7. Cherry Run Watershed

a. General

Cherry Run originates west of Indiana Borough and flows in a southerly direction for approximately 8.3 miles where it discharges into Two Lick Creek near Graceton.

Total stream length including all tributaries is approximate 31.5 miles. The total area of the watershed is approximately 16.5 square miles.

b. Stream Condition

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

As indicated above, approximately 2 percent of the Cherry Run Watershed is seriously degraded by mine drainage. During the study period, the entire watershed with the exception of the last 0.5 miles was unaffected by mine drainage.

Plate 61 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

Two (2) sampling stations were installed and monitored.
The minimums, maximums, and yearly averages of water quality data obtained from these stations are listed in Table 61 on Page 217.

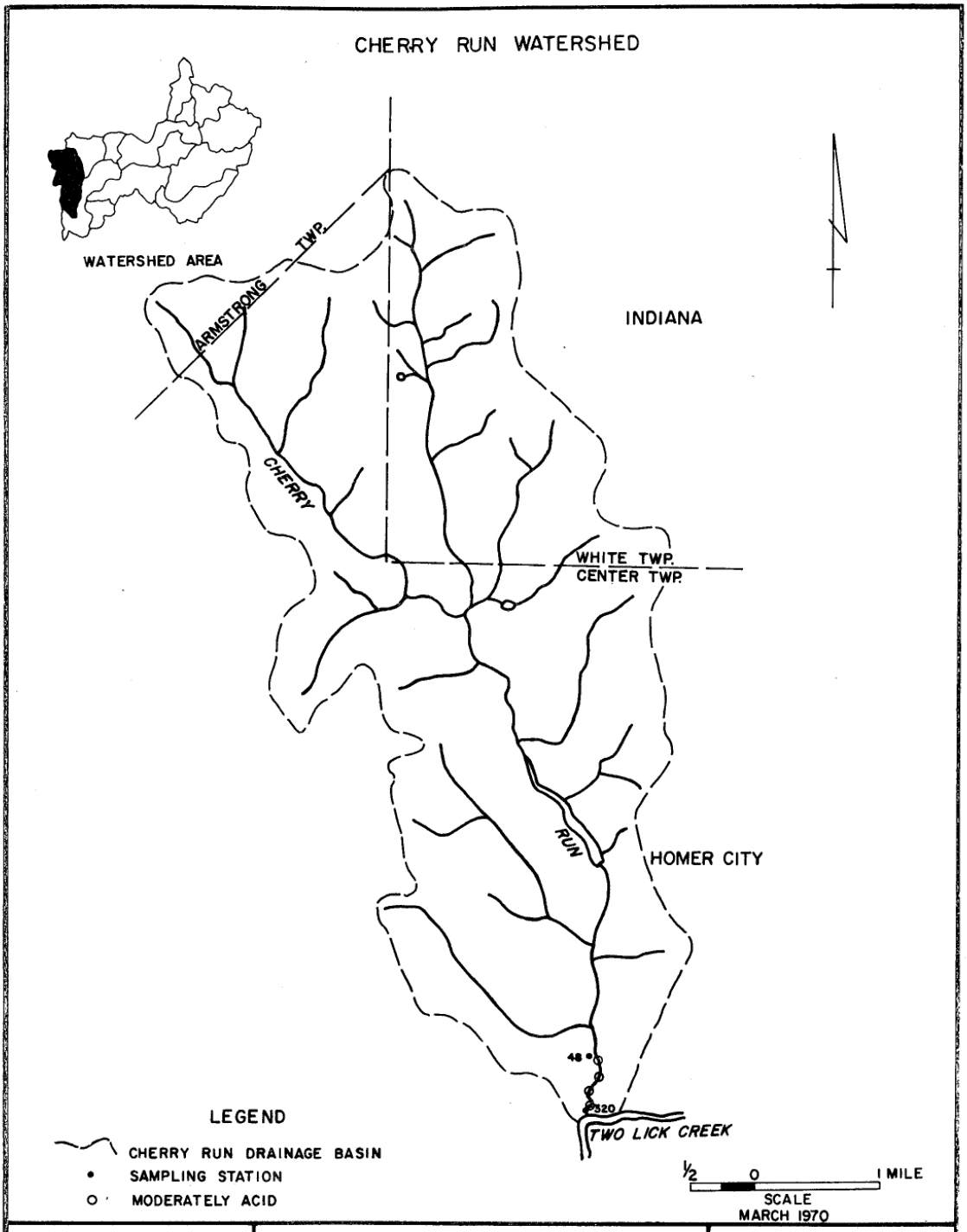
Plate 62 graphically illustrates the monthly relationship between stream flow, pollution load, and weather elements within the watershed based on measurements taken at Sampling Station #320 located near the mouth of Cherry Run.

Table 60

Stream Condition

Cherry Run Watershed

Stream Classification	Stream Length Miles	Percent Total Stream Length
Non-Polluted	31.0	98
Severely Polluted	0.0	0
Moderately Polluted	0.5	2



PREPARED BY	TWO LICK CREEK MINE DRAINAGE POLLUTION ABATEMENT PROJECT INDIANA COUNTY, PENNSYLVANIA	PREPARED FOR PENNSYLVANIA DEPARTMENT OF MINES AND MINERAL INDUSTRIES
L. ROBERT KIMBALL *Consulting Engineers* EBENSBURG, PENNSYLVANIA		

Table 61

Water Quality Data

Cherry Run Watershed

Sampling Station	Flow GPM	pH Range	Acid Load Lbs./Day	Acidity Mg./L.	Iron Mg./L.	Sulfate Mg./L.
320	Max. 13,320	4.0 - 6.4	542	Max. 124	Max. 45	Max. 880
	Min. 154			Min. 2	Min. 1	Min. 0
	Ave. 2,596			Ave. 17	Ave. 13	Ave. 139
48	Max. 283	4.1 - 6.7	525	Max. 524	Max. 325	Max. 2,700
	Min. 7			Min. 102	Min. 4	Min. 175
	Ave. 202			Ave. 215	Ave. 138	Ave. 1,617

RELATIONSHIP BETWEEN STREAM FLOW, POLLUTION LOAD AND WEATHER ELEMENTS

STATION 320 CHERRY RUN (At Mouth)

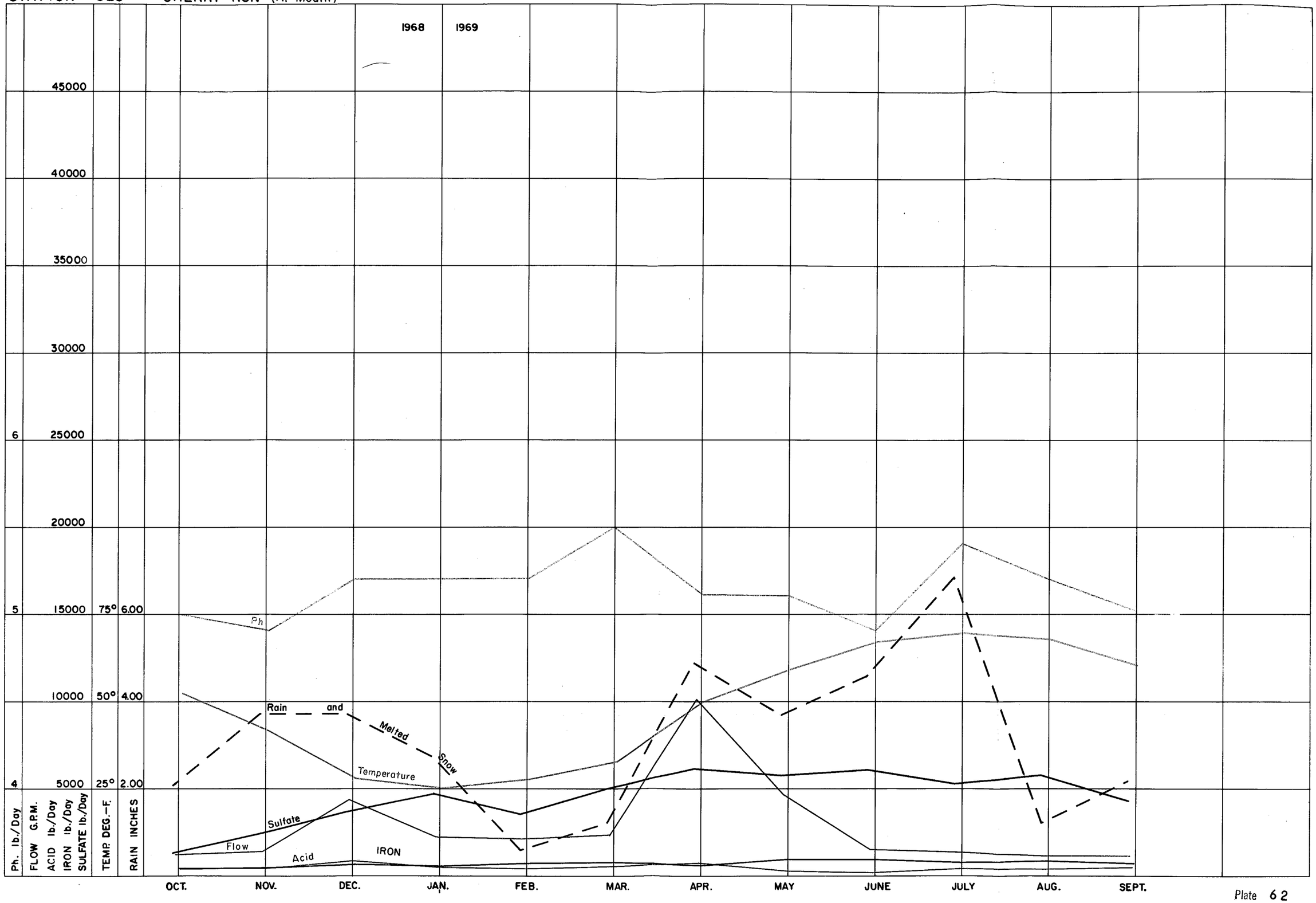


Plate 62

Peak flows and pollution loads occurred during January, February, and April with lows during the fall months.

Monthly pH levels varied considerably with a low pH of 5.2 occurring in October and November and a high of 6.5 during March and July.

Cherry 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 - 3%; Acidity - 1%; Iron - 4%; and Sulfate - 1%.

Cherry Run discharged approximately 7,337,000 gallons of water per day into Two Lick Creek during the study period.

d. Coal Mining Activity General

Although there are no deep mine openings or surface mines within the watershed, a large portion of the area has been undermined by deep mine operations originating near Lucerne and Graceton, namely the Lucerne #3 and Graceton #3 mine complexes. Map Sheets 5, 9, and 12, Appendix A shows the locations of these workings. Both mines are abandoned.

The Graceton #3 complex is partially flooded. Its lowest elevation lies beneath the watershed. A bore hole drilled into the mine near the mouth of Cherry Run is discharging mine drainage into the stream which is evidently stabilizing the level of water in the mines.

The Lucerne #3 complex is presently filling up and is beginning to discharge mine drainage from its main entry on Yellow Creek. The mine is now flooded to elevations beneath the Cherry Run basin.

In early February, water under pressure from the mine was forced to the surface through fractures in the strata and through a diamond drill hole casing on the farm of W. C. George, just north of the Cherry Run Dam.

Additional workings from two active deep mines, Lucerne #6 and Helen, will eventually be extended into the Cherry Run Watershed area.

e. Description of Mine Drainage Sources

The major mine drainage sources in the watershed are described on the following page in Table 62. Plate 63 shows the locations of the various sources.

The maximum combined heads are based on the assumption that all openings into the above complex would be sealed..

The head on the bore holes is that at coal and not surface level.

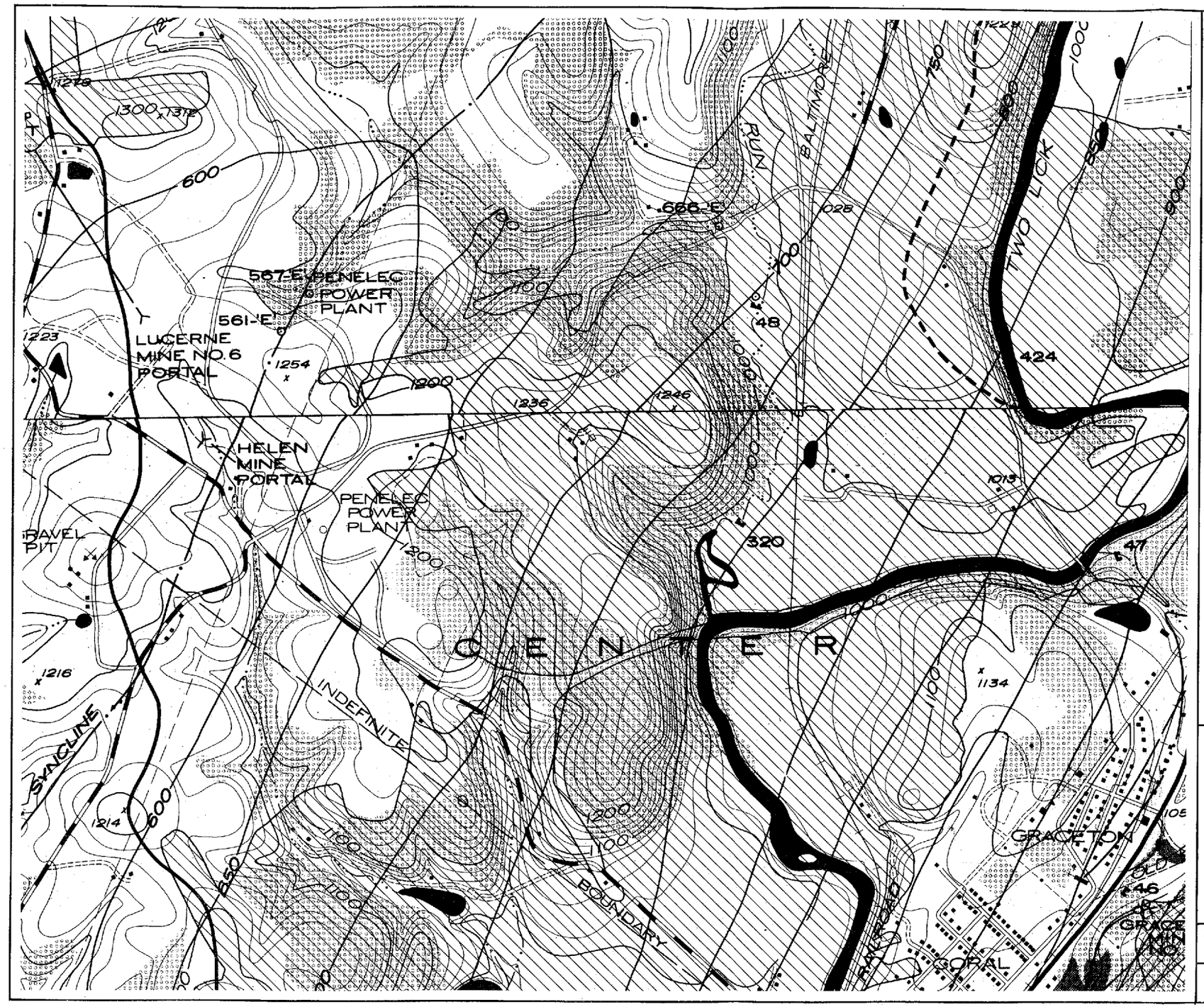
Table 62

Major Mine Drainage Sources

Cherry Run Watershed

Source Description	Flow GPM	Sampling Station(s)	Pollution Load - Lbs./Day Acid	Iron	Sulfate	Combined Maximum Head (Feet)
1. Graceton #3 Mine Bore Hole	202	48	525	338	3,938	693
2. Lucerne #3 Mine Diamond Drill Hole	20	Catch Samples	5	19	1,447	445 (204)*

*A maximum head of 204 feet would be placed on Source #2 above if Lucerne #1 and #3 Mines are not sealed.


CHERRY 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 Nº SL109
INVENTORY MAP
SCALE IN FEET
MARCH, 1970
L. ROBERT KIMBALL
Consulting Engineers
EBENSBURG, PENNSYLVANIA
SHEET Nº
LUCERNE MINE NO.6 PORTAL
HELEN MINE PORTAL
PENELEC POWER PLANT
567-E
561-E
606-E
INDEFINITE BOUNDARY
SYNCLINE
GRACETON
CORAL
BALTIMORE RUN
TWO LICK

f. Recommended Abatement Procedures - Cost Benefication

Recommended abatement treatments and related costs are listed for the various sources of pollution in Table 63.

All treatments and costs are based on data described in Section X.

A key to define the recommended abatement procedures is shown on Page 224.

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 63a 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 63

Recommended Abatement Procedures - Cost Benefication

Cherry Run Watershed

Source Name	Pollution Order	Recommended Treatment Procedures	Total Cost $	Cost Per Pound $	Total Abatement Lbs. Acid/Day
1. Graceton #3 Churn Drill Hole	1	Plant	$ 76,058	$ 144.90	525
Total Source			$ 76,058		525

Table 63a

Benefication - Recommended Plans

Cherry Run Watershed

Plan	Above Sources Abated	Benefication Pollution Reduction Acid Lbs./Day - % of Total	Benefication Pollution Reduction Iron Lbs./Day - % of Total	Benefication Pollution Reduction Sulfate Lbs./Day - % of Total	Total Cost
A	1	529 - 100%	352 - 99%	5,023 - 93%	$76,058

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