

6. Tearing Run Watershed

a. General

Tearing Run originates near the village of Waterman and flows in a westerly direction for approximately 3.2 miles where it discharges into Two Lick Creek Proper near Homer City.

The watershed's total stream length including all tributaries is approximately 8.5 miles and the total area is approximately 5.3 square miles.

b. Stream Condition

An analysis of mine drainage contamination within the watershed provides the following breakdown on stream condition.

Table 55

Stream Condition

Tearing Run Watershed

<u>Stream Classification</u>	<u>Stream Length Miles</u>	<u>Percent Total Stream Length</u>
Non-Polluted	1.1	13
Severely Polluted	6.0	70
Moderately Polluted	1.4	17

As indicated above, approximately 87 percent of the Tearing Run Watershed is seriously degraded by min.- drainage.

Plate 56 shows the locations of the sampling stations and the extent of mine drainage pollution within the various portions of the watershed.

c. Sampling Station Data

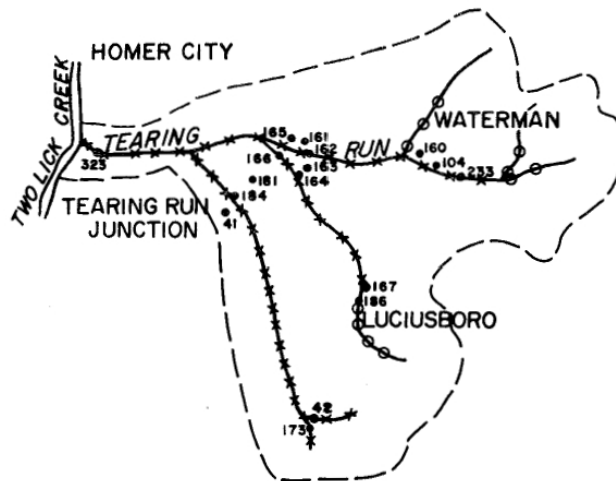
Seventeen (17) sampling stations were installed and monitored. The minimums, maximums, and yearly averages of water quality data obtained from these stations are listed in Table 56 on Page 199.

Plate 57 graphically illustrates the monthly relationship between stream flow, pollution load, and weather elements within the watershed based on measurements taken at Sampling Station #323 located near the mouth of Tearing Run.

TEARING RUN WATERSHED

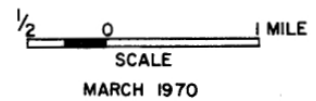


WATERSHED AREA



LEGEND

- TEARING RUN DRAINAGE BASIN
- SAMPLING STATION
- MODERATELY ACID
- SEVERELY ACID



PREPARED BY
L. ROBERT KIMBALL
Consulting Engineers
EBENSBURG, PENNSYLVANIA

TWO LICK CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT
INDIANA COUNTY, PENNSYLVANIA

PREPARED FOR
PENNSYLVANIA
DEPARTMENT OF MINES
AND
MINERAL INDUSTRIES

Table 56

Water Quality DataTearing Run Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
323	Max. 30,110 Min. 88 Ave. 1,456	2.4 - 4.8	2,323	Max. 540 Min. 66 Ave. 132	Max. 80 Min. 2 Ave. 15	Max. 1,625 Min. 0 Ave. 492
233	Max. 111 Min. 31 Ave. 56	3.4 - 4.6	44	Max. 70 Min. 56 Ave. 65	Max. 8 Min. 5 Ave. 6	Max. 580 Min. 350 Ave. 447
186	Max. 380 Min. 17 Ave. 179	4.2 - 5.2	29	Max. 76 Min. 18 Ave. 31	Max. 65 Min. 1 Ave. 63	Max. 725 Min. 212 Ave. 404
184	Max. 972 Min. 17 Ave. 288	3.7 - 4.6	458	Max. 212 Min. 72 Ave. 132	Max. 6 Min. 1 Ave. 4	Max. 1,500 Min. 100 Ave. 124
181	Max. 108 Min. 4 Ave. 20	3.3 - 4.1	24	Max. 824 Min. 470 Ave. 638	Max. 325 Min. 75 Ave. 158	Max. 2,750 Min. 1,250 Ave. 1,687
173	Max. 56 Min. 4 Ave. 32	3.6 - 4.8	250	Max. 140 Min. 84 Ave. 101	Max. 4 Min. 1 Ave. 2	Max. 1,530 Min. 360 Ave. 841
167	Max. 36 Min. 4 Ave. 15	3.6 - 4.2	37	Max. 440 Min. 104 Ave. 204	Max. 120 Min. 23 Ave. 49	Max. 2,250 Min. 750 Ave. 1,238
166	Max. 1,323 Min. 31 Ave. 220	3.7 - 4.6	100	Max. 90 Min. 20 Ave. 38	Max. 1 Min. 0.2 Ave. 1	Max. 1,170 Min. 250 Ave. 502

199

Table 56 Continued

Water Quality DataTearing Run Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
165	Max. 43 Min. 6 Ave. 12	3.0 - 4.2	213	Max. 2,320 Min. 714 Ave. 1,520	Max. 750 Min. 140 Ave. 445	Max. 8,000 Min. 2,000 Ave. 4,634
164	Max. 253 Min. 1 Ave. 75	3.0 - 4.5	347	Max. 1,224 Min. 218 Ave. 384	Max. 200 Min. 3 Ave. 151	Max. 3,100 Min. 875 Ave. 1,515
163	Max. 14 Min. 3 Ave. 5	3.0 - 3.9	36	Max. 1,080 Min. 144 Ave. 617	Max. 170 Min. 3 Ave. 97	Max. 11,000 Min. 450 Ave. 2,104
162	Max. 2,376 Min. 48 Ave. 412	3.3 - 4.5	250	Max. 200 Min. 24 Ave. 50	Max. 10 Min. 1 Ave. 4	Max. 966 Min. 190 Ave. 435
161	Max. 71 Min. 36 Ave. 49	3.0 - 4.2	812	Max. 1,820 Min. 600 Ave. 1,380	Max. 890 Min. 20 Ave. 444	Max. 8,100 Min. 2,625 Ave. 4,894
160	Max. 530 Min. 4 Ave. 100	3.9 - 5.4	18	Max. 96 Min. 6 Ave. 15	Max. 45 Min. 2 Ave. 5	Max. 4,500 Min. 340 Ave. 539
104	Max. 95 Min. 1 Ave. 18	3.2 - 4.7	33	Max. 350 Min. 78 Ave. 151	Max. 212 Min. 5 Ave. 77	Max. 1,440 Min. 125 Ave. 639
42	Max. 145 Min. 1 Ave. 29	2.9 - 4.3	81	Max. 400 Min. 140 Ave. 231	Max. 105 Min. 3 Ave. 41	Max. 1,500 Min. 150 Ave. 630

Table 56 Continued

Water Quality Data

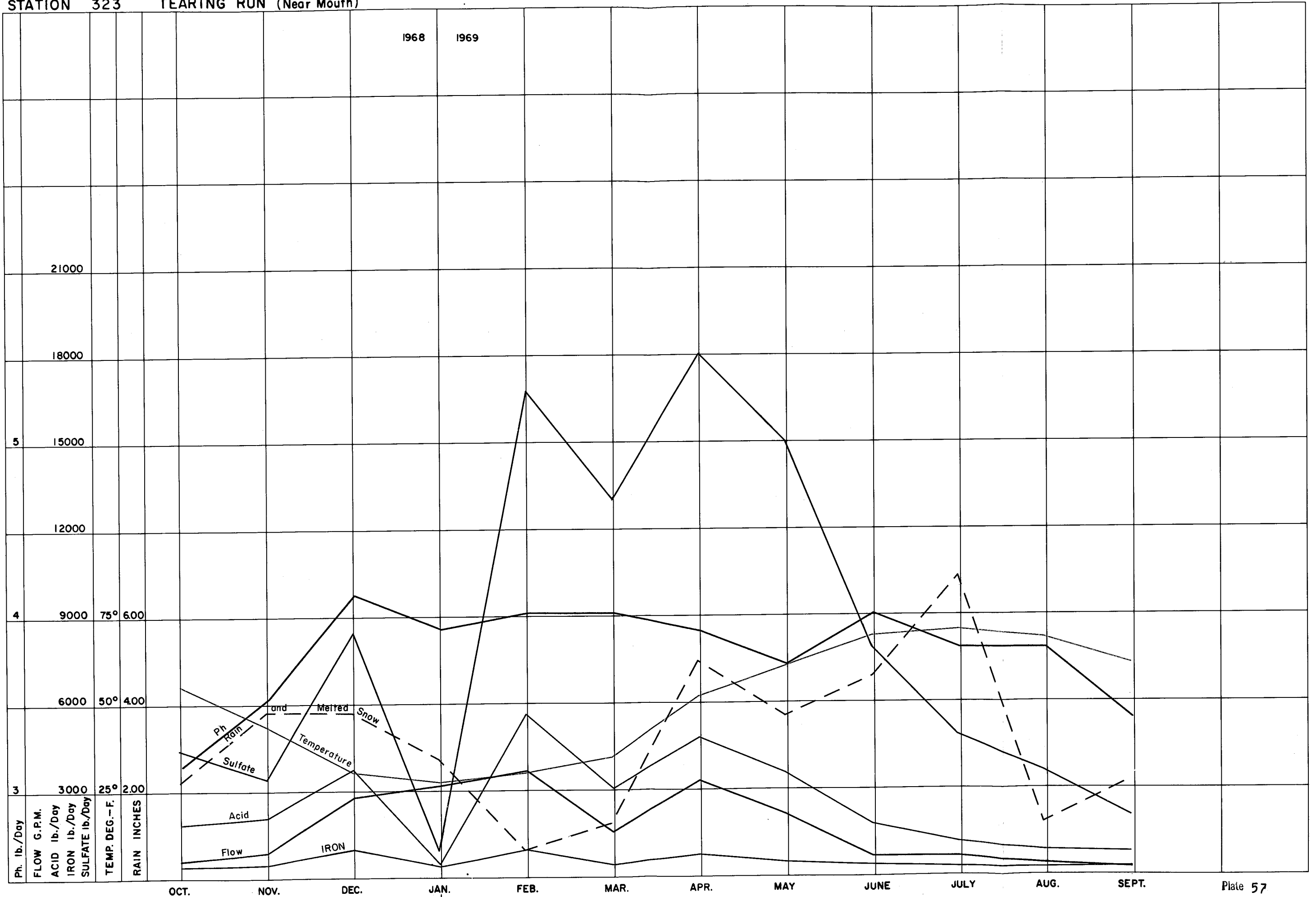
Tearing Run Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
41	Max. 862 Min. 1 Ave. 27	2.3 - 4.0	394	Max. 2,500 Min. 680 Ave. 1,228	Max. 850 Min. 3 Ave. 196	Max. 6,600 Min. 1,125 Ave. 2,581

RELATIONSHIP BETWEEN STREAM FLOW, POLLUTION LOAD AND WEATHER ELEMENTS

STATION 323 TEARING RUN (Near Mouth)

1968 1969



High flow and contamination load levels occurred during the winter and spring with lows recorded during the fall months.

PH levels generally corresponded with flow rates with an average pH of 4.2 during December and a low of 3.2 in October.

The acid load was proportionally higher during the fall months which accounts for the low pH's recorded during that season.

Tearing Run contributed the following percentages of flow and pollution load to the total flow and load of Two Lick Creek as measured at Sampling Station #424 near Graceton: Flow - 2%; Acidity - 4%; Iron - 3%; and Sulfate - 3%.

Tearing Run discharged approximately 2,096,000 gallons of water per day into Two Lick Creek Proper during the study period.

d. Coal Mining Activity General

The area has been extensively mined since 1905 with mining activity reaching its peak from 1915 through 1945. Both the Upper Freeport (B) and Lower Kittanning (B) seams were mined. Most of the coal resources have now been exhausted.

Map Sheets 9 , 10, and 13, Appendix A show the locations and extent of both deep and strip mines.

Deep Mines

There are presently no deep mines in operation. Several mines operated into the late 1940's and early 1950's. Two of the largest mine complexes, Waterman and Snyder, are interconnected and have openings within and outside the watershed.

Table 57 on the following page lists the major abandoned mines and the following information: Type of opening, total number of openings, seam mined, maximum head, whether or not the mine is draining water, and number of acres mined.

Table 57

Abandoned MinesTearing Run Watershed

<u>Name of Mine</u>	<u>Type of Opening</u>	<u>Seam Mined</u>	<u>Draining Water</u>	<u>Total No. Openings</u>	<u>Area Mined (Acres)</u>	<u>Maximum Head (Feet)</u>
1. Snyder #1	Drift	B	X	3	595	(219)*
2. Snyder #2	Drift	B	X	6	2,620 ⁽²⁾	52 (248)*
3. Snyder #3	Drift	B	X	2	206	(207)*
4. Waterman	Slope	B	X	4	511	33 (60)*
5. Coy #1**	Drift	E	X	6	95	260
6. Coy #2***	Drift	E	X	6	252	20 (225)***
7. Tearing Run****	Slope	E	X	7	165	14
8. Idabel	Drift	E	-	4	53	47
9. Graceton #2 ^(*)	Drift	E	X	6	58	
10. Stewart	Drift	E	X	6	39	20
11. Luciusboro #1 ⁽¹⁾	Slope	E	-	4	568	52

*Snyder and Waterman complexes are interconnected. The head indicated in parenthesis is based on placing watertight seals on all entries into the above mines. Local heads based on not sealing the fan shaft located at Rissinger School near Homer City in the Lower Portion of Two Lick Creek are indicated with parenthesis.

**Coy #1 and #2 are interconnected.

***Coy #2 includes two openings with only a maximum head of 13 feet. The maximum head of 225 feet is based on sealing the entire Coy complex.

****Tearing Run Mine is interconnected with Graceton #3 Mine which has its main entries on the Lower Portion of Two Lick Creek.

(*)Graceton #2 main entries are on the Lower Portion of Two Lick Creek,

(1)Luciusboro #1 is discharging mine drainage into Blacklick Creek Watershed.

(2)Indicates total acreage of Snyder #2 with 2,227 acres in Lower Yellow Creek.

Strip Mines

The first strip mining in the Two Lick Creek drainage basin took place in the Tearing Run Watershed in 1943 near Waterman.

Approximately 183 acres were stripped between then and the mid 1960's.

Most of the earlier strips were shallow and narrow pits cut along the outcrops of abandoned deep mines. Few were backfilled; however, most are now adequately revegetated.

The more recent strips were backfilled and revegetated in accordance with state law. However, at least one is not adequately revegetated.

Several of the strips broke into or cut close to old deep mine workings and as a result deep mine water is draining over and through the stripped areas.

e. Description of Mine Drainage Sources

The major mine drainage sources are listed on the following page in Table 58 beginning with the most serious contributor of acid load. Each source is associated with the sampling station(s) measuring the mine drainage and the respective contamination load. Plates 58, 59, and 60 show the locations of various sources.

Combined maximum heads are given for deep mines that are discharging mine drainage. Deep mines that are interconnected in this watershed are not listed collectively as one source.

Table 58

Major Mine Drainage SourcesTearing Run Watershed

<u>Source Description</u>	<u>Flow GPM</u>	<u>Sampling Station(s)</u>	<u>Pollution Load - Lbs./Day</u>			<u>Combined Maximum Head (Feet)</u>
			<u>Acid</u>	<u>Iron</u>	<u>Sulfate</u>	
1. Snyder #2 Mine	61	161, 165	1,025	327	3,529	52
2. Tearing Run Mine (Graceton #3)	27	41	394	63	828	14
3. Snyder #1 Mine (Main Entries)	80	163, 164	383	142	1,492	219
4. Coy #1 and #2 Mines (Coy #1 Main Entries)	32	181	250	62	661	453
5. Snyder #1 and #2 Coal Refuse	667	Estimated	160	5	1,100	-
6. Waterman Mine Coal Refuse	238	162 (Minus 104, 160, 233)	155	2	1,074	-
7. Graceton #2 Strip Mine and (3) Drifts	49	42, 173	105	4	420	47
8. Snyder #1 (1) Drift*	15	167	37	9	225	19
9. Luciusboro #1 Coal Refuse	179	186	29	0	384	-
10. Stewart Mine	26	233 and Catch Samples	20	1	72	20
11. Waterman Mine Drainage Drift	100	160	18	5	649	33

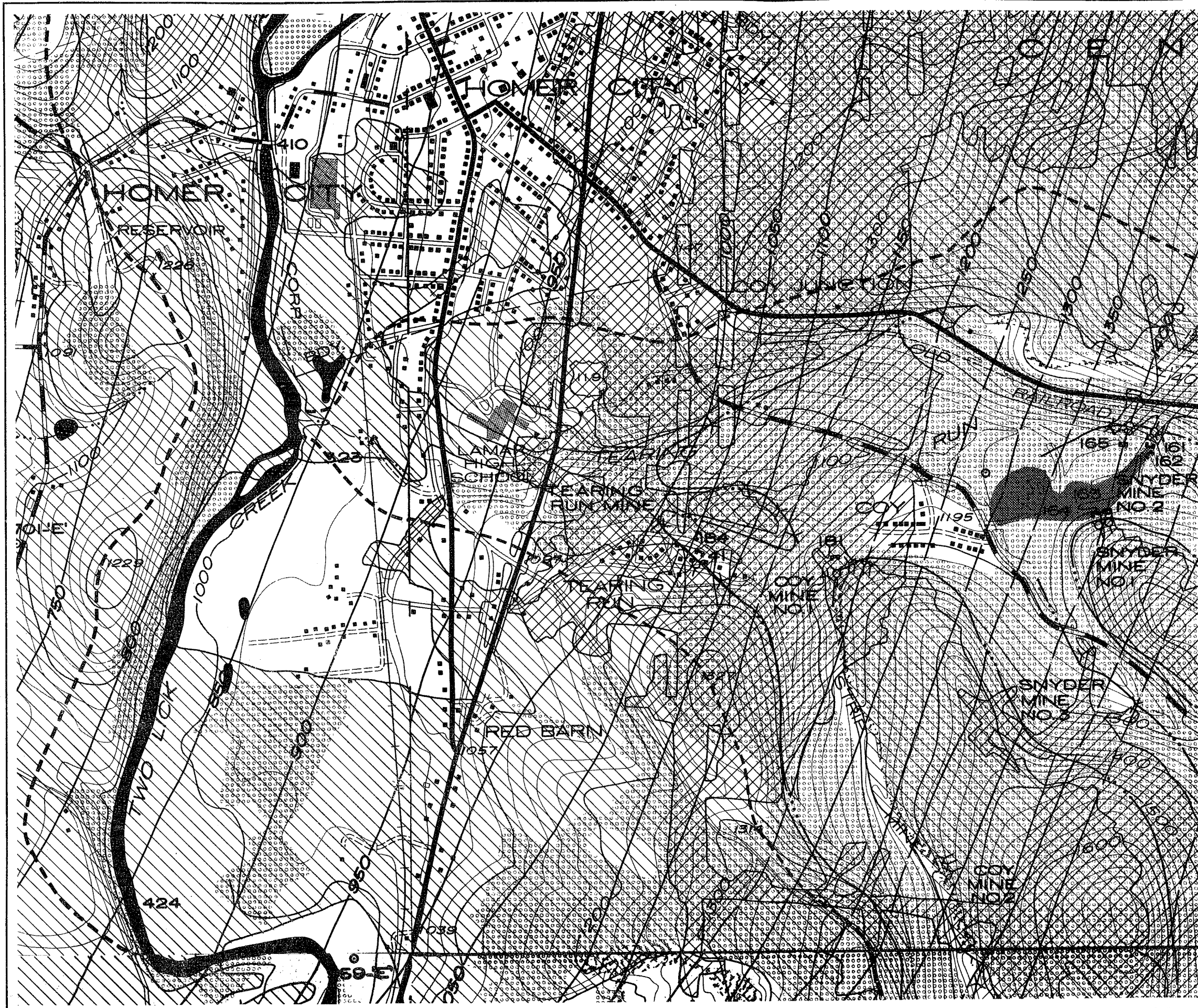
Table 58 Continued

Major Mine Drainage Sources

Tearing Run Watershed

<u>Source Description</u>	<u>Flow GPM</u>	<u>Sampling Station(s)</u>	<u>Pollution Load - Lbs./Day</u>			<u>Combined Maximum Head (Feet)</u>
			<u>Acid</u>	<u>Iron</u>	<u>Sulfate</u>	
12. Coy #2 Drifts*	63	182, 183 Estimated	15	2	800	20
13. Coy #1 and #2 Strip Mine	288	184	5	1	200	-

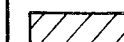




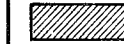

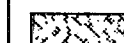








*Head is as indicated if no seal is placed on main entries.



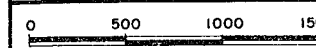


TEARING RUN



LEGEND

-  KITTANNING SEAM
-  FREEPORT SEAM
-  UPPER FREEPORT (E) SEAM
-  LOWER FREEPORT (D) SEAM
-  LOWER KITTANNING (B) SEAM
-  COAL REFUSE AREA (NEW)
-  COAL REFUSE AREA (OLD)
-  STRIP MINE AREA
-  SAMPLING STATION
-  DIAMOND DRILL HOLE
-  MINE OPENING (DRY)
-  MINE OPENING (DRAINING)
-  WATERSHED PERIMETER (EXTERIOR)
-  WATERSHED PERIMETER (INTERIOR)
-  COAL CONTOUR UPPER FREEPORT SEAM
-  COAL CONTOUR LOWER FREEPORT SEAM (COAL MISSING DUE TO EROSION)

TWO LICK CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT
 INDIANA COUNTY, PENNSYLVANIA
 PROJECT N° SL109
INVENTORY MAP

















 SCALE IN FEET	MARCH, 1970	 SHEET N° 
L. ROBERT KIMBALL <i>Consulting Engineers</i> EBENSBERG, PENNSYLVANIA		




TEARING RUN

2

LEGEND

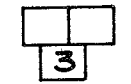
-  KITTANNING SEAM
-  FREEPORT SEAM
-  UPPER FREEPORT (E) SEAM
-  LOWER FREEPORT (D) SEAM
-  LOWER KITTANNING (B) SEAM
-  COAL REFUSE AREA (NEW)
-  COAL REFUSE AREA (OLD)
-  STRIP MINE AREA
-  SAMPLING STATION
-  DIAMOND DRILL HOLE
-  MINE OPENING (DRY)
-  MINE OPENING (DRAINING)
-  WATERSHED PERIMETER (EXTERIOR)
-  WATERSHED PERIMETER (INTERIOR)
-  COAL CONTOUR UPPER FREEPORT SEAM
-  COAL CONTOUR LOWER FREEPORT SEAM (COAL MISSING DUE TO EROSION)

**TWO LICK CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT**
INDIANA COUNTY, PENNSYLVANIA
PROJECT N° SL109
INVENTORY MAP

0 500 1000 1500 SCALE IN FEET	MARCH, 1970	 SHEET N° 2
L. ROBERT KIMBALL <i>Consulting Engineers</i> EBENSBURG, PENNSYLVANIA		



TEARING RUN



LEGEND

- KITTANNING SEAM
- FREEPORT SEAM
- UPPER FREEPORT (E) SEAM
- LOWER FREEPORT (D) SEAM
- LOWER KITTANNING (B) SEAM
- COAL REFUSE AREA (NEW)
- COAL REFUSE AREA (OLD)
- STRIP MINE AREA
- SAMPLING STATION
- DIAMOND DRILL HOLE
- MINE OPENING (DRY)
- MINE OPENING (DRAINING)
- WATERSHED PERIMETER (EXTERIOR)
- WATERSHED PERIMETER (INTERIOR)
- COAL CONTOUR UPPER FREEPORT SEAM
- COAL CONTOUR LOWER FREEPORT SEAM (COAL MISSING DUE TO EROSION)

**TWO LICK CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT**
INDIANA COUNTY, PENNSYLVANIA
PROJECT N° SL109
INVENTORY MAP

0 500 1000 1500 SCALE IN FEET	MARCH, 1970	
L. ROBERT KIMBALL <i>Consulting Engineers</i> EBENSBURG, PENNSYLVANIA		

f. Recommended Abatement Procedures - Cost Benefication

Recommended abatement treatments and related costs are listed for the various sources of pollution in Table 59.

All treatments and costs are based on data described in Section X. A key to define the recommended abatement procedures is shown on Page 214. Two abatement plans, a primary and alternate, are recommended for rehabilitation of the watershed. Plan A is recommended as the primary plan and Plan B as the alternate. An estimated effectiveness of 75% reduction of pollution load is assigned for each recommended treatment in both plans.*Plan A is based on an arbitrary maximum cost of \$1,000.00 per pound of acid load abated and will provide an estimated reduction of acid load in the magnitude of 82% for the watershed. Plan B is based on an arbitrary cost of \$400.00 per pound of acid load abated and will provide an estimated reduction of acid load of approximately 78% for the watershed. Table 59a lists the sources to be abated, the amount of benefication, and costs associated with both plans.

*With the exception of treatment plants which are assigned an effectiveness of 100% reduction of pollution load.

Table 59

Recommended Abatement Procedures - Cost Benefication

<u>Tearing Run Watershed</u>					
<u>Source Name</u>	<u>Pollution Order</u>	<u>Recommended Treatment Procedures</u>	<u>Total Cost \$</u>	<u>Cost Per Pound \$</u>	<u>Total Abatement Lbs. Acid/Day</u>
1. Tearing Run Mine	2	1 Seal	\$ 11,000	\$ 37.23	295
2. Snyder #2 Mine	1	4 Seals	44,000	57.23	769
3. Snyder #1 Mine	3	Plant	55,497	144.90	383
Coy #1 and #2 Mines	4	Plant	36,225	144.90	250
4. Snyder #1 Drift Mine	8	1 Seal	11,000	395.68	29
5. Graceton #2 Strip Mine and (3) Drifts	7	3 Seals 25A - R2	41,938	532.21	79
6. Snyder #1 and #2 Refuse Pile	5	9A - RP	66,528	554.40	120
7. Waterman Mine Refuse Piles	6	11A - RP	81,312	699.16	116
8. Waterman Mine Drainage Drift	11	1 Seal	11,000	814.81	13
9. Luciusboro #1 Refuse Pile	9	3A - RP	22,176	1,017.25	22
10. Coy #2 Drift	12	2 Seals	22,000	1,946.90	11
11. Stewart Mine	10	4 Seals	44,000	2,933.33	15
12. Coy #1 and #2 Strip Mines	13	10A - R2 - F - B	<u>19,000</u>	5,000.00	<u>4</u>
Total all Sources			\$ 465,676		2,106

Table 59a

Benefication - Recommended Plans

Tearing Run Watershed

<u>Plan</u>	<u>Above Sources Abated</u>	<u>Benefication Pollution Reduction Acid Lbs./Day - % of Total</u>	<u>Benefication Pollution Reduction Iron Lbs./Day - % of Total</u>	<u>Benefication Pollution Reduction Sulfate Lbs./Day - % of Total</u>	<u>Total Cost</u>
A	1 - 8	2,054 - 79%	515 - 84%	8,022 - 70%	\$358,500
B	1 - 4	1,725 - 66%	503 - 81%	5,589 - 49%	157,722

KEY TO RECOMMENDED ABATEMENT PROCEDURES

- R1 - Grass and legumes - Method #1
- R2 - Grass and legumes - Method #2
- R3 - Seedlings
- F - Flumes
- D - Ditching
- B - Terrace backfill
- A - Acreage on strip mines and refuse piles
- RP - Standard Refuse Pile Reclamation
- RB - Refuse Burial and Reclamation
- SC - Soil Cover
- Plant - Treatment Plant
- Pond - Pond Construction and Reclamation
- Seal - Mine Seal