Source of Pollution

AREA 9

Area 9 is along the drainage divide separating the Swamp Creek and Johnson Run sub-basins and all but a few acres of this source is in the West Branch Swamp Creek drainage area, Area 9 is a strip-mine that was stripped for the Lower Kittanning Coal by the Wabash Ridge Corporation. Approximately 38. 2 acres have been affected by the mining operations.

The strip-mine can be divided into a western area of 26. 2 acres and an eastern area of 12 acres by the north-south property line fence. The eastern area has a fairly dense tree cover of conifers and some hardwoods such as Aspen, but there is very little ground cover. There are acid discharges from the eastern area after a heavy rainfall, but it is probably only a matter of time before the reclamation measures already taken will be more effective in reducing pollution from this part of the strip-mine. The tree canopy, at present, is effective in intercepting part of the precipitation.

The western area has few trees, except for the north slope where in. a few places there is a moderate to dense tree cover. The ground cover of grass and weeds is light to moderate, but there are barren areas. In one small area hay mulch was applied by the property owner and this area has a heavy grass cover. In the western part, :.near Township Road 363, there is a coal refuse pile and the ground adjacent to the strip-mined area is covered with coal waste material.

Recommended Abatement Measures - The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 60 lbs. per day or a little over 1 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.

It is recommended that there be no further reclamation of the eastern area. The coal waste pile and coal waste material adjacent to the strip-mine should be removed in the western area and this area seeded with grass and legumes. The reclamation requirements are as follows:

Reclamation Requirements
Western Area (26.2 Acres)

Earthwork

Remove coal waste material and trash in western part of strip-mine and on ground adjacent to northwest end of strip-mine (Estimate 10,000 c.y.)

Grading prior to soil treatment of areas gullied by erosion.

Soil Treatment

Standard Ground Limestone (Total application to contain a minimum of 240 lbs. magnesium per Ac.	7-1/2 tons per Ac.
50-200-200 in lbs. $N-P_2O_5-K_2O$	per Ac.

Planting

Creeping red fescue	20 lbs. per Ac.
Birdsfoot trefoil (Viking or Empire)	10 lbs. per Ac.

Mulching as directed (Estimate 12 Ac.)

Hay	2 Tons per Ac.

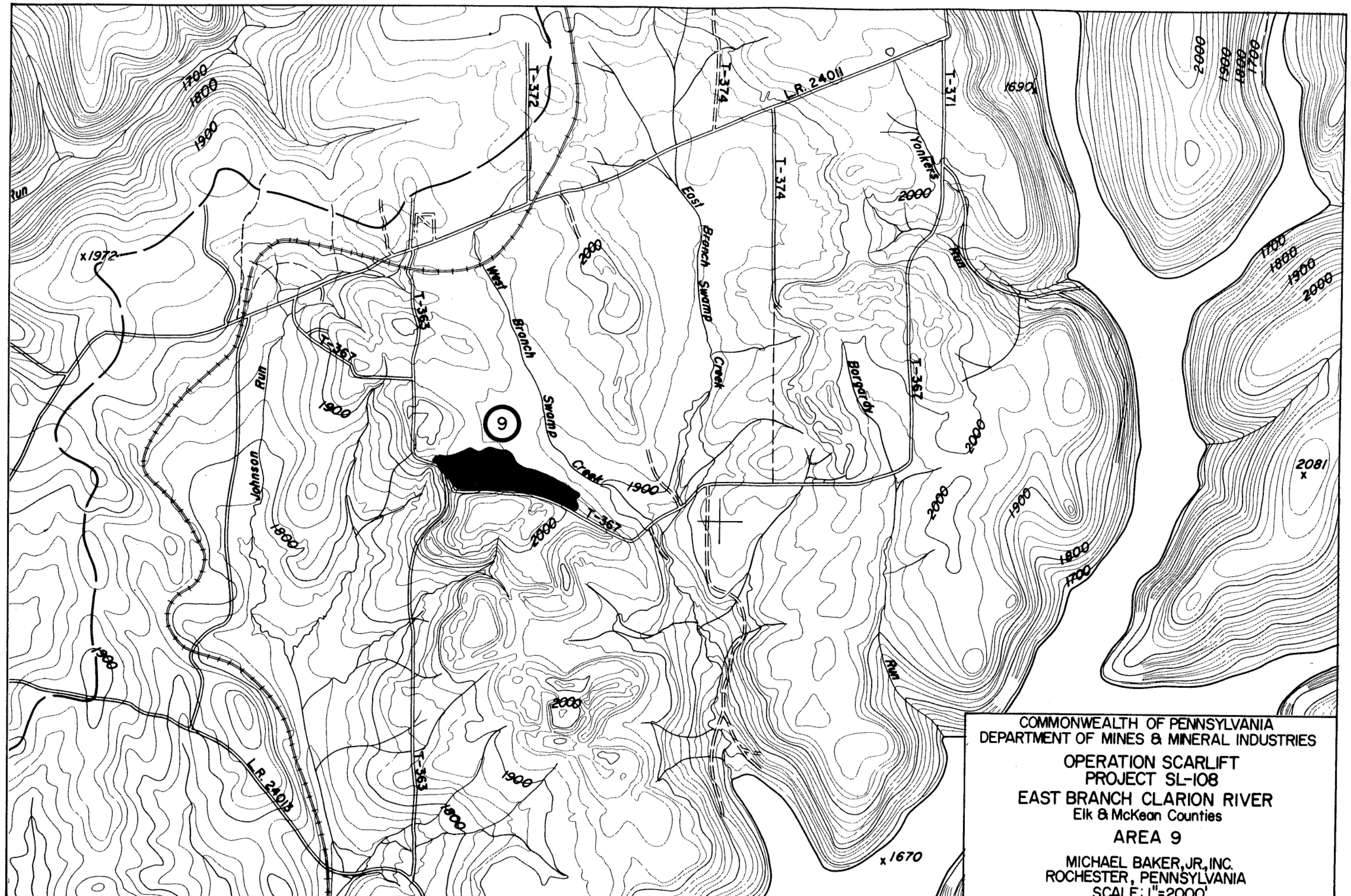
Special Requirements

In the fall, 4 tons of limestone per acre shall be spread and incorporated into the soil to a minimum depth of 4 inches. In the Spring, 3-1/2 tons of limestone and the fertilizer requirement, in separate applications, shall be spread and incorporated into the soil to a minimum depth of 4 inches. It may not be possible to incorporate the limestone and fertilizer into the soil in a few small areas of the outer slope, because of tree cover. Seed shall be applied by disc drill or comparable method where possible; seed shall be broadcast in other areas.

The coal mine waste and trash shall be dumped into the pit in the northeastern part of the Area 11 strip-mine.

Cost of Methods of Abatement

Description	Estimated Percent Abatement	Estimated Cost
AREA 9		
Remove coal waste material, improve drainage, soil treatment & Planting	80%	$30,000



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF MINES & MINERAL INDUSTRIES

OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties

AREA 9

MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

Source of Pollution

AREA 12

Area 12 is a major source of acid mine drainage pollution in the Swamp Creek and Johnson Run Sub-basins. The area was stripped for the Lower Kittanning Coal by the Wabash Ridge Corporation and is the second largest strip-mine in the East Branch Clarion River Watershed. The total area of the strip-mine is approximately 160 acres with about 55 percent in the Swamp Creek sub-basin. Approximately 2. 6 acres at the top of the hill has a heavy hardwood cover and was not affected by the mining operations. Probably about 3 acres of the stripping near the top of the hill, also included the Middle Kittanning Coal which was thin_ and irregular at this location.

The strip-mine was not backfilled and coal is exposed along the highwall. The highwall is 50 to 60 feet in height. The spoil material is mostly coarse and highly permeable, and rainfall infiltrates the ground rapidly. During periods of heavy rainfall, acid water discharges along the perimeter of the strip-mine and into the intermittent tributaries of Swamp Creek and Johnson Run. At other times, it appears the acid water does not surface along the perimeter of the strip-mine, but instead, there is seepage of acid water from points much further downhill from the strip-mine.

Even though the area was not backfilled or the acid material covered, the strip-mine operator planted trees. The trees are mostly evergreens, but some deciduous trees native to the area, such as aspen and cherry, have seeded in. It appears the survival percentage of the original planting was poor to fair. In many areas, the growth rate of the trees that did survive is poor. There is little ground cover other than some poverty grass, an annual sage and blackberry.

A comparison of the combined acid loads attributed to Stations 5916 and 5917 with the acid loads at Station 5918 indicate a great deal of acid mine drainage is being discharged from sources below Township Road 367. The Area 11 and Area 12 strip-mines are the only possible sources for such acid discharges. Most of the acid drainage emanating below Township Road 367 is attributed to the Area 12 strip-mine, and it is the largest single source of acid mine drainage pollution in the East Branch Clarion River Watershed,

Recommended Abatement Measures - The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 900 lbs. per day or about 16 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.

It is recommended that extensive terrace grading be done in all of the strip-mined area with the exception of the steep slopes along the perimeter and the relatively level southeast lobe. Terrace grading will reduce considerably the volume of groundwater infiltration and increase surface runoff. A vegetation cover should be developed which will speed up the process of soil formation and prevent the erosion of spoil material. The erosion of spoil material is undesirable because it exposes fresh spoil material to oxidation , and thereby continually exposing the acid mineral salts that cause the formation of acid discharges. The grading should be carefully supervised to insure the prompt burial and covering of acid material,

For the purpose of making reclamation recommendations, the strip-mine is separated into three areas:

1) Terrace Area - This area is to be backfilled and graded (87. 5 Acres).

2) Southeast Area - This area is the southeast lobe in which there are no deep depressions or poor drainage (22. 1 acres).

3) Slope Area - The perimeter of the strip-mine where slopes are steep (47. 5 acres),

The reclamation requirements are as follows: Reclamation

	Requirements Earthwork
Terrace Area	Backfilling and grading including affected area above highwall Remaining highwall area shall have a maximum slope of 2:1 with rounding at top except where rock is exposed 87, 5 Ac,
Southeast Area & Slope Area	None

Soil Treatment

All Areas	Standard Ground Limestone (Total application to contain a minimum of 240 lbs. magnesium per Ac.)	6 tons per Ac.
	50-200-200 in lbs. $N-P_2O_5-K_2O$	per Ac.

Planting

Terrace Area	Black locust	900 per Ac.
	Creeping red fescue	20 lbs/Ac.
	Weeping lovegrass	3 lbs/Ac.
Southeast Area	Black locust (Planted between existing trees)	400 per Ac.
	Creeping red fescue	20 lbs/ac.
	Weeping lovegrass	3 lbs/Ac.
Slope Area	Creeping red fescue	30 lbs/Ac.
	Penngift crownvetch	10 lbs/Ac.

Mulching

Terrace Area	Hay	2 tons/Ac.
Southeast Area	None	
Slope Area	Wood cellulose fiber (As directed, Estimate 15 Acres)	1200 lbs/Ac.

Special Requirements

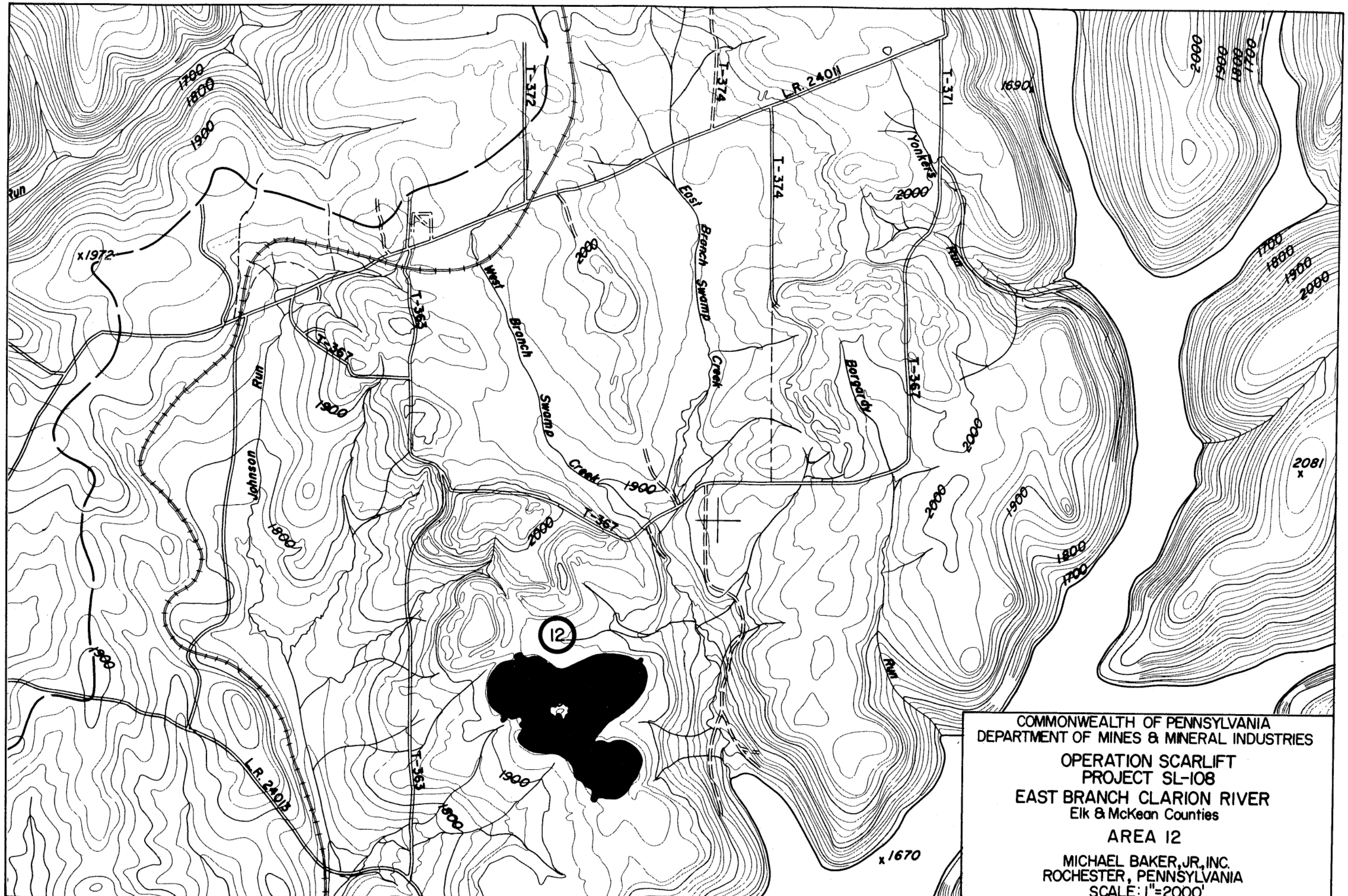
Terrace Area — Limestone and fertilizer in separate applications shall be spread and incorporated into the soil to a minimum depth of 4 inches. Seed shall be applied by disc drill or comparable method. Tree planting shall be done with a minimum disturbance to the seed bed.

Southeast Area and Slope Area — Wherever feasible limestone and fertilizer in separate applications shall be spread and incorporated into the soil to a minimum depth of 4 inches. Seed shall be applied by disc drill or comparable method. In other areas 1) limestone shall be applied using a blowing method or by hand, 2) Seed and 25-100-100 lbs. of $N-P_2O_5-K_2O$ per Ac.

shall be hydroseeded in one application in the Spring, 3) the remainder of the fertilizer, 25-100-100 lbs. per Ac., shall be applied in the fall after the seeding has become established.

Cost of Methods of Abatement

Description	Estimated Percent Abatement	Estimated Cost
AREA 12		
Terrace backfilling and grading to improve drainage, soil treatment and planting	80%	$450,000

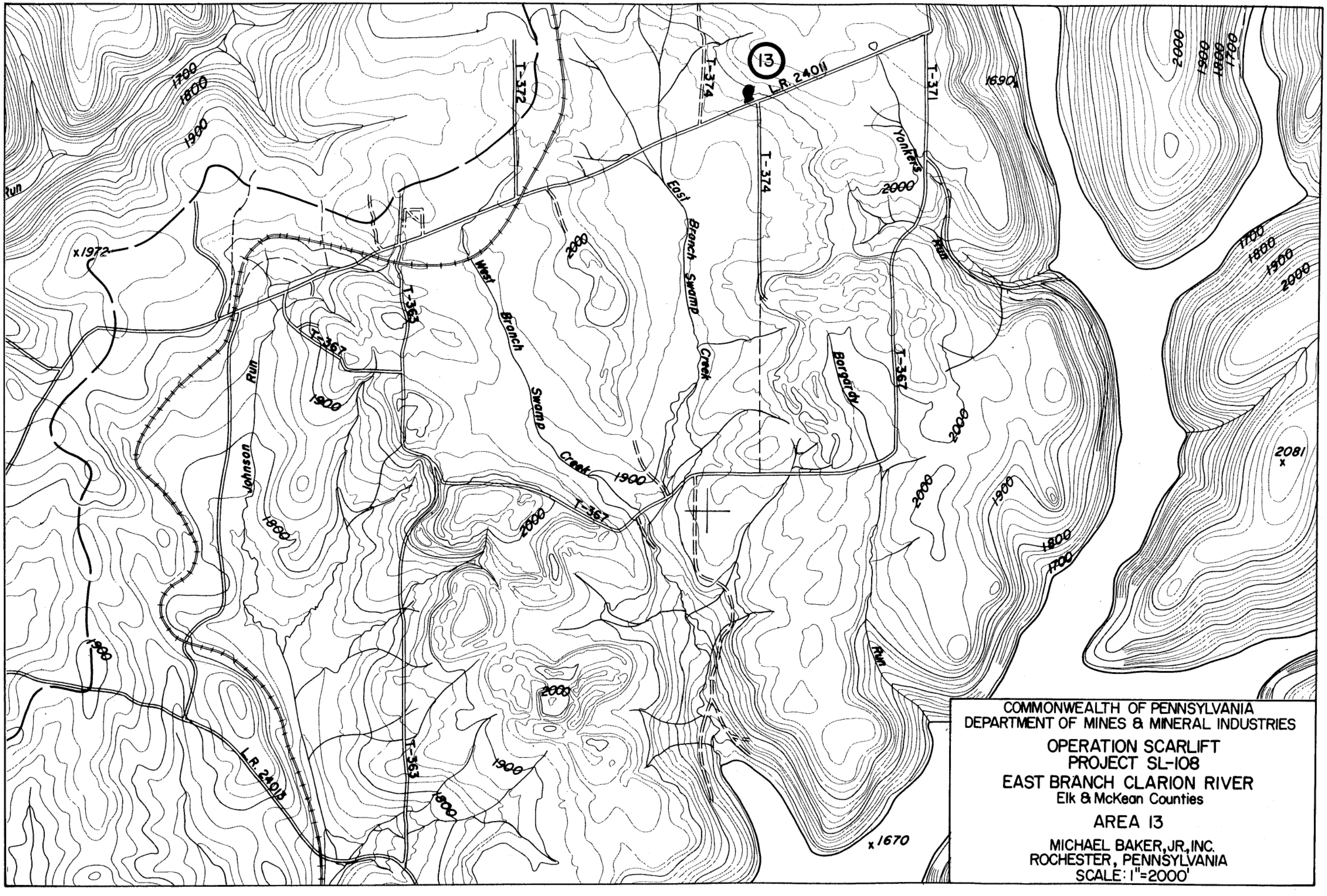

T-372
T-374
L.R. 24011
T-371
T-374
T-367
T-363
T-367
T-363
East Branch Swamp Creek
West Branch Swamp Creek
Borgerdy Run
Yonkers Run
Johnson Run
L.R. 24013
x1972
1700
1800
1900
2000
1690
2081
x1670
12
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF MINES & MINERAL INDUSTRIES
OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties
AREA 12
MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

Source of Pollution

AREA 13

This is a small stripped area of about 1. 37 acres just northwest of the junction of Legislative Route 24011 and Township Road 374 South. There is no evidence of coal or coal waste material at this location. According to local residents, the operation was abandoned when no coal was found. Some natural revegetation has occurred and there is a sparse grass cover and a few trees,

Recommended Abatement Measures - Since this is not a source of acid mine drainage pollution, no recommendations are presented.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF MINES & MINERAL INDUSTRIES

OPERATION SCARLIFT
PROJECT SL-108

EAST BRANCH CLARION RIVER
Elk & McKean Counties

AREA 13

MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

Source of Pollution

AREA 14

This is the largest strip-mined area in the East Branch Clarion River Watershed and about 54 percent of the area is within the Swamp Creek sub-basin, The total area affected by mining operations is about 207. 5 acres. The strip-mining was done by the following operators:

1. Wabash Ridge Corporation stripped the area east of Township Road 367,

2. Mahoning Corporation stripped the northern area west _ of Township Road 367, and

3. Juliette Coal Company stripped the southern area.

Most of the strip-mined area was backfilled to some extent, except for an area in the northern part. There is a large area in the southern part whichwas poorly graded and depressions cause ponding of surface water. Some seepage was noticed in the area where the Nashedka Mine was located, but the seepage may be due from groundwater flow emanating from the northern part of the strip-mine which was not backfilled.

The strip-mine operators planted trees, mostly evergreens in the north and larch in the south. Trees native to the area, such as aspen and cherry have seeded in. Additional plantings of evergreen seedlings have been made by property owners in recent years. Of the original planting, the survival and growth rate in some areas has been very good. There is very little ground cover other than some poverty grass, annual sage and berry.

The spoil material at the surface ranges from fine to coarse and there are some exposures of acid material. There is very little evidence of soil formation, probably because of the absence of ground cover and because the type of trees planted do not contribute very much in the way of a forest mat.

The Nashedka mine was located within the Swamp Creek subbasin part of the Area 14 strip-mine and 250 feet east of Township Road 374 and about 0. 9 mites south of the junction of Township Road

374 and Legislative Route 24011. The records of the Pennsylvania Department of Health show the mine was sealed at one time, but the records also show the mine was active again in 1948, abandoned in 1951, and partially stripped out in 1955. This investigation found the location completely stripped.

Records and laboratory data from the Pennsylvania Department of Health indicate acid discharges from the Nashedka mine were a major source of pollution on East Branch Swamp Creek. The results of 16 water quality tests made on samples taken from July 8, 1948 to August 31, 1960 indicated the pH ranged from 2. 6 to 3.6, sulfates from 220 to 13, 000 mg/ 1 and total iron from 9 to 2, 139 mg/ 1. The acid loads ranged from 10 lbs. per day in 1951, when the mine was reported as abandoned, to as high as 9, 040 lbs. per day in 1956, when it appears part of the mine was being stripped. (See Table 4).

It is difficult to reconstruct conditions during the time of the stripping operation, but it is possible much of the strip-mine drainage flowed through the old workings of the Nashedka mine; the heading was not stripped until about 1960. It should be noted that the Pennsylvania Department of Health sampling station was located 300 feet west of Township Road 374, and at this point, it could have been receiving drainage from part of the stripping operation. Regardless of what condition produced the high acid loads, it should be recognized that the Lower Kittanning Coal and its associated under arc? overclays, in the East Branch Clarion River Watershed, are highly sulfurous and can through chemical reaction with surface and subsurface waters, produce highly acid waters.

Recommended Abatement Measures - The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to approximately 830 lbs. per day or about 15 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.

Most of the area has a light to moderate tree cover which is just beginning to become effective in reducing the volume of runoff by interception and evapotranspiration. It is recommended that this forest cover not be disturbed with the exception of reclamation in areas where there is internal drainage.

Recommendations are made for the improvement of drainage out of the strip-mined area and for the establishment of a ground cover. For the purpose of making reclamation recommendations, the stripmine is separated into three areas:

TABLE 4

SAMPLE LOCATION: NASHEDKA MINE 250' E. of T-374, 0.9 mile S. jct. T-374 & L.R. 24011
Most of the water samples taken 300' W. of T-374 at or near tributary of East Branch Swamp Creek

PA. DEPT. OF HEALTH SAMPLE NO.	MO.	DAY	YR.	pH	TOTAL ACID MG/L	ALK. MG/L	SO4 MG/L	TOTAL IRON MG/L	FLOW CFS	ACID PPD	REMARKS
7	7	8	48	2.6	790.0	- 550.0			No. Meas.		Active mine
1543	4	10	51	3.35	180.0	- 30.0	220.	9.0	0.0100	10.	Abandoned mine
3601	3	10	53	3.1	200.0	- 84.0	380.	35.0	0.0387	42.	
3939	7	23	53	3.25	200.0	- 32.0	260.	35.0	0.0225	24.	
4477	5	6	54	2.8	1380.0	- 690.0	2600.	223.0	0.1284	955.	
5116	2	16	55	2.80	3200.0	-1300.0	4100.	1030.0	0.0334	576.	Partially stripped
438	9	27	55	2.6	8560.0	-2150.0	13000.	2139.0	0.0030	138.	out
931	8	15	56	2.95	5360.0	-1302.0	7000.	1100.0	0.3129	9040.	
990	10	31	56	3.0	3150.0	- 234.0	5450.	636.0	0.0360	611.	
1160	4	8	57	3.60	390.0	- 430.0	2300.	230.0		(+658.)	*Large discharge
1280	5	16	57	3.02	1470.0	- 600.0	2875.	280.0	0.0312	247.	
2027	4	10	59	2.8	2990.0	-1160.0	5225.	497.28		(+5042.)	*Large discharge
2183	6	29	59	2.84	4010.0	- 370.0	5980.	838.9		(+6763.)	*Large discharge
2243	9	8	59	2.85	4170.0	- 350.0	5880.	917.0	0.0606	1362.	
2712	8	4	60	2.68	1540.0	- 700.0	3440.	197.0	0.0606	503.	
2760	8	31	60	2.77	3900.0	- 460.0	5690.	669.0	0.1020	2144.	

*Unable to measure the flow - The PPD figure in brackets is a minimum estimate that is calculated by using the highest flow measured at the weir on August 15, 1956.

1) Terrace Area - This area includes most of the strip-mine (189.5 Acres). Backfilling and grading to improve drainage is recommended in about 46 acres of this area.

2) Slope Area - Parts of the perimeter of the strip-mine where slopes are steep (11.4 acres).

3) Nashedka Mine Area - This area is in the vicinity of the former Nashedka Mine where the soil was affected by acid discharges (6.6 acres).

The reclamation requirements are as follows:

Reclamation Requirements

Earthwork

Terrace Area	Backfilling and grading to improve drainage (Estimate 27,000 C. Y.)	
	About 750 C. Y. of backfill is to be coal mine waste material removed from the Area 32 Mine Waste Bank which is located just east of Township Road 367 and adjacent to northend of stripmine in the Yonkers Run Sub-Basin. This material shall be placed in the bottom of the depressions.	

Soil Treatment

Terrace Area and Slope Area

	Standard Ground Limestone (Total application to contain a minimum of 240 lbs. magnesium per Ac.)	5 Tons per Ac.
	50-200-200 in lbs. $N-P_2O_5-K_2O$	Per Ac.
Nashedka Mine Area	Standard Ground Limestone (No magnesium requirement)	7 tons per Ac.
	50-200-200 in lbs. $N-P_2O_5-K_2O$	Per Acre

Planting

Terrace Area	Creeping red fescue	15 lbs/Ac.
	Weeping lovegrass	2 lbs/Ac.
	Birdsfoot trefoil (Viking or Empire)	10 lbs/Ac.
Slope Area	Creeping red fescue	30 lbs/Ac.
	Penngift crownvetch	10 lbs/Ac.
Nashedka Mine Area	Reed canarygrass	20 lbs/Ac.
	Weeping lovegrass	3 lbs/Ac.

Mulching

Terrace Area	None	
Slope Area	Wood cellulose fiber	1200 lbs./Ac.
Nashedka Mine Area	None	

Special Requirement

Terrace Area and Nashedka Mine Area

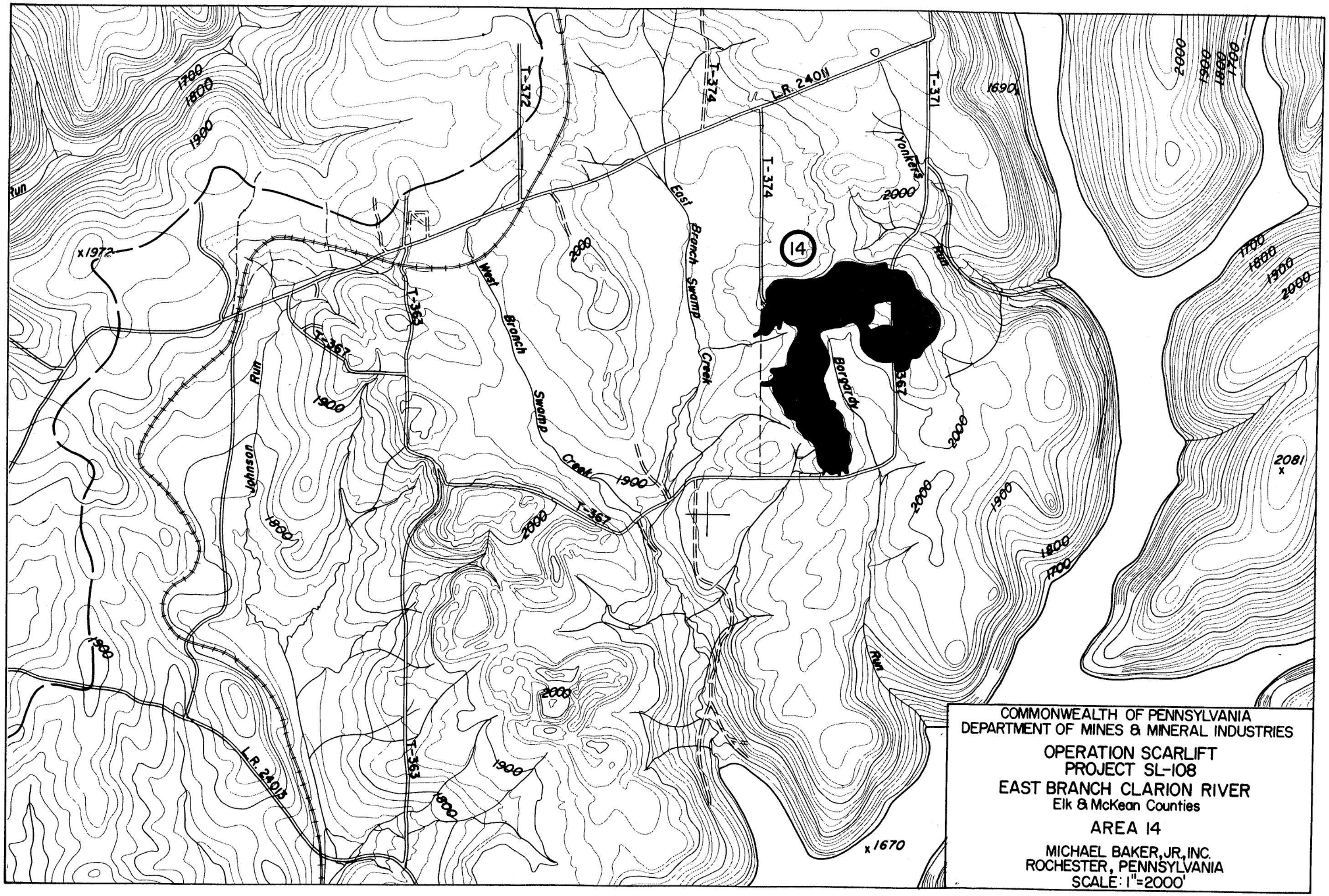
Wherever feasible limestone and fertilizer in separate applications shall be spread and incorporated into the soil to a minimum depth of 4 inches. Seed shall be applied by disc drill or comparable method. In other areas limestone and fertilizer shall be applied using a blowing method or by hand and the seed shall be broadcast.

Slope Area

Limestone shall be applied using a blowing method or by hand. Seed and 25-100-100 lbs. of N-P_2O_5-K_2O per Ac. shall be hydroseeded in one application in the spring. The remainder of the fertilizer, 25-100-100 lbs. per Ac., shall be applied in the fall after the seeding has become established.

Cost of Methods of Abatement

Description	Estimated Percent Abatement	Estimated Cost
AREA 14		
Backfill and grade to improve drainage, soil treatment and planting	80%	$224,000


T-372
T-374
L.R. 24011
T-371
Yonkers
Run
East Branch Swamp Creek
14
Borgata
T-367
West Branch Swamp Creek
T-363
Johnson Run
L.R. 24012
x1972
x1670
2081
1700
1800
1900
2000
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF MINES & MINERAL INDUSTRIES
OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties
AREA 14
MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

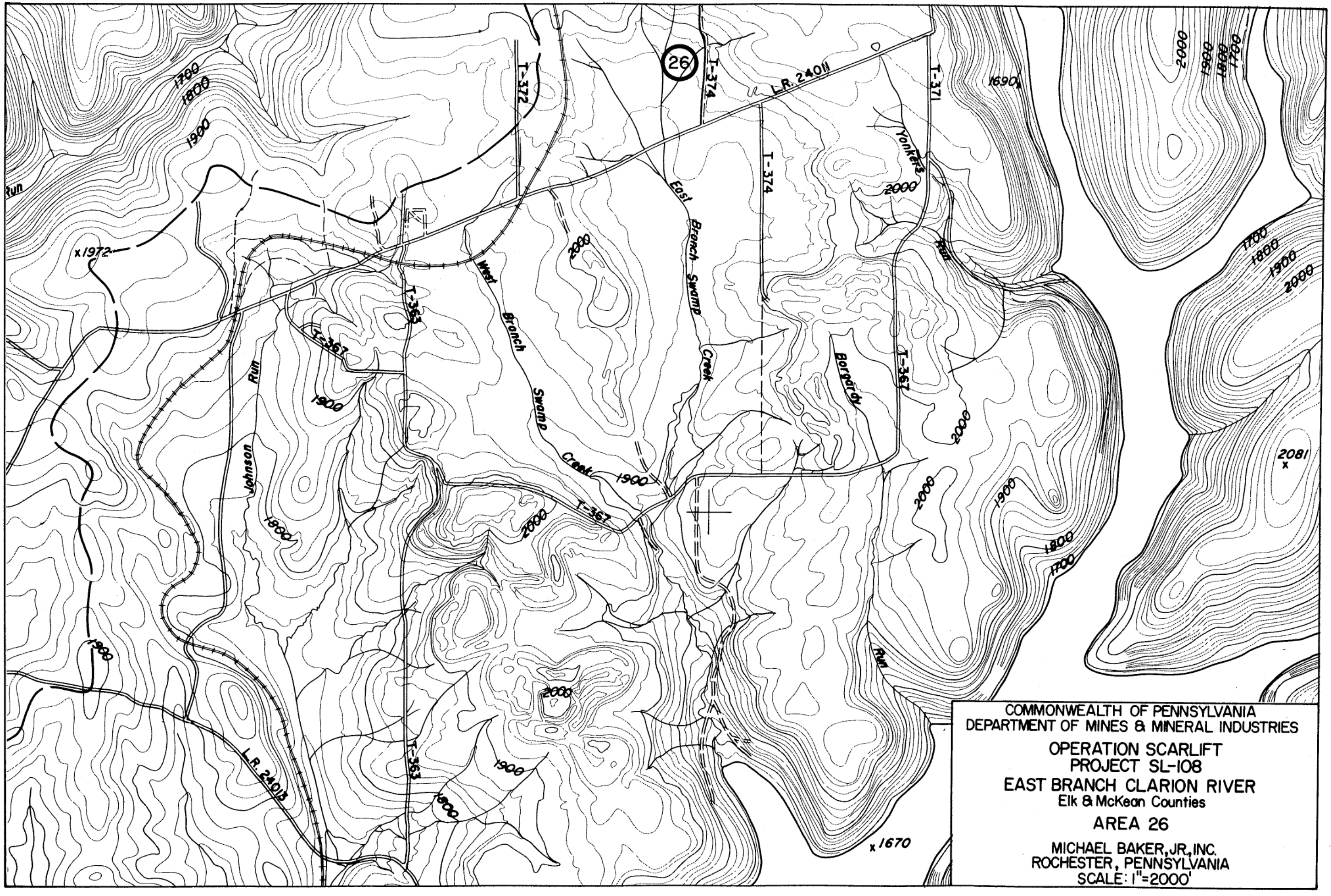
Source of Pollution

AREA 26

Area 26 is Township Road 374 North, The road is about 3, 000 feet long. Very little mine waste material was used in the construction of this road as most of the mine waste was used in the construction of driveways leading to houses off the road. This is a very minor source of acid mine drainage pollution.

Recommended Abatement Measures - It is recommended that no abatement measures be taken to further reduce acid mine drainage pollution. from this source.

The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 5 lbs. per day or less than 0. 1 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.



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DEPARTMENT OF MINES & MINERAL INDUSTRIES

OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties

AREA 26

MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

Source of Pollution

AREA 28

Area 28 is an old haul road beginning at the north end of the Area 7 strip-mine, crossing over the Area 6 strip-mine, and terminating at Legislative Route 24011. The total effected area contains approximately 4.5 acres.

The 600 feet of haul road between the north end of Area 7 strip-mine and the south end of Area 6 strip-mine contains very little mine waste. Either most of it washed away or possibly mine waste was not used in the construction of this section of the road.

The first 400 feet of the haul road, from the north end of the Area 6 strip-mine, contains a great deal of mine waste material. The next 600 feet of haul road is through a wooded area and there is very little evidence of mine waste material.

The last 1, 550 feet of haul road to Legislative Route 24011 contains most of the mine waste material and the soil to the east of the haul, up to a distance of 300 feet from the road, has been affected by acid discharges.

Recommended Abatement Measures - The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 100 lbs. per day or about 2 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.

It is recommended that the mine waste material be removed and the area graded to improve drainage. The affected area should be seeded with grass and legumes. The reclamation requirements are as follows:

Reclamation Requirements

Earthwork

Removal of coal mine waste material from haul road (Estimate 2, 000 cu. yds,)
Grading to improve drainage

Note: The Haul Road crosses a gas line

Soil Treatment

Standard Ground Limestone 6 Tons per Ac,
(Total application to contain a minimum of 240 lbs. magnesium per Ac,)

50-200-200-in lbs. N-$P_2 0_5$-$K_2 0$ per Ac.

Planting

Creeping red fescue 20 lbs/Ac,
Birdsfoot trefoil (Viking or Empire) 10 lbs/Ac,

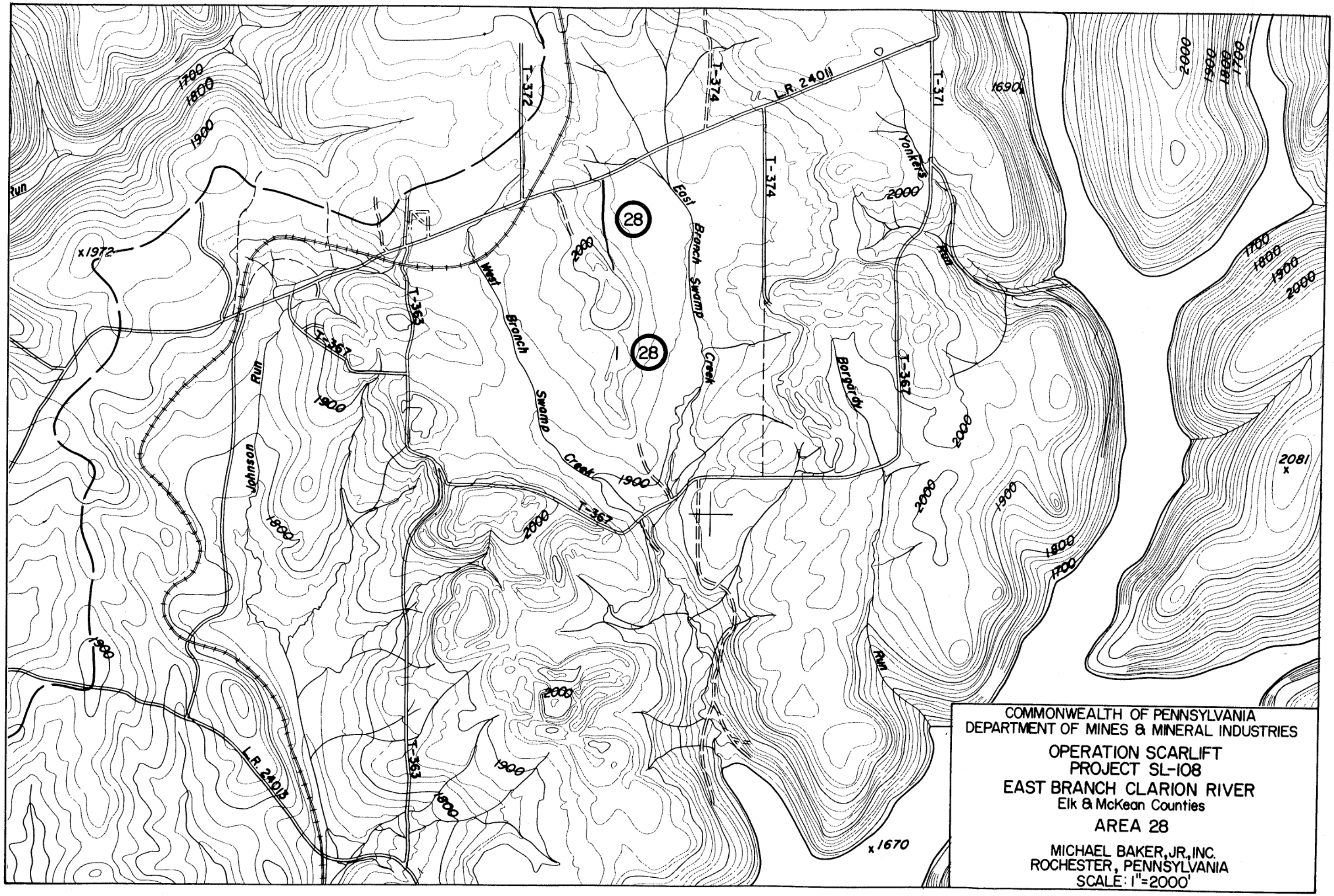
Special Requirements

Spread limestone and fertilizer in separate application and incorporate to a minimum depth of 4 inches. Seed shall be applied by disc drill or comparable method.

The coat mine waste shall be dumped into the pit in the northeastern part of the Area 11 Strip-Mine.

Cost of Methods of Abatement

Description	Estimated Percent Abatement	Estimated Cost
AREA 28		
Remove coal waste material, improve drainage, soil treatment & planting	90%	$11,000



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OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties

AREA 28

MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

Source of Pollution

AREA 29

Area 29 is an old haul road beginning at the southend of the Area 7 strip-mine and terminating at Township Road 367. Summer cabins are located along the road and some of the mine waste on the road may have be en placed by property owners to upgrade the wearing surface.

The total area affected by mine waste material is about 3. 4 acres, The first 1, 150 feet of haul road, beginning at the stripmine, has a thin layer of mine waste mixed with soil and an area up to 400 feet from the road has been affected by acid discharges, Most of the mine waste material is on or adjacent to the last 450 feet of road terminating at Township Road 367,

Recommended Abatement Measures - The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 40 lbs. per day or less than 1 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.

It is recommended the mine waste material be removed and the road be reconstructed with crushed limestone aggregate. The affected area outside the roadway limit should be seeded with Reed Canarygrass because of the wet conditions.

To insure that mine waste is not used on this private road in the future, it maybe necessary to upgrade the road to meet Township specifications and have the property owners along the road agree to turn the roan over to the Township.

The reclamation requirements are as follows: Reclamation

Requirements Earthwork

Remove coal waste and coat waste mixed with soil from the road and areas adjacent to the road (Estimate 2, 350 cu, yds.) Replace road bed with crushed limestone aggregate and grade ditches. Roadway to be 30' wide at Township Road 367 and taper to a 15' width at a distance of 100'.

Note: Estimate of quantity of mine waste material

Station 0' to Station 450' - 1, 700 cu. yds. (Depth 3' to 4') Station 450' to Station 600' - 650 cu. yds, (depth 1')

Soil Treatment

Affected area outside roadway - 2. 7 Ac.

Standard Ground Limestone 6 Tons per Ac.
(Total application to contain a minimum of 240 lbs. magnesium per Ac.)

50-50-50 in lbs. N-$P_2 0_5$-$K_2 0$ per Ac,

Planting

Affected area outside roadway - 2, 7 Ac.

Reed canarygrass 15 lbs. per Ac.
Redtop 3 lbs. per Ac,

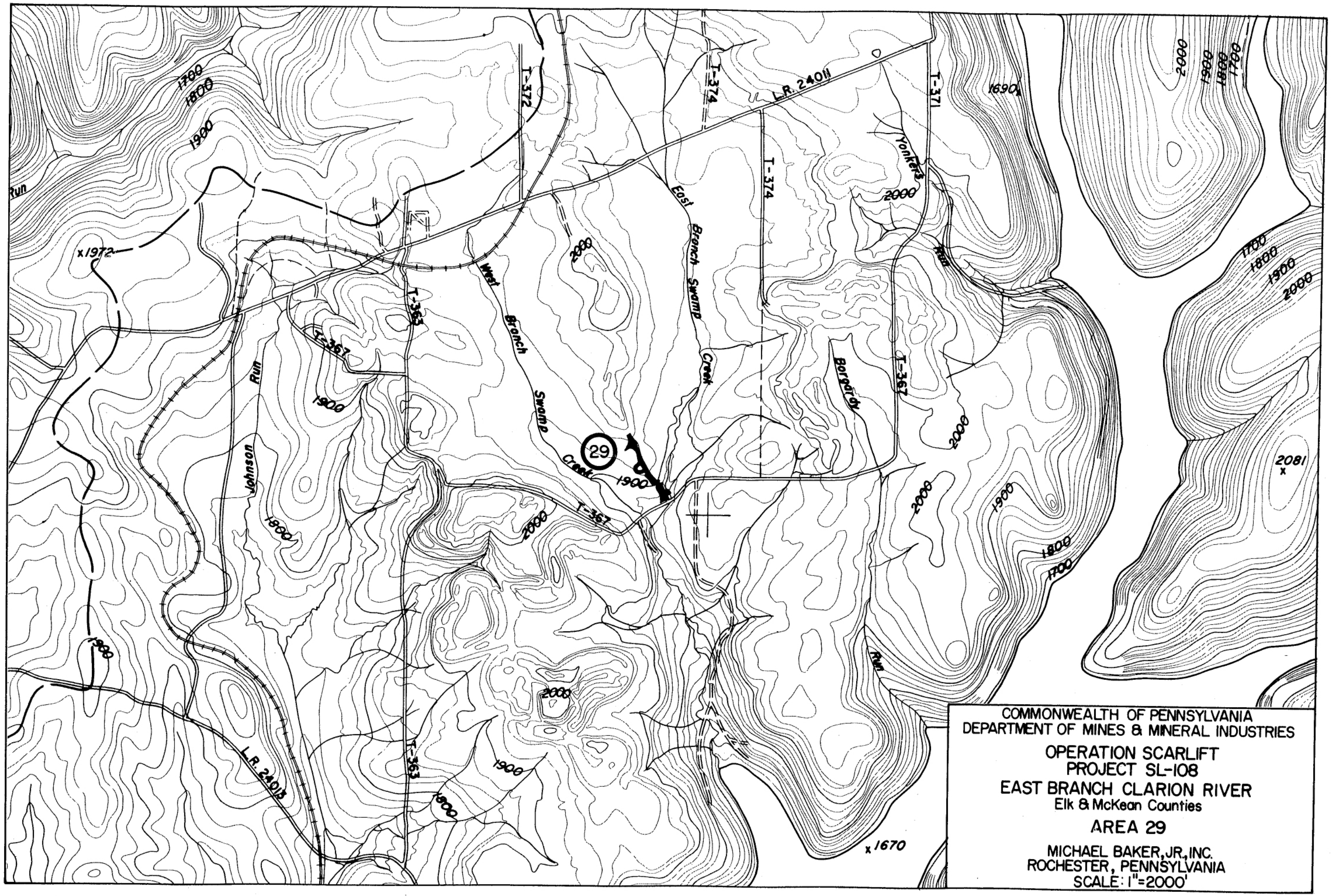
Special Requirements

Spread limestone and fertilizer in separate applications and incorporate to a minimum depth of 4 inches, Broadcast seed.

The coal mine waste material shall be dumped into the pit in the northeastern part of the Area 11 Strip-Mine.

Cost of Methods of Abatement

Description	Estimated Percent Abatement	Estimated Cost
AREA 29		
Remove coal waste material from roadway, replace with crushed limestone, improve drainage and in areas outside roadway soil treat and plant.	90%	$30,000


T-372
T-374
L.R. 24011
T-371
T-374
T-367
T-363
T-363
T-367
Yonkers Run
East Branch Swamp Creek
West Branch Swamp Creek
Borgardy Run
Johnson Run
Run
29
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x1670
L.R. 24013
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OPERATION SCARLIFT
PROJECT SL-108
EAST BRANCH CLARION RIVER
Elk & McKean Counties
AREA 29
MICHAEL BAKER, JR., INC.
ROCHESTER, PENNSYLVANIA
SCALE: 1"=2000'

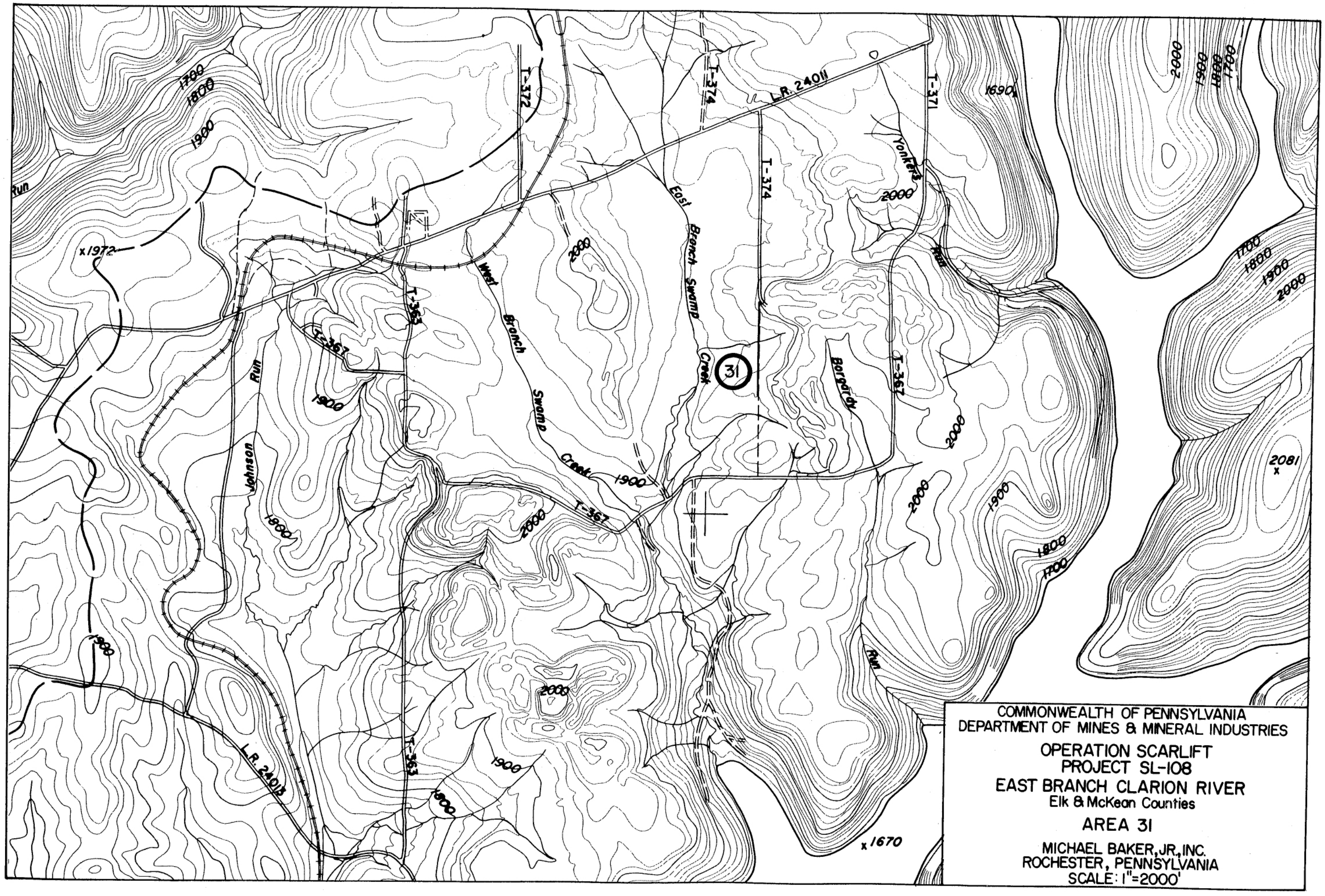
Source of Pollution

AREA 31

Area 31 is a section of Township Road 374 South which has been abandoned. The abandoned section begins near the location of the old Nashedka Mine and terminates at Township Road 367. Mine waste was used in upgrading this road when Area 14 was being stripped. This is one of the sections of road that were cleaned up under orders from the Pennsylvania Department of Health in the 1950's. The road is impassible and overgrown with vegetation.

Recommended Abatement Measures - This is a very minor source of pollution and it is recommended no abatement measures be taken to further reduce acid mine drainage pollution.

The average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 3 lbs. per day or about 0. 05 percent of the total average daily acid load contributed by pollution sources in the East Branch Clarion River Watershed.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF MINES & MINERAL INDUSTRIES

OPERATION SCARLIFT
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Source of Pollution

Areas Discussed in Other Sub-Basins

AREA 10

Most of the strip-mine is in the Johnson Run Sub-basin, Within the Swamp Creek Sub-Basin, the average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 15 lbs. per day or about 7 percent of the total average daily acid load produced by this source. Area 10 is discussed in the Johnson Run Sub-basin section of the report, page A-89.

AREA 11

This is the third largest strip-mined area in the East Branch Clarion River Watershed and about 60% of the area is in the Johnson Run Sub-basin where it is a major source of acid mine drainage pollution. Within the Swamp Creek Sub-basin, the average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be approximately 90 lbs. per day or about 12 percent of the total average daily acid load produced by this source. It is recommended that mine waste material from other areas in the Swamp Creek Sub-Basin be buried in the northeast end of the strip-mine. Area 11 is discussed in the Johnson Run Sub-basin section of the report, page A-92.

AREA 27

Less than an acre of this strip-mine is in the Swamp Creek Sub-basin, Most of this small strip-mine (8. 7 acres) is in the Yonkers Run Sub-basin where it is a minor source of acid mine drainage pollution. Within the Swamp Creek Sub-basin, the average acid discharge from this source is estimated, on the basis of water quality tests performed over a one year period, to be less than 1 lb. per day. Area 27 is discussed in the Yonkers Run Sub-basin section of the report on page A-158.