

C. MOOSE RUN

1. Moose Run Acid Discharge Pollution

Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
D201	Gobblers Knob #1 and	-	-
D202	Penfield Coal & Coke #1	MO-7	356
D203	Penfield Coal & Coke #3	MO-4	40
D205	Moose Run #1	MO-8	590
<u>Non Point Sources</u>			
D204	Stott #1 Cropline	MO-5	25
R302	Gobblers Knob #1 Refuse and Settlement Pond (8 Acres)	SO-1	640 (e)
-	Cropline Seeps Along Moose Run	-	1,250 (e)
(e) Estimated loading			
Known Source Loading			2,901 lbs/day
Measured Loading at Stream Mouth (MO-2)			4,168 lbs/day
Acid Loading from Undisclosed Non Point Sources			1,267 lbs/day

The large amount of acid measured at the mouth of Moose Run (Sampling Station M0-2) cannot be totally accounted for by the measured sources upstream. It is believed that refuse material and cropline seepages account for a significant amount of this acid.

Along Moose Run, below the Stott No.1 Mine (D204) and continuing downstream for 2,300± feet, is the refuse (R302) from the Gobblers Knob No.1 Mine (D201) Penfield Coal and Coke No.1 Mine (D202), and Moose Run No.1 Mine (D205). As the Gobblers Knob Mine operation progressed, the streambed was diverted 150 feet to the east for approximately 1,200± feet in order to accommodate the tipple, refuse area and treatment plant settling basins. Thus the original stream has been backfilled with pyritic refuse and some portion of Moose Run still seeps through this

old backfilled channel. Conversely, numerous seeps from this refuse-type material have been noted just above the water level flowing to Moose Run for the entire 2,300 feet.

The stream in this relocated reach lies along the Lower Kittanning Vein cropline which may contribute additional acid. The combined seeps from the pyrite in the refuse, the fact that water from Moose Run still seeps through the waste deposits in its original streambed, and the storm runoff from 290,000± c.y. of waste covering eight acres are major factors in generating this additional acid. Data obtained from a spot reading taken 8/24/76 illustrates that a significant change in water quality occurs as stream enters this particular region (See Spot Sample Data, Page VIII-14).

The Moose Run No.1 Mine (D205) is adjacent to the active Stott No.1 Mine. The two mines are interconnected but have internal seals installed to control drainage. Flow from the Moose Run Mine comes from both the two portals and from along the cropline. The flow averages 125 g.p.m. and has a 590 lbs/day acid loading (M08). As the Stott No.1 operation retreats toward the abandoned Moose Run No.1 Mine, a 200 feet barrier will be retained. Thus, any abatement work scheduled should not influence the active workings.

The other large discharge is from the Gobblers Knob No.1 Mine (D201) which lies along the westerly cropline of Moose Run. The mine covers 355 acres and the older adjacent interconnected Penfield Coal and Coke No.1 Mine (D202) is estimated to have an additional 115 acres, giving the complex a total of 470 acres which have been mined.

The cropline in the mine's vicinity is at the level of Moose Run and crosses the stream near the abandoned Gobbler's Knob No.1 settling basins. Because of the Lower Kittanning Vein's five percent northerly dip towards the axis of the Caledonia Syncline, approximately 210 acres of the Gobblers Knob No.1 Mine is submerged. Only the upper reaches of the mine constitute an acid mine discharge problem. There is only one known portal to the complex, which discharges at an average rate of 100 g.p.m. and has an average acid load of 356 lbs/day (M07). The portals to Penfield Coal and Coke No.1 were never observed. From reviewing the mine drainage permits it was determined that they were located in the proximity of the Gobblers Knob entry.

The Penfield Coal and Coke No.1 Mine lies up-dip in respect to the Gobblers Knob No.1 Mine and is included when considering the hydraulic head above the portal of approximately 150 feet. It has been reported that some hydraulic seals have been placed in the Gobblers Knob No.1 Mine when recent mining cut into the older workings. However, a discharge problem still exists, possibly from the up-dip and older Penfield Coal and Coke No.1 Mine area.

The only strip mine influencing Moose Run (S101) is not a polluting source. There are several seepages along the regraded base with yellow-boy characteristics, however, the pH checks in the field indicate a 5.5 to 6.5 range. The cropline has not been stripped for the most part and because the deep mine workings are in close proximity to the cropline, several stripping permits have been denied.

The Penfield Coal and Coke No.3 Mine (D203) contributes some acid (average 40 lbs/day at Sampling Station MO-4). This mine has eight known portals, three of which have a discharge. Only the lowest portal has an acid loading; Sampling Station MO-3 monitors the same mine and is alkaline.

2. Moose Run Abatement

To abate the acid mine drainage originating in the Moose Run watershed (see Plate No.65) it is recommended to:

A. Remove refuse (R302) from the Gobblers Knob No.1 tippel area (290,000 c.y.) and consider burying in the strippings of the adjacent Matley Hollow (not within the study area). Regrade remaining spoil-type material and plant.

B. Return Moose Run to its original channel. From the Stott No.1 settling basins for 2,300 feet downstream to the Gobblers No.1 Mine settling basins consider lining the entire channel bed with a protected impervious layer in order to prevent acidic seepage from entering the stream.

C. Seal the Penfield Coal and Coke No.3 Mine (D203) with approximately eight double bulkhead hydraulic seals (Direct Abatement).

D. Seal the Gobblers Knob No.1/Penfield Coal and Coke No.1 Mines (D201-202) with two double bulkhead hydraulic seals. (Department to determine responsibility). (Direct Abatement).

E. Seal the Moose Run No.1 Mine (D205) with either clay barrier or grout curtain along cropline. Flooding this mine should not affect the Stott No.1 Mine due to proposed 200 feet barrier downdip.

3. Moose Run Costs and Benefits

Benefits to stream watershed from Proposed Acid Mine Drainage Projects:

Project No.	Type Project	Efficiency Percent	AMD Removed Lbs/Day	Cost
A	Bury Refuse (R302) 290,000 c.y.	70	450(e)	\$217,000
B	Channel Alignment 2,300 l.f.	40	500(e)	57,000
C	Double Bulkhead Seals (D203) Eight Each	90	35	40,000
D	Double Bulkhead Seals (D201/D202) Two Each	90	320	22,000
E	Clay Barrier (D205) 1,400 l.f.	80	470	375,000
(e) Estimated loading				
Totals			1,775	\$711,000
<u>Watershed Benefits</u>				
\$400 per pound of acid removed from Moose Run 42 percent of AMD abated from watershed				

4. Moose Run Mine Drainage Permits and Property Owners

The following is a listing of those Mine Drainage Permits and Property Owners that will affect abatement projects on Moose Run. For additional data concerning ownership refer to Assessment Map No. H2, Huston Township, Clearfield County, Revised 1-3-74.

Project No.	Mine Drainage Permit No.	Property Owner
A	266M004	Osceola Fire Brick Company Osceola Mills, Pa. 16666
B	266M004	Osceola Fire Brick Company Osceola Mills, Pa. 16666
C	3269BSM2	Commonwealth of Pennsylvania
D	9408	Osceola Fire Brick Company
E	15525 (refused)	Commonwealth of Pennsylvania

Moose Run Spot Samples Data
(See Plate No.65), Flow 350 gpm

Sampling Station	Date	pH	Acid mg/l	Alk. mg/l	Iron mg/l	Sulfate mg/l	Acid Loading Lbs/day
MO1	8/24/76	3.2	158	-	6	1,900	666
MO300	8/24/76	3.2	160	-	12	1,713	675
MO301	8/24/76	3.1	148	-	9	1,800	625
MO302	8/24/76	3.2	156	-	13	1,800	660
MO303	8/24/76	3.8	78	-	20	1,850	330
MO304	8/24/76	5.9	26	16	2	310	110
MO6 (60 gpm)	8/24/76	6.1	28	26	1	1,488	20

D. MILL RUN

1. <u>Mill Run Acid Discharge Pollution</u>			
Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
D206	Sarnoski Mine (Country Bank)	M-14	172
D206	Proctor No.2, No.7 Drift	M-13	26
D206	Proctor No.2, Watercourse*	M-15	5,787
	No.7 Drift Refuse Seep	M-18	60
*Watercourse flows intermittent			
<u>Non Point Sources</u>			
R304	No.7 Drift, Refuse Bank	SO-9	370 (e)
(e) Estimated loading			

Stream loading measured at the mouth as a function of the watercourse effects (M-15).

Mill Run Characteristics (Sampling Station M-12)					
Borehole Status	Discharge (g.p.m.)	pH	Acid Lbs/Day	Total Iron Lbs/Day	Sulphates Lbs/Day
Dry	4,863	3.8 - 4.6	696	33	5,826
Flowing	7,948	2.8 - 3.9	7,399	3,790	12,932
Annual	7,699	2.8 - 4.6	5,036	1,841	10,999

The Mill Run watershed must be evaluated for acid mine drainage abatement under two separate conditions in order to fully appreciate the effect of the Proctor No.2 boreholes which are located near the stream

mouth. During the sampling period this source was dry for 135 consecutive days. When they are flowing, the boreholes have an average acid loading of 20,055 lbs/day (the maximum recorded was 45,400 lbs/day and the annual average is 5,7,87 lbs/day).

The Mill Run watershed (2,515 acres) is the principal region supplying ground water to the Proctor No.2 Mine (D206). Because the mine is on both sides of the stream and at one point crosses Mill Run, it is the major factor to be considered in abating any of the watershed's AMD. In the first consideration for eliminating the acid the watershed is to be evaluated when the boreholes are not flowing and only those sources which directly influence Mill Run.

When the boreholes are dry, Mill Run is only a mildly acid stream with an average concentration of 12 p.p.m. It is influenced by two deep mine discharges and two sources from a single refuse bank.

In the strippings along the west wall of the valley is a small, but acidic source, the Sarnoski Mine (interconnected with D206). There reportedly were two or three other small drift mines in this area which may connect to the Sarnoski Mine.

The Proctor No.2, No.7 Drift, located one and one-half miles northwest of the Bennett Branch confluence, has an average flow of 9 g.p.m. and apparently serves as a "bypass" for a small portion of the mine water which does not enter the mine pool that exists at the boreholes.

The refuse bank (R304) near Proctor No.2, No.7 Drift covers about five acres and has a 215,000 c.y. volume. A highly acid seep originates near the bank's toe (Sampling Station M-18) and flows directly into Mill Run. As in the case of Moose Run, Mill Run has apparently been relocated and some of the stream seeps through its original location.

Portions of the refuse bank currently are adjacent to the stream and does receive acid discharge directly with the runoff from rainfall as a non point source.

The remaining polluting factors in Mill Run are related to the overall effect on the project area created by Proctor No.2. These items do not directly affect Mill Run directly but rather influence the acid mine drainage either the No.1 Drift (P-22, 22A) or the borehole water course (M-15).

There are three strip mines on the northern cropline (S-102, 103, and 104) totaling 96 acres which have been cut into the deep mine workings. The strip terrace has been graded toward the highwall and storm runoff is directly infiltrating into Proctor No.2. These strippings show isolated areas of acid flushing and several acres of established trees have been destroyed.

The Proctor No.2 Mine discharge at the No.1 Drift (Sampling Station P-22 and 22A) displays a cyclic flow characteristic which lags the Mill Run mouth by 14 to 22 days and varies directly to the flow recorded at Sampling Station M-12 (Plate No.66). There is some evidence that water is entering a mine tunnel under the stream through the rock fractures during periods of high storm runoff. The depth of cover at the crossing of Mill Run with the mine tunnel is approximately 80± feet and consists of a sandstone and shale formation.

When the boreholes are flowing (Sampling Station M-15), they become the dominant factor which pollutes Mill Run. As the mine water flows through the workings toward the boreholes it apparently traverses through pyritic strata which continually increases in sulphur and iron contents. By the time the flow reaches the water course, the acid concentration has increased from an average 300 p.p.m. (Sampling Station M13) to over 1,800 p.p.m. Thus, as the fall and winter rainfall period begins to fall the mine's sump to overflowing, a highly acid discharge enters Mill Run near the stream mouth. Even though a direct relationship of acid loading between M12 and M15 could not be established for a given day, it is quite readily visible that there is a noted degradation of Mill Run water when the borehole flow begins.

Station	Date	Flow (gpm)	Acid lbs/day
M12	12/03/73	18,050	10,440
M15	12/03/73	1,800	45,436

Over 80 percent of the mine's flow is routed through the workings to the borehole. Thus any attempt to seal them can have a major effect on the next highest portal, the No.1 Drift at Hollywood. Abatement of acid mine drainage from the boreholes will be discussed in "Treatment Plant Recommendations".

2. Mill Run Abatement

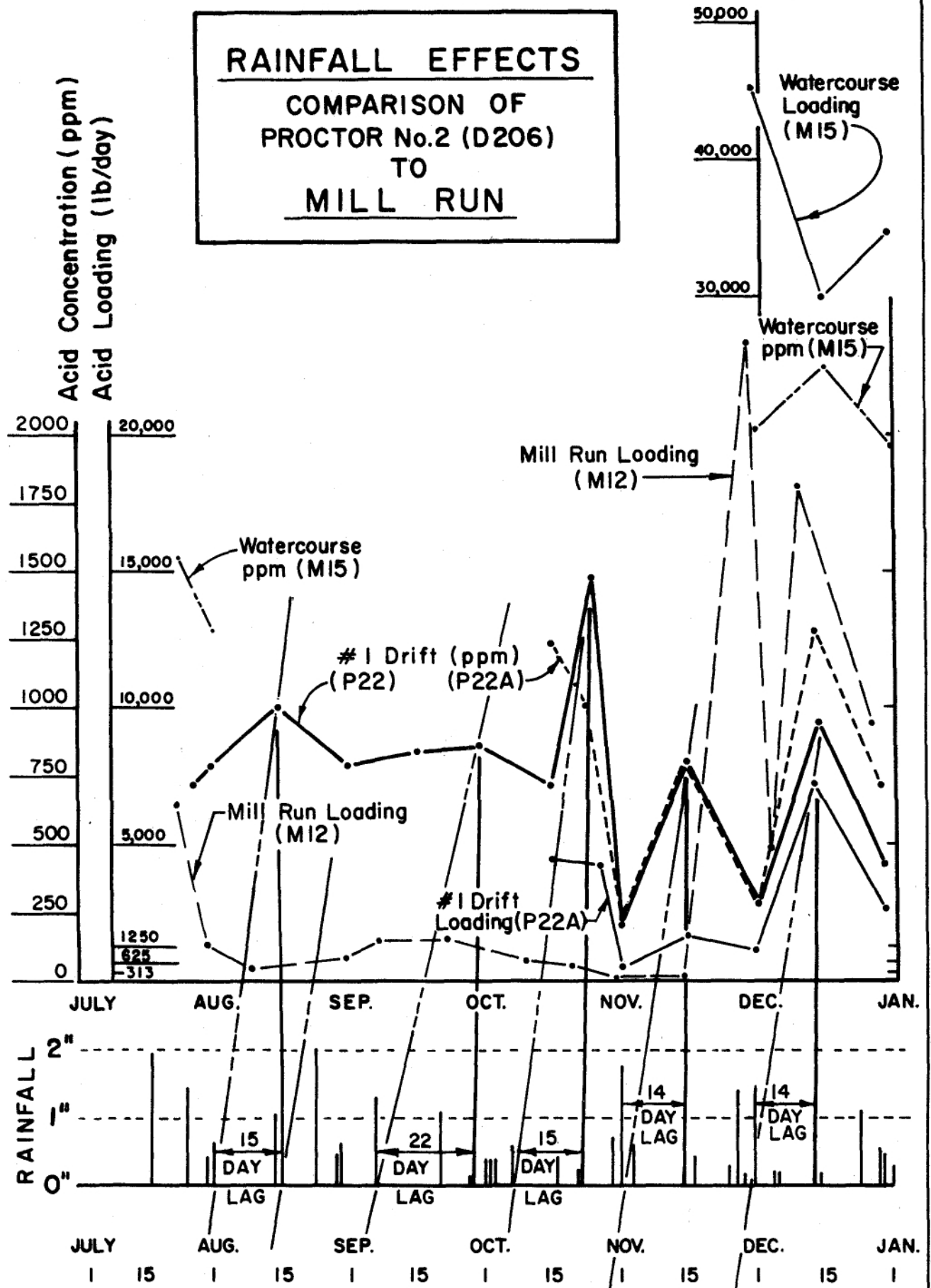
To abate the acid mine drainage originating in the Mill Run watershed, (See Plate No.67) it is recommended to:

- A. Seal the Sarnoski Mine with a double bulkhead hydraulic seal (Direct Abatement).
- B. Seal the Proctor No.2, No.7 Drift with two double bulkhead hydraulic seals (Transfers AMD to treatment).
- C. Remove the No.7 Drift refuse bank (R304) and consider burying in Strippings 5102 and S104.

To reduce the storm runoff infiltration into Proctor No.2 it is recommended to (Influence to Hollywood Area):

RAINFALL EFFECTS

COMPARISON OF PROCTOR No.2 (D206) TO MILL RUN



D. Reverse the terrace on the strippings (S102, 103, 104) located on the northern, up-dip cropline (96 acres).

E. Provide an impervious liner on Mill Run above Proctor No.2 where it crosses under the stream for 1,000 l.f.

F. To eliminate the discharge from the Proctor No.2 Watercourse it is recommended to collect the discharge and to transport it to the proposed treatment facility at Hollywood.

3. Mill Run Costs and Benefits

Benefits to the stream watershed from proposed acid mine drainage projects:

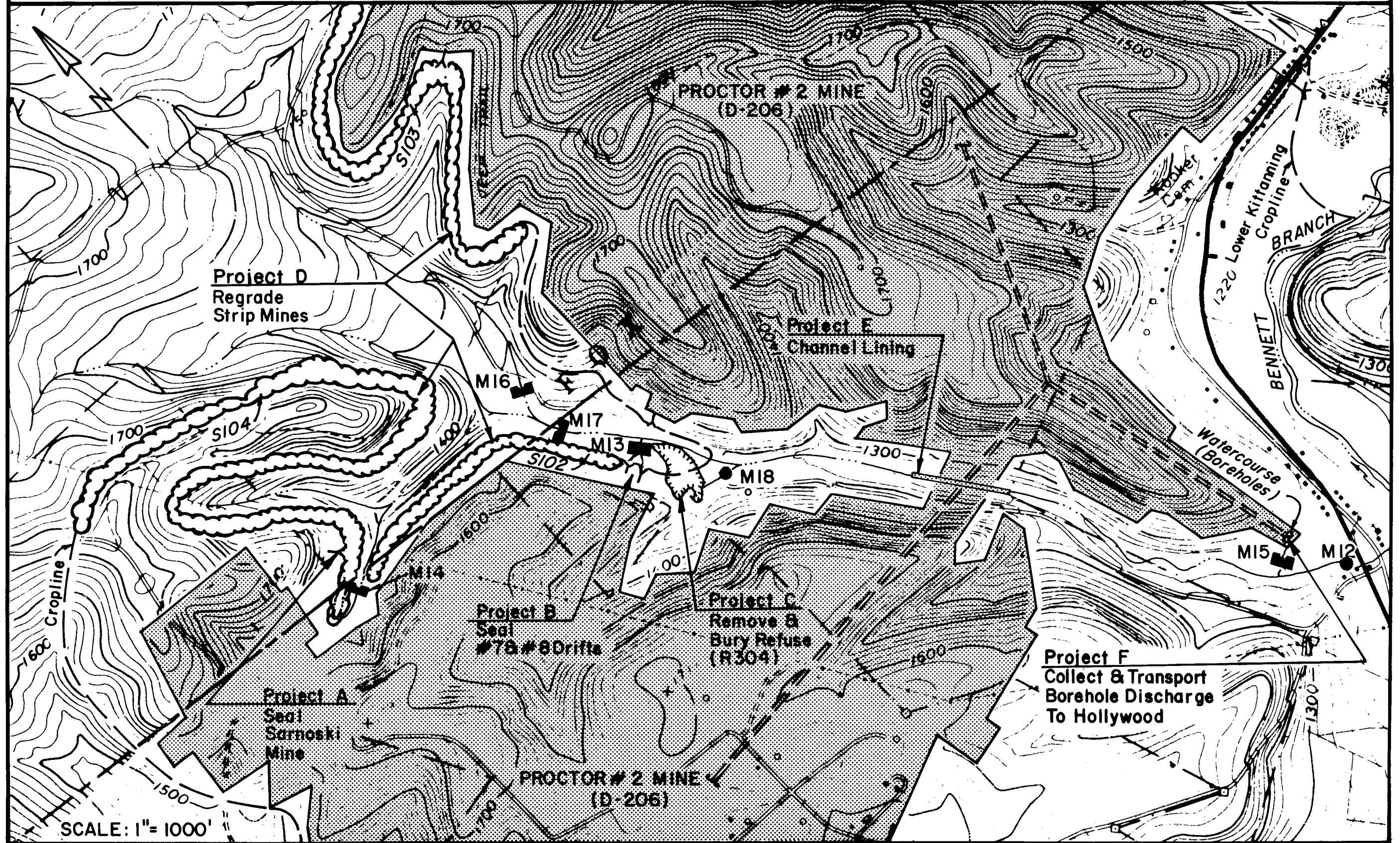
Project No.	Type Project	Efficiency Percent	AMD Removed Lbs/Day	Cost
Mill Run Benefits				
A	Mine Seal (D206 Sarnoski) One Each	90	155	\$ 15,000
B	Mine Seal (D206, No.7 Drift) Two Each	90	23	15,000
C	Bury Refuse (R304) 215,000 c.y.	70	260(e)	150,000
Totals			438	180,000
Proctor No.2 Infiltration Benefits (Influence to Hollywood Area)				
D	Reverse Terraces (S102, 103, 104) 96 Acres	70	703(e)	\$228,000
E	Channel Lining 1,000 l.f.	-	-	30,000
Proctor No.2, Treatment				
F	Collect and transport borehole discharge to proposed Hollywood Treatment Facility (See Section G)			
(e) Estimated loading				
<u>Watershed Benefits</u>				
\$410 per pound of acid removed from Mill Run				
63 percent of AMD abated from watershed when the boreholes are dry				

4. Mill Run Mine Drainage Permits and Property Owners

The following is a listing of those Mine Drainage Permits and Property Owners which will affect abatement projects on Mill Run. For additional data concerning ownership refer to Assessment Map No. H1, Huston Township, Clearfield County and Assessment Photograph No. 3-208, Fox Township, Elk County.

Project No.	Mine Drainage Permit No.	Property Owner
A	18128	Commonwealth of Pennsylvania
B	284	Commonwealth of Pennsylvania
C	284	Commonwealth of Pennsylvania
D	13337 13769 3065BSM38	Commonwealth of Pennsylvania
E	--	Commonwealth of Pennsylvania
F	--	Thomas J. & Emma Haag

MILL RUN ABATEMENT MEASURES



E. TYLER RUN

1. Tyler Run Acid Discharge Pollution

Sources prior to reaching the Hollywood Area (to Sampling Station T-24)

Tyler Run beyond Hollywood Pollution (Sampling Stations T-24 to T-23)

Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
D207	Five Points Mine	T-30	153
D207	Five Points Mine	T-29	238
D208	Proctor No.1, Van Horn Mine	T-28	10
<u>Non Point Sources</u>			
R322/ S112	No.4/No.5 Drift Refuse Rhodes Strip Mine	S0-12 S0-14	106(e) 12(e)
(e) Estimated loading			
Known Source Loading			519 lbs/day
Measured Loading at Sampling Station (T-24)			524 lbs/day
Acid Loading from Undisclosed Non Point Sources			5 lbs/day

Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
D206	Proctor No.2, No.1 Drift	P-22	91
D206	Proctor No.2, No.1 Drift	P-22A	2,717
D207	Proctor No.1, Water Course	P-34	2,578
Tyler Run to Hollywood Loading			524
Known Source Loading			5,385 lbs/day
Measured Loading at Stream Mouth (T-23)			*10,440 lbs/day
Acid Loading from Undisclosed Non Point Sources			* 5,055 lbs/day

*Sampling Station T-23 quality data of 20,567 lbs/day acid is considered inaccurate. See Section G for Adjusted Loading.

Near Tyler Run's headwaters stripping have cut into the Toby Coal Company "Five Points Mine", D207, and has opened at least five portals. The flow from these sources has ponded in the Rhodes Stripping (S112) to form the stream's origin (see Plate No.68).

The Proctor No.1, No.4 Drift discharges into the stream as the result of an abandoned retreat mining operation.

The Rhodes Strip Mine covers about 38 acres along both sides of the watershed and the spoil displays moderately acidic characteristics.

Along the Lower Kittanning Cropline downstream from the stripping, both Proctor No.1 and Proctor No.2 have collapsed portals opposing each other. Approximately 35,000 c.y. of refuse from these workings (R322) has been dumped in the area and Tyler Run meanders over the material.

At Sampling Station T-24 the average acid loading for Tyler Run is 524 lbs/day. This is the final station which monitors the stream before the Hollywood Region contributes and significantly increases the acid mine drainage entering Bennett Branch.

Near the Hollywood Treatment Plant discharges from the Proctor No.2 Mine (Sampling Station P-22 at the sealed drift portal and P-22A at the pump station) and Proctor No.1 Mine (Sampling Station P-34 located at its pump station) flow directly enter this stream adding an additional average of 5,390 lbs/day.

2. Tyler Run To Hollywood Abatement

To abate the acid mine drainage in the Tyler Run watershed (See Plate No.68) it is recommended to:

A. Seal the five discharging mine portals of the Five Points Mine with double bulkhead hydraulic seals (Transfers AMD to Hollywood Area for Treatment).

B. Drain the strip mine ponds located at the headwaters and regrade 38 acres of the Rhodes Stripping.

C. Seal the Proctor No.1, No.4 Drift with double bulkhead hydraulic seal (Transfers AMD to Hollywood Area for Treatment).

D. Remove 35,000 c.y. deep mine refuse R322 from the stream bed and bury it in the adjacent strippings (S112).

For further discussion concerning abatement of Tyler Run pollution in the Hollywood region, Section F, "Lower Kittanning Cropline at Hollywood" and Section M, "Treatment Plant Recommendations" should be reviewed.

3. Tyler Run Costs and Benefits

Benefits to the stream watershed from proposed acid mine drainage projects:

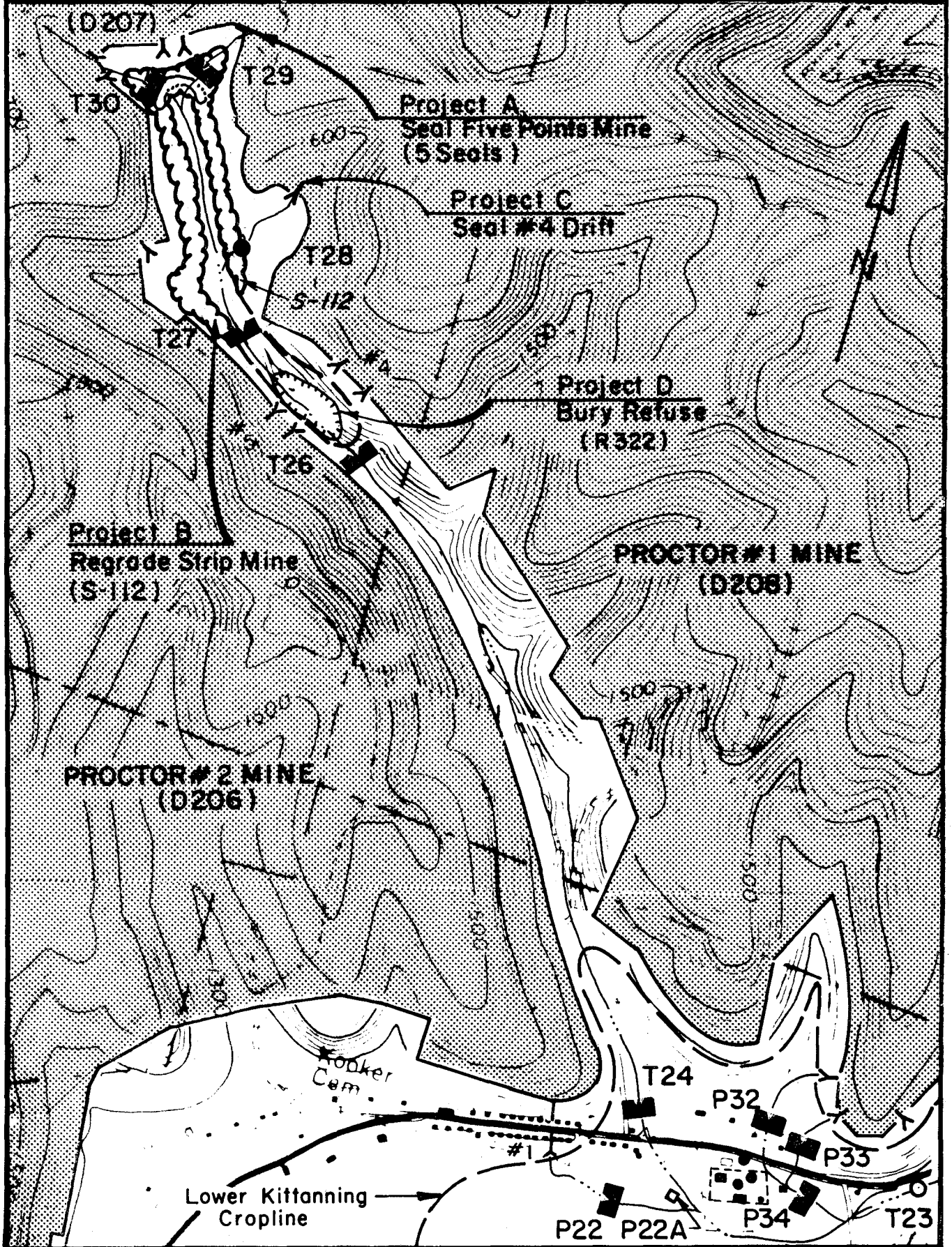
Project No.	Type Project	Efficiency Percent	AMD Removed Lbs/Day	Cost
A	Double Bulkhead Seals (D207) Five Each	90	352	\$ 40,000
B	Drain Ponds & Regrade Stripping S-112 (38 Acres)	70	8(e)	92,000
C	Double Bulkhead Seal (D208, No.4 Drift) (One Each)	90	9	15,000
D	Bury Refuse (R322) (35,000 c.y.)	70	74(e)	23,000
Totals			443	\$170,000
(e) Estimated loading				
<u>Watershed Benefits</u> \$384 per pound of acid removed from Tyler Run to Hollywood (T-24) 84 percent of AMD abated from watershed to Hollywood				
Benefits to Tyler Run beyond Hollywood (T24), see Section G and Section M for discussion				

4. Tyler Run Mine Drainage' Permits and Property Owners

The following is a listing of those Mine Drainage Permits and Property Owners which will affect abatement projects on Tyler Run. For additional data concerning ownership refer to Assessment Photograph No. 3-208, Fox Township, Elk County.

Project No.	Mine Drainage Permit No.	Property Owner
A	None	Commonwealth of Pennsylvania
B	13426	Commonwealth of Pennsylvania
C	14424	Commonwealth of Pennsylvania
D	Unknown	Commonwealth of Pennsylvania

TYLER RUN ABATEMENT MEASURES



F. TYLER RESERVOIR RUN

1. Tyler Reservoir Run Acid Discharge Pollution

Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
D211	Tyler Mine, Watercourse	TR-35	548
D211	Tyler Mine No.1 & No.2	TR-37	287
D211	Tyler Mine No.6 Drift	TR-38	444
D211	Tyler Mine No.5 Drift	TR-39	16
D211	Unknown Drift	TR-40	70
D211	Tyler Mine No.4 Drift	TR-41	34
<u>Non Point Sources</u>			
R303	Tyler No.14 Refuse	S0-5(e)	844
R323	Tyler Mine No.5/6 Drift	S0-3(e)	48
S115	Stripping/Refuse (9 Acres)	S0-4(e)	151
(e) Estimated loading			
Known Source Loading			2,442 lbs/day
Measured Loading at Stream Mouth (TR-36)			8,333 lbs/day
Acid Loading from Undisclosed Non Point Source			5,891 lbs/day

The Tyler Mines Complex has the greatest influence on Tyler Reservoir Run and virtually the entire southern flank of the Caledonia Syncline from the Village of Tyler northeastwardly to approximately opposite the Village of Force (see Tyler Mines Plate C5). It is bounded on the north by Bennett Branch and on the south by Laurel Run. Of the 16 known discharge points, six are considered major with an acid load exceeding 100 lbs/day. Three are significant with loadings exceeding 25 lbs/day and three are essentially alkaline. The balance of the discharges are considered minor. The discharges in the region around the Village of Tyler, which include the mine's water course and the mine's Nos. 1, 6 and 8 portals constitute 38 percent of the flow and 63 percent of the acidity derived from the Tyler Mines Complex.

Tyler Mines Complex Major Discharges

Portal	Sampling Station	Acid Loading Lbs/Day
Water Course	TR-35	548
No.1 & No.2	TR-37	287
No.6	TR-38	444
No.8	TR-42	232
No.9	UN-180	216
No.10	BH-139	413

The tributary which supplies water to the Tyler Reservoir displays a prominent acid characteristic at its mouth; the water quality of the reservoir itself is potable. (See Tyler No.14 Plate C7 and Tyler Mines Plate C5). By taking a summation of all known discharge sources and comparing this to the acid load at the stream's mouth, it is apparent that the refuse and strippings in the valley are also contributing to the problem.

A three acre refuse deposit from the Tyler Mine, No.5 and No.6 Drifts (R323), is in the valley 1,500 feet northeast of the Reservoir, contains approximately 45,000 c.y. of acidic material (SO-3).

Refuse from the Tyler No.14 Mine (R303) covering three acres with an approximate 136,000 c.y. volume has been dumped adjacent to approximately 1,000 feet of the stream. The refuse has spilled over into the channel to a height of 35± feet at the mine tipple (SO-5).

Water sampled below the refuse (R303) has an average acid load of 8,333 lbs/day (TR-36) compared to an accumulated 1,700 lbs/day known to originate from the eight Tyler Mines point sources. Additional seeps exist both above and below the road (L.R.7142), but would not account for substantial acid quantities.

The Tyler Mines covers some 2,160 acres and only the northwestern cropline borders Tyler Reservoir Run. In addition to the sources mentioned previously, there are four other contributing areas which warrant comment. Two of these areas are in the Laurel Run watershed.

Tyler Reservoir Run Pollution (Related Sources)

Mine No.	Mine Name	Source No.	Lbs/Day Acid Load
<u>Point Sources</u>			
Flowing Directly to Bennett Branch			
D210	Tyler No.14 Water Course	BB-21	1,891
D211	Tyler Mine No.8 Drift	TR-42	232
D211	Tyler Mine No.9 Drift	UN-180	216
Flowing Directly to Laurel Run (Bell Hollow)			
D211	Tyler Mine No.10 Drift	BH-139	413
D211	Tyler Mine No.16 Drift	BH-140	35
D211	Tyler Mine Haulageway	BH-138	19
<u>Non Point Sources</u>			
D211	S119/120 (Bell Hollow) BH-141 less BH-139	BH-141 corrected	1,614(e)
(e) Estimated loading			

The Tyler No.14 Mine (D210), sometimes known as the Underhill Mine, is an isolated portion of the older Mine complex. The mine is located in the west wall of Tyler Reservoir Run and adjacent to Bennett Branch. Approximately 366 acres of coal with an average 38 inch thickness has been extracted. The mine has a potential full capacity of 264 million gallons water which would generate to a 75 foot hydraulic head.

Tyler No.14 has five known portals, two of which are near the Village of Tyler which seep during prolonged wet periods and are not considered significant sources. The mine's water course, one of the major acid mine discharge sources (BB-21), flows directly into Bennett Branch. There are two discharge points from the mine which are acidic. The water course has an average flow of 156 g.p.m. and an average acid loading of 2,180 lbs/day. The remaining source, a connecting country bank mine (TR-45), is considered a minor discharge which at times has been alkaline.

The fifth portal has been collapsed and covered during stripping operations. There is no evidence of any discharge.

Adjacent to Laurel Run the cropline has been stripped (S-118) for some 3,500 l.f. (11 acres) along the highest elevations of the mine. This operation stripped through at least one portal. The entire Bell Hollow region, excluding that on State Forest land, has been both strip and auger mined (S-119/120) along some 14,000 l.f. of cropline (134 acres) with at least nine portals cut into. These strippings along Laurel Run and Bell Hollow are important since they lie at higher elevations and runoff entering the Tyler Mines Complex would discharge near Tyler.

In Bell Hollow the No.10 Drift (BH-139) is a major source and has the workings' highest acid concentration (612 mg/l). It is the only discharge point in the entire mine with a significant iron loading.

To abate the acid mine drainage from the Tyler Mines complex, first priority would be to consider correcting the Bell Hollow region by double bulkhead hydraulic mine seals. This would reduce the AMD entering Bell Hollow and Laurel Run. In particular the entire Laurel Run main stem should then become a viable stream. In Bell Hollow the primary project would be to construct hydraulic seals at the No.10 Drift and then at the three known remaining openings. This should cause these flows to remain in the mine complex and drain to the lower areas where the discharges are recommended to be treated. Bell Hollow has been auger mined and the cropline would have to be inspected for an extended period after sealing to insure that the impervious plugs, which were placed during the mining operation, perform as constructed.

The No.9 Drift portal is approximately 6,000 feet east of Tyler (UN-180) and discharges directly into Bennett Branch. The entire cropline from this portal to the west has been opened by smaller country bank mines and portions of the cropline to the east are planned for new stripping (Drainage Permit 4673SM9).

The fourth area is the smaller watershed adjacent to Tyler Reservoir Run into which the No.8 Drift discharges AMD. This flow has been trapped at the watershed's mouth by an impoundment dam (B&S Railroad Dike) and a 40 foot deep acidic pond covering two acres has developed. Piping has formed through the dam's core in several locations (TR-42) and a potential dam failure is a probability. It is felt that this dam should be inspected for safety and then if deemed necessary it should be treated locally, opened and drained. Should the dam fail the water would most likely do property damage to portions of the Village of Tyler.

2. Tyler Reservoir Run Abatement

To abate the acid mine drainage originating in the Tyler Reservoir Run watershed (See Plates No.69 and No.70) it is recommended to:

A. Remove and bury the Tyler No.14 Mine refuse (136,000 c.y.) to include cleaning the adjacent stream channel and dismantling the abandoned tipple. Stripping S113 should be considered as a potential burial site.

B. Remove and bury the Tyler Mine No.5/6 refuse (45,000 c.y.) in the nearby strip mines.

To abate the runoff contributing to the Tyler Mines (D211) acid discharges, it is recommended to:

C. Treat and drain the B&S Railroad Dike impoundment dam (16 million gallon storage).

D. Regrade the Laurel Run (5-118) and Bell Hollow (S-119/120) strip mines by reversing the existing terraces.

E. Seal the No.10 Drift and three other portals in Bell Hollow with double bulkhead hydraulic mine seals (BH-138, 139, 140). (Transfers AMD to Tyler Reservoir for Treatment).

To abate AMD from the Tyler No.14 Mine (D210) it is recommended to:

F. Seal the mine along its northern cropline (see Tyler No.14 Plate C7) with double bulkhead hydraulic seals. The Department should determine the owner's responsibility for eliminating this discharge (Direct Abatement).

To eliminate acid mine drainage from those mine adits discharging into Tyler Reservoir Run the following is recommended:

G. A series of treatment facilities designed to treat only the sources and discharge (further reference should be made to Section M "Treatment Plant Recommendations").

3. Tyler Reservoir Run Costs and Benefits

Benefits to the stream watershed from proposed acid mine drainage projects:

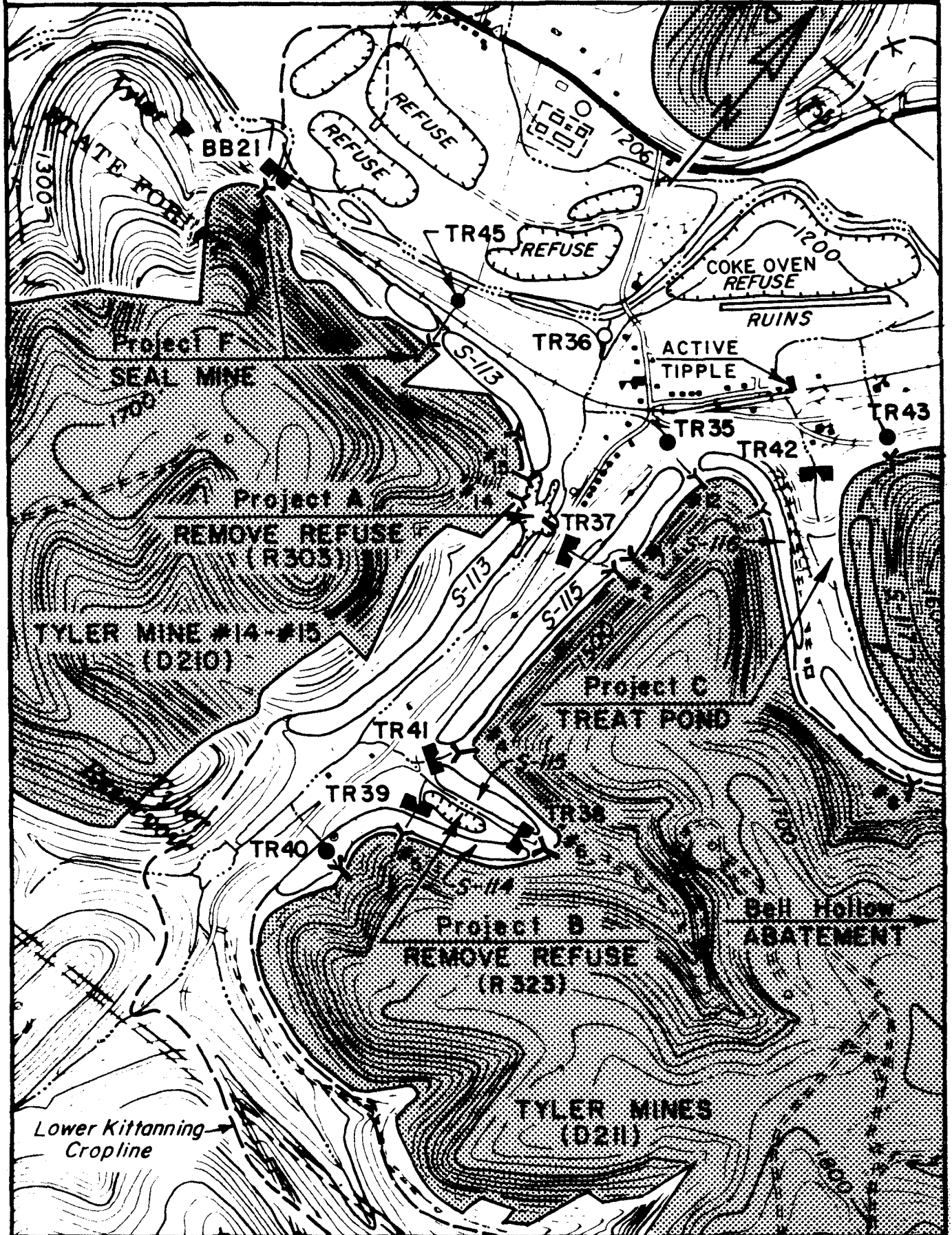
Project No.	Type Project	Efficiency Percent	AMD Removed Lbs/Day	Cost
A	Bury Refuse (D210) 100,000 c.y.	70	590(e)	\$ 75,000
B	Bury Refuse (D211, No.5 Drift) 45,000 c.y.	70	34(e)	34,000
G(1)	Treatment Facilities located on Tyler Reservoir (Two each treating TR-35, 37, 38, 39, 40, 41)	100	1,397	240,000
Tyler Mines Complex Benefits (Influence to Tyler Reservoir Run)				
C	Drain Impoundment Dam 16 million gallons	Safety	Hazard	\$100,000
D	Reverse Terraces (S-118, S-119/120) 145 Acres	70	1,130(e)	344,000
E	Double Bulkhead Seal (D211, Bell Hollow) Four Each	90	420	45,000
Totals			3,571	\$748,000
Bennett Branch Benefits (Direct Abatement to Bennett Branch)				
F	Double Bulkhead Seal (D210) 2 Each	90	1,700	\$ 20,000
G(2)	Treatment Facilities Related to Tyler Mines Two each treating TR-42, 43, 44, UN180	100	598	148,000
<u>Watershed Benefits</u>				
\$209 per pound of acid removed from Tyler Reservoir Run				
9 percent of AMD abated from watershed by reclamation only				
49 percent of AMD abated from watershed including treatment				
(e) Estimated loading				

4. Tyler Reservoir Run Mine Drainage Permits and Property Owners

The following is a listing of those Mine Drainage Permits and Property Owners that will affect abatement projects on Tyler Reservoir. For additional data concerning ownership refer to Assessment Maps No.H1 and I-1, Huston Township, Clearfield County.

Project No.	Mine Drainage Permit No.	Property Owner
A	300	Underhill Coal Mining Company St. Marys, Pennsylvania
B	None	Underhill Coal Mining Company
C	None	Underhill Coal Mining Company
D	263M16 263M58	Underhill Coal Mining Company
E	263M16 263M58	Underhill Coal Mining Company
F	300	Underhill Coal Mining Company
G	None	(1) Underhill Coal Mining Company (2) Kristianson & Johnson Coal Co.

TYLER RESERVOIR RUN ABATEMENT MEASURES

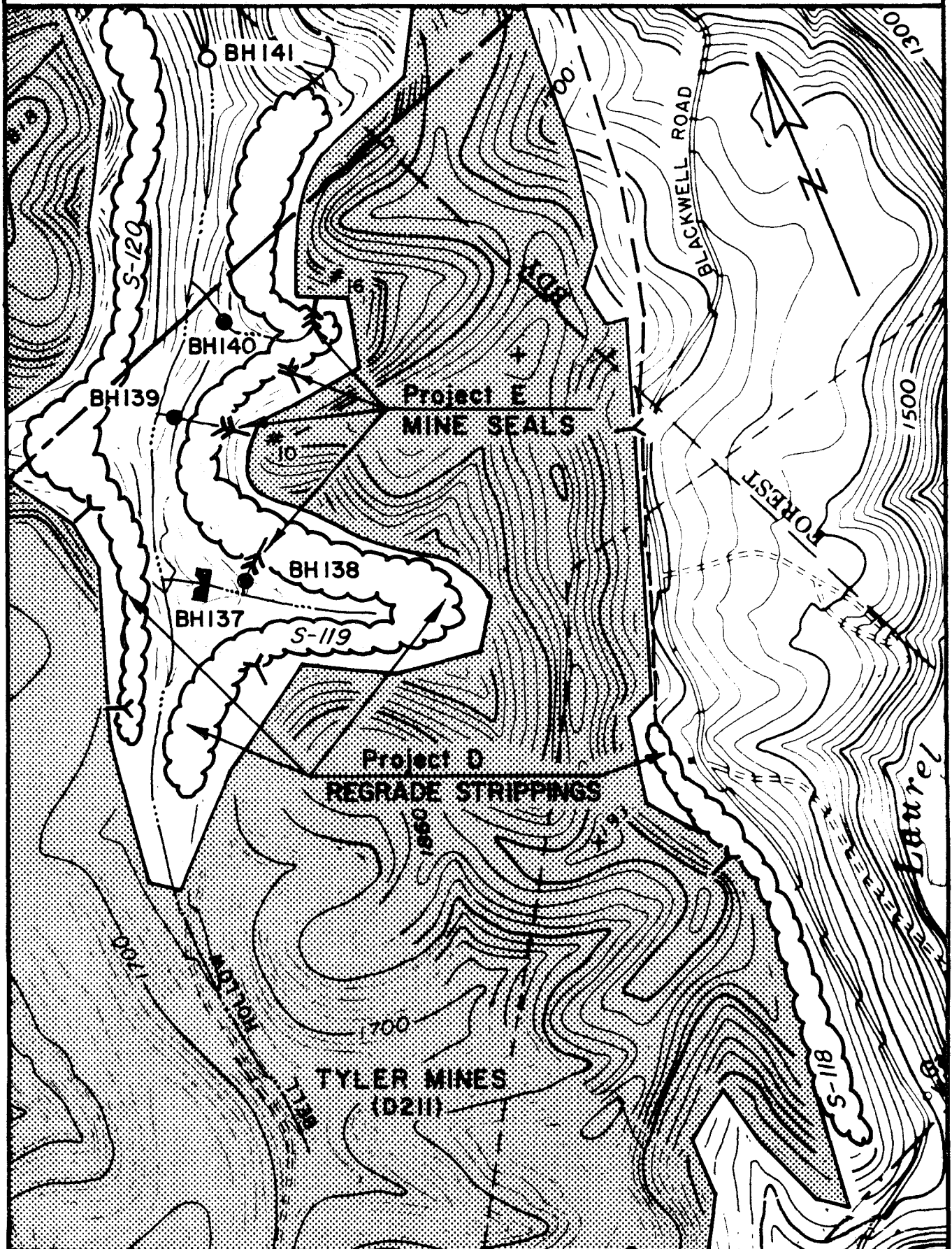


SCALE : 1" = 1000'

PLATE NO. 69

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BELL HOLLOW ABATEMENT MEASURES



SCALE: 1" = 1000'

PLATE NO. 70

VIII-39