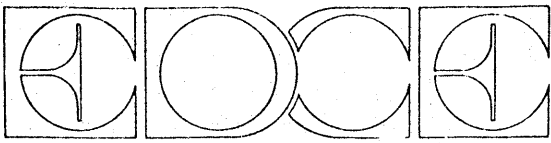
(1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.

(2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.

(3) No borehole found, cost is for exploratory work only.

(4) Work is complete, but change order authorizing payment has not been approved.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.



E. D. Appolonia Consulting Engineers, Inc.

10 DUFF RD., PITTSBURGH, PA. 15235
TEL (412) 242-5107 OR 243-3200
TELEX: 81-2378

June 24, 1971

Project No. 70-108

Mr. Alex Molinski, Director
Bureau of Mining Area Restoration
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania
State Project No. SL-107-4

Progress Period
May 1, 1971 through May 31, 1971

Dear Mr. Molinski:

This report summarizes the progress of construction at the Ernest Mine Complex facilities for the above progress period. Enclosed for your information are copies of the Daily Diary for the month, and Table I summarizing the percentage of work completion in each area. Also enclosed is Table II which summarizes the test borings and piezometer installations.

E-1 Mine Opening

The water level at Cummings Shaft continued to increase after the valve was closed on April 26, 1971. On May 14, 1971, the water elevation at Cummings reached El. 1066, and water started flowing from the E-1 opening. Flow from E-1 indicates that no barrier exists between Cummings and E-1. Consequently, further investigation in the mine for barriers to this flow will not be required. To facilitate construction of the E-1 barrier, the valve at Cummings was reopened on May 14, 1971 and the water level began to decrease in the Cummings Shaft and at E-1.

After determining that no work is required inside the E-1 opening, the contractor placed the concrete pad for the E-1 barrier (2-1/2 cubic yards of concrete). The barrier wall will be placed when the 18-inch transfer pipe is in place.

E. D. Appolonia Consulting Engineers, Inc.

Mr. Alex Molinski

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June 24, 1971

The 18-inch E1-E2 transfer pipe was delivered on May 28, 1971. The pipe support on the bridge crossing between E-1 and E-2 was installed. For ease of construction, the protective box and insulation will be slightly larger than shown on the Plans.

E-4 Boreholes

Borehole No. 3 was plugged during the progress period. The flow from the borehole was stopped by placing an open barrel over the hole. The water level rose about 15 inches and stopped. The hole was plugged with timber, wrapped with burlap and the plug set by striking with the drill bit. Grout was pumped down to the plug and the grout pipe withdrawn as the grout filled the hole. This method was satisfactory to properly seal the borehole and is less costly than the specified Lynes packer. A letter is being sent to the contractor, M. F. Fetterolf Coal Company, requesting that a credit be given to the work item, due to the lower borehole packer cost. The packer requirements for the remaining E-4 boreholes will be in accordance with the Contract Drawings and Specifications.

Cleaning and reaming of the 16-inch diameter borehole began during the progress period. The pipe and valves for the boreholes arrived at the site.

Piezometer Installation

Piezometer boreholes P1, P3, P4, P5, P7, P8, P9, P10 and P11 were drilled during the progress period. A description of drilling quantities and piezometer installations are summarized on the enclosed Table II.

Piezometer P2 was eliminated since it would have been drilled near the E-2 opening where the change in mine water elevation can easily be observed from the E-1 portal.

Piezometer borehole P1 was drilled near the Cummings Shaft but failed to hit the mined seam. The hole penetrated solid coal and as indicated by the pressure testing, the piezometer would not properly record the water elevation in the mine. As a result, the borehole was grouted without installing a piezometer. However, a piezometer is not required in this area since the water elevation at Cummings Shaft represents the elevation head in the mines and can be easily observed from the surface. Although a piezometer was not installed, the boring provided information of rock strata and permeability.

At P8, near the E-4 boreholes, a similar condition occurred. The first borehole missed the drift and had to be grouted without installing a piezometer. The second borehole, P9, successfully hit the mined seam and a piezometer was installed.

E. D'Appolonia Consulting Engineers, Inc.

Mr. Alex Molinski

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June 24, 1971

Preliminary copies of the borehole logs, pressure tests and shift reports were transmitted in the field to Mr. George Mandel of your office. A complete record of the boring logs and rock permeabilities will be included with the As-Built Drawings. Protective steel pipe encasements with locks were grouted in place over the piezometer caps. Duplicate keys were made for use by the Bureau of Mining Area Restoration, Ebensburg office, M. F. Fetterolf Coal Company and E. D'Appolonia Consulting Engineers, Inc.

The contractor's progress has been slowed due to late ordering of pipe for the E-1 to E-2 transfer pipe. The bulk of the month has included cleaning up completed areas, preparing the bridge at E-1, and aiding the drillers in installing piezometers.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw
Encl.

cc: Mr. J. Buscavage
Mr. G. Mandel

CONSTRUCTED) PROGRESS
 ERNEST MINE COMPLEX
 STATE PROJECT NO. SL-107-4

% Completion (1971)

Item	Work Area Description	% Completion (1971)											
		Jan.		Feb.		March		April		May		June	
		Total Bid Cost	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80	99	99	103	100				
B	Mine Openings; E1 Barrier	0	0	0	0	0	0	47	25	86	75		
	Mine Openings; E2 Barrier	0	0	33	10	57	20	56	30	65	50		
	E2A and E2B Drifts	-	-	-	-	-	-	0	100(4)				
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0	0	0	0	0	3	10	13	15		
D	Mine Opening, E3 Barrier	0	0	0	0	27	20	131	100				
E	E4 Boreholes	0*	10	0	10	0	10	23	25	43	40		
F	Borehole in Creekside DSH No. 44	0	0	0	0	3(3)	100						
G	Borehole in Crooked Creek	14	10	0	0	103	100						
H	Fulton A Shaft	66	100	66	100								
	Fulton B Shaft	87	100	87	100								
	Possible Third Shaft	-	-	-	-	-	-	.03	100				
	2 - 8" Dia. Boreholes	0	5	0	5	96	100						
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0	0	0	18	30	62	95		
J	Remove Barrier in E1	-	-	-	-	-	-	-	-	0	100		
	TOTAL JOB COMPLETION	17%	-	25%	-	42%	-	50.4	-	0	100	COMPLETED	

NOTES:

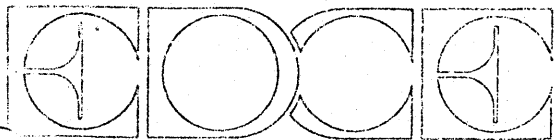
(1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.

(2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.

(3) No borehole found, cost is for exploratory work only.

(4) Work is complete, but change order authorizing payment has not been approved.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.



E. D. Apolonia Consulting Engineers, Inc.

10 DUFF RD., PITTSBURGH, PA. 15235
TEL. (412) 242-5107 OR 243-3200
TELEX: 81-2376

July 28, 1971

Project No. 70-103

Mr. Alex Molinski, District Engineer
Ebensburg District
Office of Engineering and Construction
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania

Progress Period
June 1, 1971 through June 30, 1971

Dear Mr. Molinski:

This report summarizes the construction activities at the Ernest Mine Complex for the above progress period. The enclosed Table I is the estimated percent completion continued from previous reports. Copies of the daily diary are also enclosed.

The piezometer monitoring program is under way. A letter is being prepared which outlines proposed procedures and scheduling for obtaining the piezometer readings. Piezometer No. P6 is not completed, pending access to the location of Borehole DDH44 in Creekside.

Completed Work Areas

Work has been completed prior to this progress period at Cummings Shaft, E-3 Mine Opening, Fulton Run and the Crooked Creek Borehole. Clean-up may be required at these locations when the project is completed.

E-1 Mine Opening

The concrete barrier in the E-1 mine opening was completed during the progress period. The 18-inch water transfer pipe was placed in the barrier and the area in front of the E-1 opening has been graded to drain surface

runoff water. The gate above the concrete wall has not been installed.

Water Transfer Pipe, E-1 Opening to E-2 Opening

The 18-inch water transfer pipe was installed between the E-1 Opening and the E-2 Opening. The pipe was placed on line between the openings, and at the grade specified on the plans, with one exception. About 75 feet from E-2, an existing 8-inch pipe was uncovered which intersected the grade of the water transfer pipe. R & P Coal Company would not furnish information regarding the utility of the pipe which negated any attempt of removal. Therefore, the pipe was circumvented by passing the 18-inch pipe over the top for a distance of about 75 feet and then back on grade again. No other existing pipes were uncovered.

The bridge crossing was completed and the protective housing constructed. To facilitate construction and to improve the protective housing, several field changes were made. The protective housing, as constructed, is sketched in the diary entry for June 24, 1971. The principal improvements were support of the housing from the two outside channels, and the addition of planking covered with tar paper for the roof.

The Foamglass insulation was placed on the pipe between E-1 and the bridge, from the bridge 75 feet toward E-2, and 25 feet from E-2 toward E-1. The remainder of the pipe has sufficient soil cover for protection against freezing.

The cleanouts were installed as specified. Four posts embedded in concrete were placed around the cleanouts to protect them from traffic.

E-2 Mine Opening

The seal of the E-2 Mine Opening was completed during the progress period. The 18-inch pipe was placed 50 feet into the opening, and an earth seal placed around the pipe. The opening was backfilled to a level one foot above the keystone. The area above the opening has been backfilled and graded.

E-4 Mine Opening

The reaming of the 16-inch borehole was completed. Packers for sealing the boreholes arrived at the site and should be installed next month.

E. D'Appolonia Consulting Engineers, Inc.

Mr. Alex Molinski

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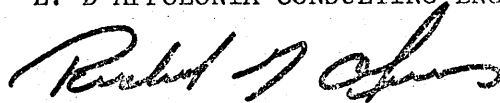
July 28, 1971

General Comments

Progress through the period has been satisfactory. The E-4 Borehole work and installation of the piezometer at Creekside DDH44 should be completed in July.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw
Encl.

cc: Mr. J. Buscavage
Mr. G. Mandel

CONSTRUCTION PROGRESS
ERNEST MINE COMPLEX
STATE PROJECT NO. SL-107-4

% Completion (1971)

Item	Work Area Description	Jan.		Feb.		March		April		May		June	
		Total Bid Cost (1)	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80	99	99	103	100	100	100	100	100
B	Mine Openings; E1 Barrier	0	0	0	0	0	0	47	25	86	75	86	95
	Mine Openings; E2 Barrier	0	0	33	10	57	20	56	30	65	50	84	100
	E2A and E2B Drifts	-	-	-	-	-	-	0	100(4)	0	100	100	100
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0	0	0	0	0	3	10	13	15	102	100
D	Mine Opening, E3 Barrier	0	0	0	0	27	20	131	100	100	100	100	100
E	E4 Boreholes	0*	10	0	10	0	10	23	25	43	40	42**	45
F	Borehole in Creekside DDH No. 44	0	0	0	0	3(3)	100	0	0	0	0	0	0
G	Borehole in Crooked Creek	14	10	0	0	103	100	0	0	0	0	0	0
H	Fulton A Shaft	66	100	66	100	0	0	0	0	0	0	0	0
	Fulton B Shaft	87	100	87	100	0	0	0	0	0	0	0	0
	Possible Third Shaft	-	-	-	-	-	-	.03	100	0	0	0	0
	2 - 8" Dia. Boreholes	0	5	0	5	96	100	0	0	0	0	0	0
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0	0	0	18	30	62	95	72	95
J	Remove Barrier in E1	-	-	-	-	-	-	-	-	0	100	-	-
	TOTAL JOB COMPLETION	17%	-	25%	-	42%	-	50.4%	-	61%	-	74%	-

NOTES:

(1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.

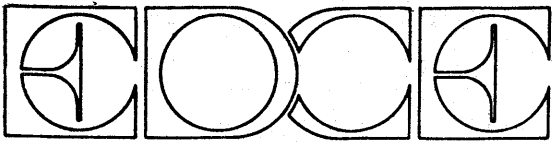
(2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.

(3) No borehole found, cost is for exploratory work only.

(4) Work is complete, but change order authorizing payment has not been approved.

*Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.

** Includes credit for packers.



E. D. Appolonia Consulting Engineers, Inc.

10 DUFF RD., PITTSBURGH, PA. 15235
TEL. (412) 242-5107 OR 243-3200
TELEX: 61-2378

August 10, 1971

Project No. 70-108

Mr. Alex Molinski, District Engineer
Ebensburg District
Office of Engineering and Construction
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Construction Progress Report
Ernest Mine Complex
Indiana, Pennsylvania

Progress Period
July 1, 1971 through July 31, 1971

Dear Mr. Molinski:

This report is a summary of construction progress at the Ernest Mine complex for the above progress period. Table I is the percentage completion of work, continued from previous reports. Also attached is a copy of the daily construction diary for the month of July.

Completed Work Areas

Prior to this progress period, work has been essentially completed at Fulton Run, Cummings Shaft, the E-1, E-2 and E-3 mine openings, and Crooked Creek borehole. It should be noted that these areas are complete, pending final inspection.

E-4 Mine Opening

The only incomplete work area is at E-4. During the progress period, the two eight-inch boreholes were sealed with five-inch valved pipes while the sixteen-inch borehole was sealed with a ten-inch pipe. The contractor elected to subcontract the borehole sealing to Halliburton Corporation because of Halliburton's extensive experience in work of this nature. The packers were set in each borehole, and the grouting completed according to specifications. The attached memo from Mr. L. Mellinger, E. D'Appolonia Consulting Engineers, Inc., field engineer, describes a detailed account of the borehole sealing operation. The area around the sealed boreholes was backfilled with slag in preparation for construction of the protective housing.

E. D'Appolonia Consulting Engineers, Inc.

Mr. Alex Molinski

-2-

August 10, 1971

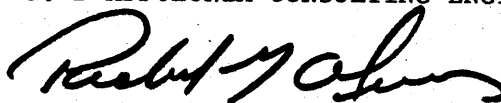
General Comments

A boring at DDH-44 in Creekside encountered the mine void, and a piezometer (P-6) was installed in the borehole. An abandoned water well was noted near DDH-44, and, because it was not carefully backfilled, it will have to be monitored in conjunction with the other piezometers as the water level rises in the mine.

All work will be completed early in August. A final inspection by the Department of Environmental Resources and our firm is tentatively planned for August 13, 1971.

Respectfully submitted,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:lar

cc: Mr. J. Buscavage
Mr. G. Mandel

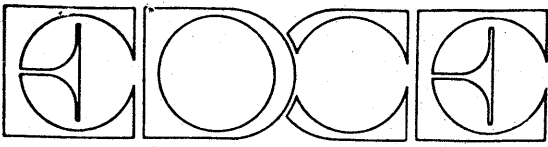
TABLE I

CONSTRUCTION PROGRESS
ERNEST MINE COMPLEX
STATE PROJECT NO. SL-107-4

Item	Work Area Description	% Completion (1971)													
		Jan.		Feb.		March		April		May		June		July	
		Total Bid Cost	Actual Work (2)	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work	Total Bid Cost	Actual Work
A	Cummings Shaft	0	0	58	80	99	99	103	100	C O M P L E T E D					
B	Mine Openings; E1 Barrier	0	0	0	0	0	0	47	25	86	75	86	95	103	100
	Mine Openings; E2 Barrier	0	0	33	10	57	20	56	30	65	50	84	100	99	100
	E2A and E2B Drifts	-	-	-	-	-	-	0	100(4)	C O M P L E T E D				106	100
C	Water Transfer Pipe Between E1 and E2 Mine Openings	0	0	0	0	0	0	3	10	13	15	102	100	102	100
D	Mine Opening, E3 Barrier	0	0	0	0	27	20	131	100	C O M P L E T E D					
E	E4 Boreholes	0*	10	0	10	0	10	23	25	43	40	42**	45	100**	95
F	Borehole in Creekside DDH No. 44	0	0	0	0	3(3)	100			C O M P L E T E D					
G	Borehole in Crooked Creek	14	10	0	0	103	100			C O M P L E T E D					
H	Fulton A Shaft	66	100	66	100					C O M P L E T E D					
	Fulton B Shaft	87	100	87	100					C O M P L E T E D					
	Possible Third Shaft	-	-	-	-	-	-	.03	100	C O M P L E T E D					
	2 - 8" Dia. Boreholes	0	5	0	5	96	100			C O M P L E T E D					
I	Instrumentation and Pressure Testing at 11 Locations Including Survey Layout	0	0	0	0	0	0	18	30	62	95	72	95	74	100
	Remove Barrier in E1	-	-	-	-	-	-	-	-	0	100				
	TOTAL JOB COMPLETION	17%	-	25%	-	42%	-	50.4%	-	61%	-	72%	-	85%	-

NOTES:

- (1) Total Bid Cost: Percent completed based on percent of total bid cost expended for the work item. Cost-plus items are not included.
 - (2) Actual Work: Engineer's estimate of work completed based on quantities and overall progress for the work item.
 - (3) No borehole found, cost is for exploratory work only.
 - (4) Work is complete, but change order authorizing payment has not been approved.
- *Site preparation work only. This item has been added to revised bid sheets for inclusion in future cost estimates.
- ** Includes credit for packers.



E. D'Appolonia Consulting Engineers, Inc.

10 DUFF RD., PITTSBURGH, PA. 15235
TEL. (412) 242-5107 OR 243-3200
TELEX: 81-2378

August 20, 1971

Project No. 70-108

Mr. A. E. Molinski, District Engineer
Ebensburg District
Office of Engineering and Construction
Department of Environmental Resources
P. O. Box 149
Ebensburg, Pennsylvania 15931

Inspection Tour
August 13, 1971
Ernest Mine Complex
Indiana, Pennsylvania

Dear Mr. Molinski:

On August 13, 1971, a final inspection of construction work performed by the Fetterolf Coal Company under the Department of Environmental Resources' Contract No. SL-107-4 was conducted at the Ernest Mine Complex. The contractor had completed his work on Monday, August 9, 1971, and requested the subsequent inspection. This letter summarizes our understanding of the discussions conducted on that day between our personnel and yourself and the instructions issued to the contractor.

Present at the inspection were:

Dept. of Environmental
Resources

A. E. Molinski
G. Mandel

E. D'Appolonia Consulting
Engineers, Inc.

L. D. Andersen
R. G. Almes
D. Rowlison

Fetterolf
Coal Company

D. Fetterolf
T. Beahr

The following items were noted at each of the work areas inspected:

Fulton Run

The site is acceptably graded at Fulton A and Fulton B Shafts. Except for work on the piezometer installations as noted elsewhere herein, the construction at this area is satisfactory.

E-4 Boreholes

The sealing, valving and the protective housing for the three boreholes at E-4 have been completed with one exception. (A fourth borehole was completely sealed without installing a valve.) The valves in the protective housing will be exposed to freezing conditions and will require insulation. A wooden box with a removable lid is to be constructed by the contractor around each valve. Each box is to be completely lined with at least four (4) inches of urethane insulation or equal. Each box is to be constructed to permit operation of the enclosed valve without dismantling the box.

Additional work on the piezometer installation is required, as noted elsewhere herein.

Crooked Creek

The seal at the Crooked Creek borehole is acceptable, as is the piezometer installation. An outbreak of water was noted in the immediate vicinity of the sealed borehole. Subsequent investigation by the contractor determined that the flow is from an eight-inch diameter borehole located approximately ten feet from the recently sealed eight-inch borehole. This borehole will be plugged and grouted using a procedure similar to that used at the plugged E-4 Borehole. The contractor is to be paid for this work based on the unit prices established for the plugging of the E-4 Borehole.

Creekside

Additional work on the piezometer is required as detailed elsewhere herein. The approximate location of an abandoned water well (situated in Creekside and about two blocks from the Creekside Piezometer P6) was observed by those present. The well was abandoned without attempting to completely seal the hole. We understand, however, that the well was partially backfilled and no evidence of the drilling was apparent at the surface. Drilling of the well was apparently stopped when the driller encountered the flooded mine void. The well was drilled by Peterman Drilling Company of Shelocta, Pennsylvania. The elevation of ground surface at the well is about the same elevation as the top of Piezometer P6. It was mentioned that the area should be inspected periodically after the E-4 valves are closed.

E-3 Mine Opening

The work at E-3 is satisfactorily completed.

E-1 and E-2 Mine Openings

The work at E-1 and E-2, including the transfer pipe, is satisfactorily

Cummings Shaft

The Cummings Shaft work is satisfactorily completed.

Additional Work Required at All Piezometers

More soil should be placed around the protective housing of all piezometers. Fill should be placed to within one or two inches of the elevation of the housing lid and graded away at a gentle slope approximately equal to 1 to 4 (vertical to horizontal) or 1 to 5.

A more convenient and efficient method of insulating the interior of the piezometer protective housings should be devised. It was suggested to the contractor that rigid urethane insulation be used for this purpose.

Piezometer Monitoring Program

The pressure gauges and a water level depth gauge will be kept by the Department of Environmental Resources at the Ebensburg office. The frequency of routine readings and site inspections will be established on a basis agreeable to EDCE and the Department of Environmental Resources. The readings will be made primarily by the Department's personnel from Ebensburg; however, monthly readings will be made by a joint-team of personnel from both EDCE and the Department. The tentative schedule of piezometer readings is as follows:

1. Immediately after closing the E-4 valves, piezometer monitoring and site inspections should be performed two or three times weekly.
2. Assuming that no serious outbreaks occur and a uniform rate of increasing water level is achieved, the monitoring interval can be extended to weekly, bi-weekly or monthly, on a basis agreeable both to the Department and EDCE.
3. The Cummings Shaft valve will remain open until it has been determined if water will discharge at E-3 after the E-4 valves are closed.

Water Quality Testing

It was agreed that the Ebensburg office would be responsible for obtaining water quality samples and subsequent testing during all phases of the piezometer monitoring program. These activities would be coordinated with other water quality testing programs presently being conducted by the Department of Environmental Resources.

E. D'Appolonia Consulting Engineers, Inc.

Mr. A. E. Molinski

-4-

August 20, 1971

In summary, after the sealing of the recently found borehole at Creekside is completed, the E-4 valves will be closed and monitoring of the piezometers will begin in accordance with the procedures outlined above. Also, discussions between those present at the inspection emphasized on several occasions that it is very important for the piezometer monitoring team to carefully inspect the site for possible outbreaks during each site visit.

Very truly yours,

E. D'APPOLONIA CONSULTING ENGINEERS, INC.



Richard G. Almes

RGA:isw

cc: Mr. J. Buscavage
Mr. D. Fetterolf