

ROBINSON RUN

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MAJOR SOURCE 4006 ROBINSON RUN

A. Description of the Source Area

1. Major source 4006 is located in Robinson Township, Washington County, Pennsylvania, approximately one mile west of McAdams. The location of the source is shown on the enclosed Dwg. 4006 - A and on the CLINTON 7-1/2 minute quadrangle included in Appendix All.
2. The discharge of source 4006 emerges from a pipe which projects from a deep mine. The area around the deep mine has been stripped and subsequently reclaimed. The source is on a golf course, and at the time of the last field survey on June 5, 1969, the acid mine water from this source was being pumped into a pond that will be a water trap in the golf course.
3. Thirteen months of field and laboratory study indicate the following maximum, minimum and average weighted parameters for source 4006:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	3.6	1.4	2.9
Flow (gpm)	90	15	48
Acidity (mg/l)	930	610	741
Iron (mg/l)	40.0	15.0	31.4
Manganese (mg/l)	22.5	7.0	2.9
Sulfate (mg/l)	2250	1500	1950
Hardness (mg/l)	1660	395	1050
Acid Load (lbs/day)	1010	110	439
Temperature (degrees C)	17	4	12.6

4. Based on thirteen months of readings, calculations show that source 4006 supplies a little over 1% of the total average acid load per day contributed by the major sources into Chartiers Creek. The slugging index is 2X.

B. Drainage

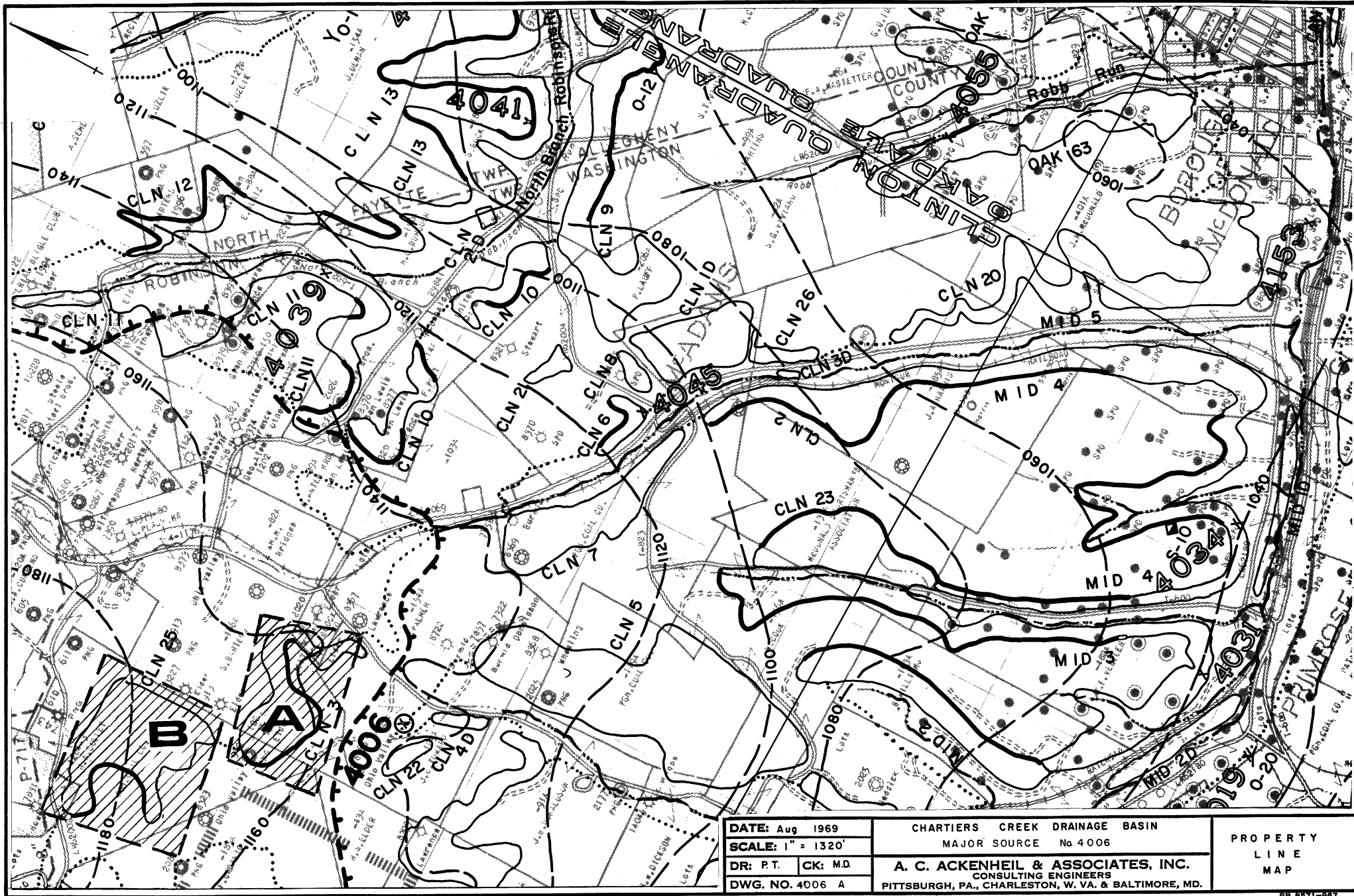
1. Surface Drainage: Source 4006 is at the headwater of a south-flowing unnamed tributary to North Branch Robinsons Run and is the first source to pollute North Branch Robinsons Run.
2. Subsurface Drainage: Structure contours on the base of the Pittsburgh Coal (see Dwg. 4006 - B) indicate a general southeast dip for the coal in the vicinity of the source. Source 4006 probably drains portions of the Shaw Mines and receives water from strip mines CLN 3 and CLN 25 which are northwest of the source.

C. Field Investigation and Abatement Methods

1. Area A: To the north of source 4006 Is strip mine CLN 3. Field view and aerial photograph interpretation indicate that about one-half of this 60-acre strip mine is unreclaimed.
2. Area B: Northwest of strip mine CLN 3 Is strip mine CLN 25, which occupies about 25 acres and is classified as unreclaimed.
3. We recommend that the natural drainage through the strip mines be improved as a means of preventing surface water from entering the deep mine.

D. Cost of Methods of Abatement

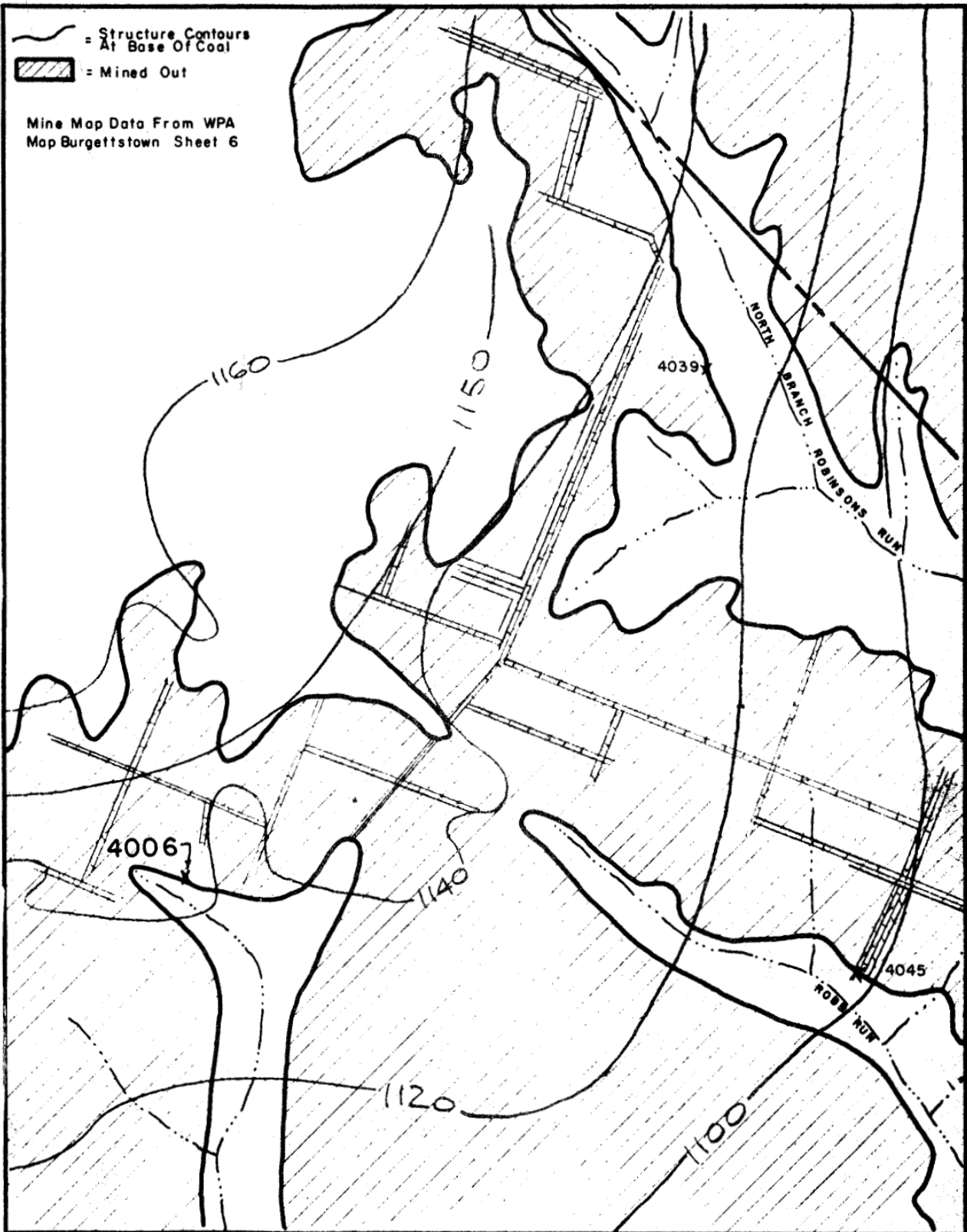
Description	Estimated Cost	Estimated Per Cent Flow Reduction
<hr/>		
<u>Area A: Pittsburgh Coal Co.,</u>		
S. Bartens (166 acres), J. E. Toward (129 acres), Midway Block Co. (9 acres)		
Improve surface drainage through strip mine CLN 3	\$45,000	35%
<hr/>		
Sub-Total:	\$45,000	35%
<hr/>		
<u>Area B: Pittsburgh Coal Co.,</u>		
M. A. Culley, B. Davis (90 acres)		
Improve drainage through strip mine CLN 25	\$42,000	35%
<hr/>		
TOTAL:	\$87,000	70%



DATE: Aug 1969  
 SCALE: 1" = 1320'  
 DR: P.T. CK: M.D.  
 DWG. NO. 4006 A

CHARTERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE No 4006  
**A. C. ACKENHEIL & ASSOCIATES, INC.**  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY  
 LINE  
 MAP



DATE: July 1969  
 SCALE: 1" = 1200'  
 DR: PT CK: MTD  
 DWG. NO. 4006-B

CHARTIERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE No 4006  
**A. C. ACKENHEIL & ASSOCIATES, INC.**  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA. & CHARLESTON, W. VA.

D E E P  
 M I N E  
 M A P

10 7199 ALBANY A. & B. SMITH CO., PCH., PA.

AT - 37

PR 8188-1088

MAJOR SOURCE 4019 ROBINSON RUN

A. Description of the Source Area

1. Source 4019 is located in Mt. Pleasant Township, Washington County, Pennsylvania, at the town of Primrose. The location of the source is shown on the enclosed Dwg. 4019 - A and on the MIDWAY 7-1/2 minute quadrangle included in Appendix All.
2. The discharge emerges from a completely slumped-over deep mine opening. The effluent is coming out of the slope entry and is piped under the road and flows into an unnamed tributary to Robinson Run. The mining maps obtained from the Carnegie Coal Company show that the source is emerging from the Primrose Mine
3. Based on our thirteen-month study of the source, it is apparent that this is a slugger (slugging index 5X), as indicated by large deviations in flow measurement. This source supplies approximately 1.5% of the total average load contributed per day into Chartiers Creek by the major sources.
4. Thirteen months of field testing and laboratory analysis indicate the following maximum, minimum and weighted average parameters for source 4019:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	6.0	2.7	4.5
Flow (gpm)	310	No Flow	81
Acidity (mg/l)	980	360	610
Iron (mg/l)	224	1.6	60.5
Manganese (mg/l)	10.5	1.4	6.3
Sulfate (mg/l)	2750	1500	2240
Hardness (mg/l)	2260	710	1150
Acid Load (lbs/day)	2680	9	590
Temperature (degrees C)	25	6	14.3

B. Drainage

- I. Surface Drainage: The discharge emitting from source 4019 flows into an unnamed tributary of Robinson Run. The surface streams which drain the area generally flow in an easterly direction.
2. Subsurface Drainage: Based on the structure contours constructed on the base of the Pittsburgh Coal, the subsurface drainage is in a southern direction. The available Primrose Mine Map does not indicate the plan of mining in the vicinity of source 4019; therefore, the direction of flow at the source is not known and is assumed to be in a southeast direction. The average flow at the source is approximately 81 gpm. It has been noted that during dry periods the flow from the slumped entry discontinued. See Dwg. 4019 - B. Based on the fact that the discharge point is on the updip side of the coal, it is assumed that the Primrose Mine is flooded and source 4019 acts as a discharge for excess water resulting from periods of heavy rainfall.

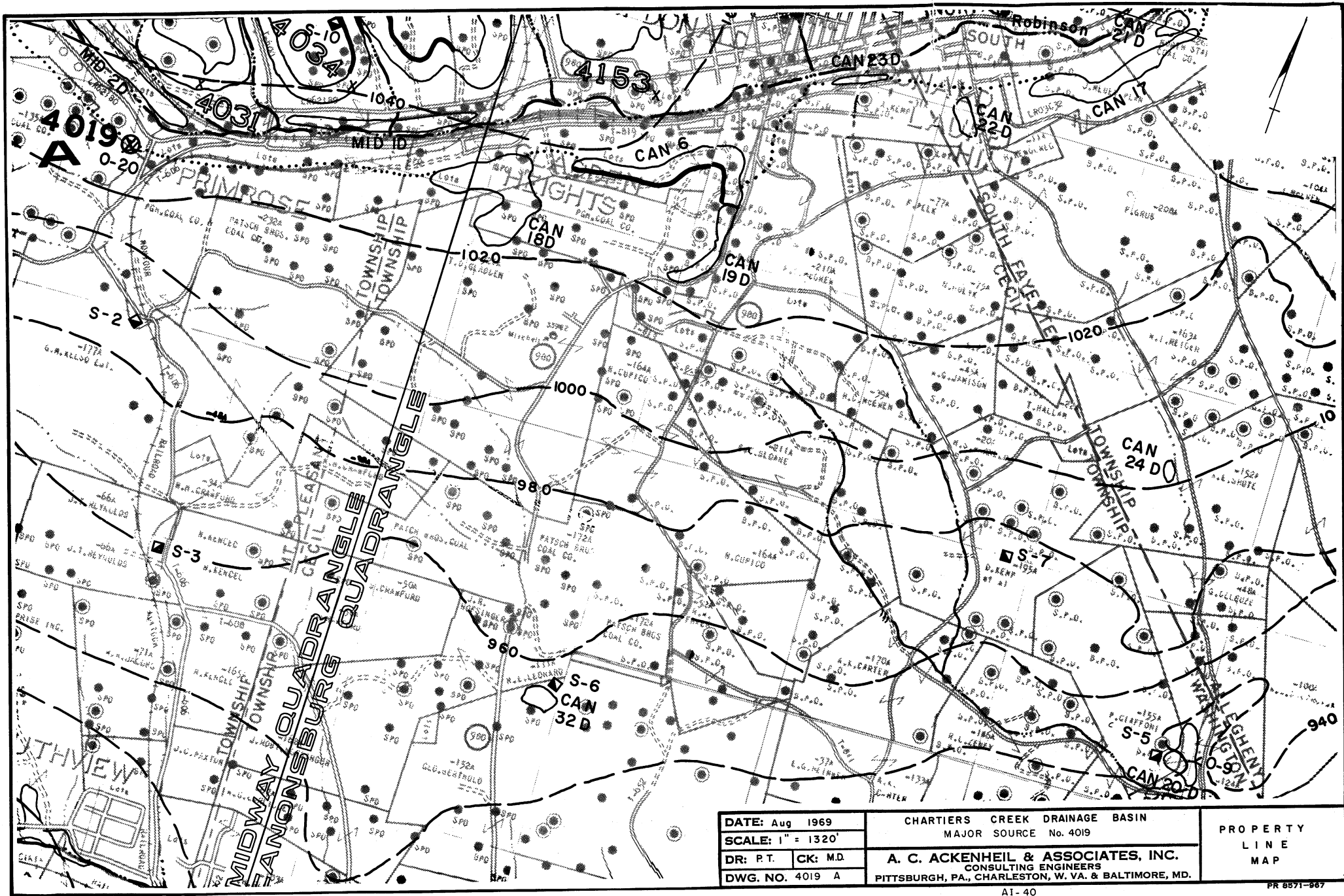
C. Field Investigations and Abatement Methods

1. To evaluate the relationship between surface and subsurface drainage, field studies were conducted north, south and west of the source. The field reconnaissance indicated that the natural surface drainage pattern had not been interrupted by stripping operations or by the development of surface depressions created by mine subsidence.
2. The recommended abatement method to reduce or eliminate the flow from source 4019 is to construct a grouted watertight bulkhead within the deep mine. The watertight bulkhead should divert the subsurface flow to the south into the Cross Creek Syncline, based on the structure contours of the coal. The hydrologic head developed at this barrier should be less than 30 ft. If damming should occur. In our opinion, the risk of the discharge emitting at a point updip from the source is slight, based on:
  - a. The structure contours of the coal dip to the south and thus in the opposite direction from the outcrop.
  - b. The barrier will be perpendicular to the apparent direction of subsurface flow and therefore should act as a diversion barrier for the flow. The structural contours on the base of the Pittsburgh Coal are shown on Dwg. 4019 - B.
3. We recommend the performance of a bore hole camera survey to accurately determine the location and condition of the opening and to observe the condition of the in-place coal. The reason such a survey is necessary is that the mine map does not provide this information.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A: Pittsburgh Coal</u> (135 acres)		
1. Construct a watertight seal and grout the outcrop 50 ft right and left of the seal.	\$12,500	
2. Explore and perform bore hole camera survey.	\$ 2,500	About 100%
<hr/>		
TOTAL:	\$15,000	About 100%

\*Borehole camera survey includes drilling, casing, camera rental, photographs, and interpretation for approximately eight to ten holes.







<b>DATE:</b> June 1969		<b>CHARTIERS CREEK, DRAINAGE BASIN</b> MAJOR SOURCE NO 4019	<b>DEEP MINE</b> MAP
<b>SCALE:</b> 1" = 1200'			
<b>DR:</b> S.K	<b>CK:</b> I.H	<b>A. C. ACKENHEIL &amp; ASSOCIATES, INC.</b> CONSULTING ENGINEERS PITTSBURGH, PA. & CHARLESTON, W. VA.	
<b>DWG. NO.</b> 4019-B			

10 7188 ALBANENS A. & B. SMITH CO., PGM., PA.

AI - 41

PR 8156-1024

AI-41

MAJOR SOURCE 4031 ROBINSON RUN

A. Description of the Source Area

1. Source 4031 is located in Robinson Township, Washington County, Pennsylvania, approximately one-fourth mile north of Primrose. The location of this source is shown on the enclosed Dwg. 4031 - A and on the MIDWAY 7-1/2 minute quadrangle included in Appendix All.
2. The discharge from this source emerges from the base of a highwall in an unreclaimed strip mine (MID 3). The coal mine map obtained indicates that the pollutants discharged at the source originated in the deep mine of Carnegie Coal Company's McDonald Mine. The deep mining commenced about 1920 and terminated in 1934. No dates were available on the strip mining within the area. Based on the 13 months of readings, this source contributes about 1.0% of the total average acid load contributed per day by the major sources into Chartiers Creek.
3. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters of source 4031:

	<u>Maximum</u>	<u>Minimum.</u>	<u>Average</u>
pH	4.0	1.8	2.6
Flow (gpm)	60	5	21
Acidity (mg/l)	2315	670	1395
Iron (mg/l)	301.5	15.0	110.5
Manganese (mg/l)	20.0	1.9	9.1
Sulfate (mg/l)	5000	2500	3500
Hardness (mg/l)	2020	484	1200
Acid Load (lbs/day)	1670	87	410
Temperature (degrees C)	32	5	17.7

Source 4031 is considered a slugger, based on its deviation in acid load. The slugging index is 4X.

B. Drainage

1. Surface Drainage: The discharge emitting from source 4031 is flowing into an unnamed tributary of Robinson Run. The surface streams that drain the area flow in a southeasterly direction. The stream to the northwest of the source has been interrupted by strip mining.
2. Subsurface Drainage: We have obtained mine maps showing source 4031 and the area to the north and northwest of the source. The structure contours constructed on the bottom of the coal mine indicate the dip of the coal to be to the southeast. Source 4031 is located at the lowest area structurally; therefore, it is the discharge point for acid mine waters flowing from the northwest.

C. Field Investigations and Abatement Methods

The relationship between surface and subsurface drainage was evaluated by field studies conducted to the north and northwest of source 4031:

- I. Source 4031 drains a small, rather isolated basin which has been strip mined to the west, north and east. Twelve minor sources are concentrated in the immediate vicinity of source 4031. These minor sources are: 4001, 4007, 4008, 4009, 4010, 4021, 4023, 4025, 4029, 4030, 4047 and 4048. The minor sources apparently bleed off much of the acid mine water from the deep mine that otherwise would be discharged at source 4031. About 180 gpm was measured during Phases I and II; however, none of these sources contributed over 1,000 lbs. acid per day during Phases I and II and hence are not considered major sources.
2. Source 4031 is located in strip mine MID 3 which occupies about 98 acres. Sixty-six acres are unreclaimed and occur along the east and west sides of the strip mine. At the southernmost tip of the strip mine 18 acres are reclaimed. Fourteen acres at the northern extreme of the strip mine have been graded so that drainage is away from the highwall.
3. Strip mine MID 2 is west of strip mine MID 3. (See Area B, Dwg. 4031 - A) It occupies approximately 44 acres and is unreclaimed.
4. Northwest of strip mine MID 2 is strip mine CLN 5. (See Area C, Dwg. 4031 - A) Strip mine CLN 5 occupies about 170 acres and is classified as unreclaimed.
5. Northeast of strip mine CLN 5 is strip mine CLN 7, which occupies about 58 acres. (See Area D, Dwg. 4031 - A) The strip mine is so graded to drain toward the highwall. Strip mine CLN 7 may also be a contributing factor to major source 4034 which is east of major source 4031.
6. To reduce the flow and the slugging index of source 4031, we recommend that the drainage through strip mines MID 3, MID 2, CLN 5 and CLN 7 be improved. Improvement of the drainage in these strip mines could eliminate many of the minor sources associated with these strip mines.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
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Area A: M.F. Vegler (482

Acres), McDonald Sportsmen's

Association (138 acres), W.

Cook (156 acres)

1. Improve surface drainage through strip mine MID 3	\$101,000	20%
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TOTAL	\$101,000	20%
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Description	Estimated Cost	Estimated Per Cent Flow Reduction
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Area B: W. Cook (156 acres) B. Williams (163 acres)

Improve surface mine drainage through strip mine MID 2.

\$66,000

13%

SUB-TOTAL

\$66,000

13%

Area C: J. Palmer (154 acres), Pittsburgh Coal Co. (119 acres), W. Cook (156 acres).

Improve surface drainage through strip mine CLN 5.

\$225,000

50%

SUB-TOTAL

\$392,000

83%

Area D: Pittsburgh Coal Co.

Improve drainage through strip mine CLN 7

\$29,800

17%

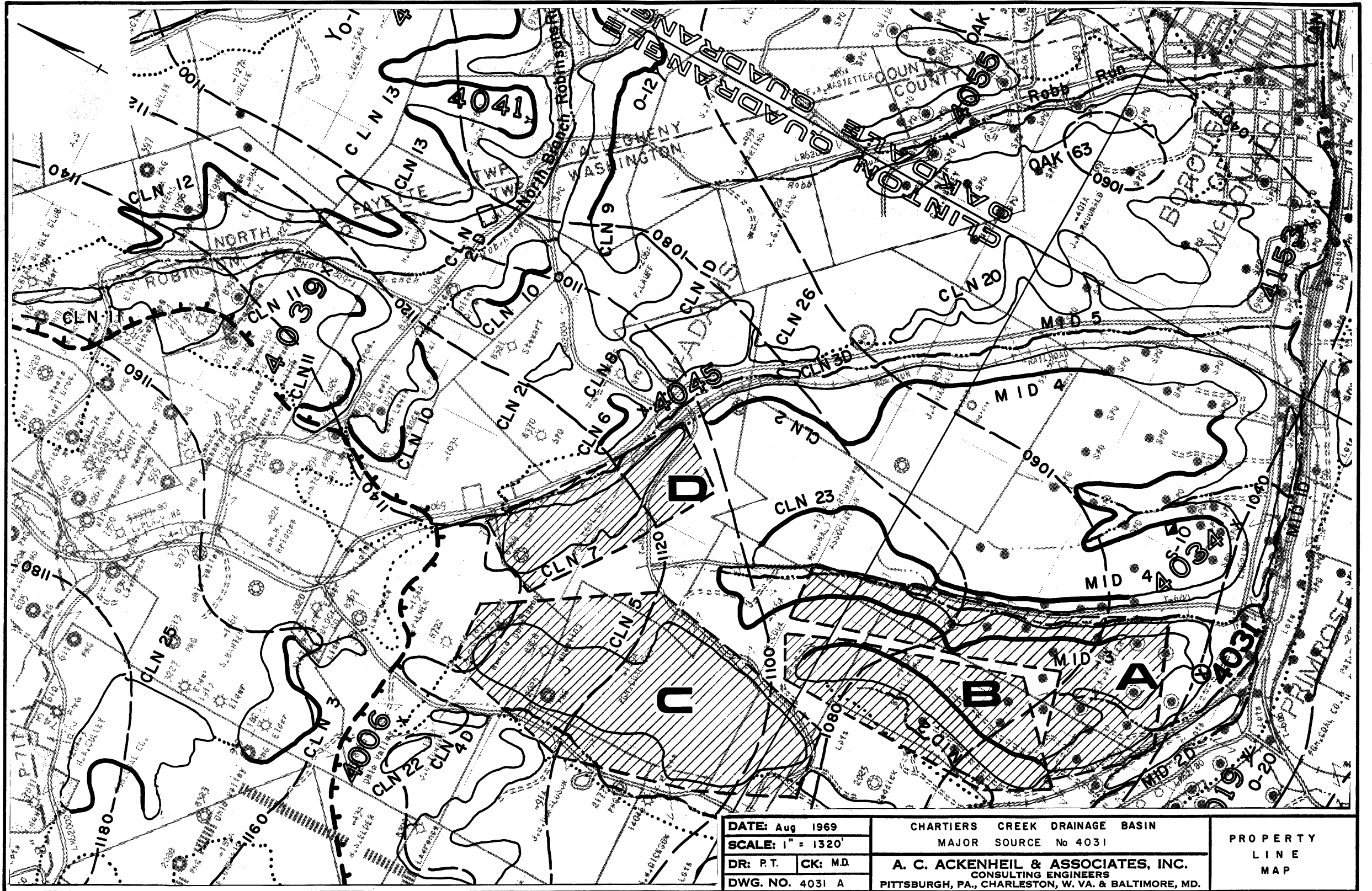
TOTAL

\$421,800

100%

\*Percentages given in this report are based on the initial flows of the twelve minor sources and the average flow from source 4031. It is realized that 100% abatement is probably not possible; however, it indicates that the corrections recommended for these strip mines should drastically reduce the flow from the major and minor associated sources. The total cost vs. the amount of pollution abatement achieved must be considered prior to initiation of any corrective action.

An additional abatement measure such as the use of a box cut between strip mines MID 2 and MID 3, and between CLN 5 and CLN 7 should be considered. Costs for this work have not been estimated but should be included during the design of abatement methods. The general location of the proposed box cut is shown on Dwg. 4031 - A.



DATE: Aug 1969  
 SCALE: 1" = 1320'  
 DR: P.T. CK: M.D.  
 DWG. NO. 4031 A

CHARTIERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE No 4031  
**A. C. ACKENHEIL & ASSOCIATES, INC.**  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY  
 LINE  
 MAP

MAJOR SOURCE 4034 ROBINSON RUN

A. Description of the Source Area

1. Source 4034 is located in Robinson Township, Washington County, Pennsylvania, approximately one mile west of McDonald. The location of the source is shown on the enclosed Dwg. 4034 - A and on the MIDWAY 7-1/2 minute quadrangle included in Appendix All.
2. The discharge emerges from the deep mine where stripping has broken into the deep mine workings. The portion of the strip where source 4034 and minor sources 4032, 4033, and 4035 are located is reclaimed. The mine map indicates this area was deep mined between 1917 and 1940 by the Carnegie Coal Company and is part of the McDonald Mine. This map does not show the dates or extent of stripping operations.
3. The 13 months of readings indicate source 4034 supplies approximately 2.0% of the total average acid load per day into Chartiers Creek. This figure is based on the total acid load of the major sources for the past 13 months less the portion contributed by the existing active mine sources.
4. The maximum, minimum and weighted average parameters have been determined by 13 months of field testing and laboratory analysis and are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.1	1.3	2.8
Flow (gpm)	130	10	56
Acidity (mg/l)	1845	800	990
Iron (mg/l)	215	13	74.0
Manganese (mg/l)	16.0	1.3	9.7
Sulfate (mg/l)	4375	1750	2850
Hardness (mg/l)	2580	815	1285
Acid Load (lbs/day)	2880	135	710
Temperature (degrees C)	21	10	15.3

5. This source is considered to be a slugger. The slugging index is 4X.

B. Drainage

1. Surface Drainage: The discharge emitting from source 4034 flows to the southeast for approximately 800 ft. and into Robinson Run. The natural drainage to the north of the source has been interrupted by stripping with sink holes located in the stream valleys above the strip mines.

2. Subsurface Drainage: Based on the structure contours on the bottom of the McDonald Mine, the subsurface flow would be to the southeast and discharge at source 4034.

### C. Field Investigations and Abatement Methods

Field reconnaissance has been conducted to the north of the source to evaluate the relationship between the surface and subsurface drainage. The reconnaissance has indicated that numerous ponds exist in the unreclaimed strip mine east of the source. These impounded areas intercept the surface runoff in the area and act as feeders to the deep mine. The results of the field investigations are as follows:

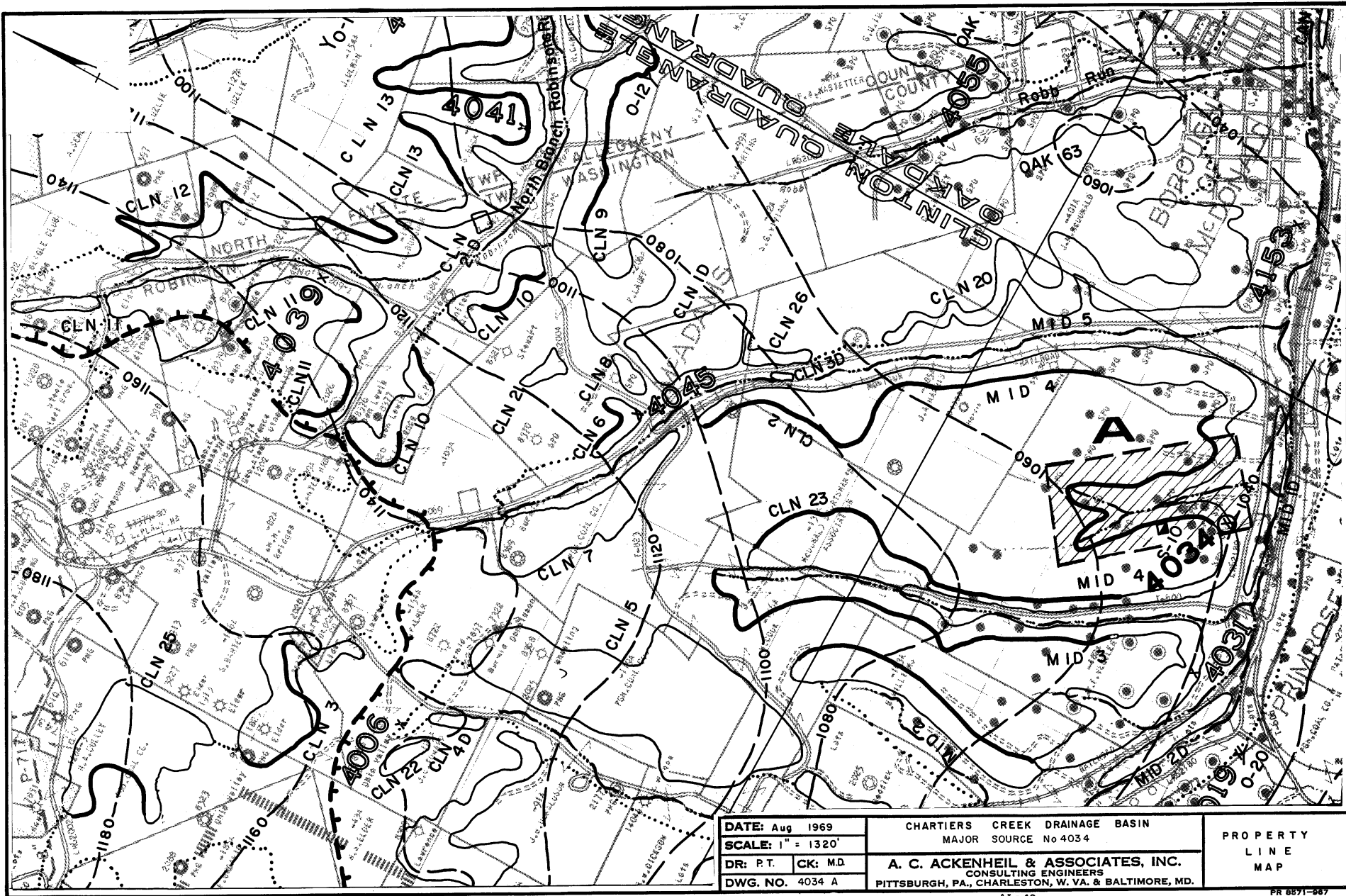
1. Approximately one-half mile north of source 4034 a large sink hole is located in the stream channel of the northeastern branch of the unnamed tributary to Robinson Run.\* This sink hole has diverted the natural drainage of the valley into the deep mine. Backfilling this sink hole and providing an improved channel through the strip mine should reduce flow of surface water into the deep mine and provide neutral water to Robinson Run.
2. The northwest branch of the unnamed tributary contains a few small sink holes in the stream channel. At the same time strip spoil material blocks the natural drainage of the valley. We recommend improving the tributary channel and providing drainage to Robinson Run. See Dwg. 4034 - A.
3. The reclaimed to unreclaimed strip mine (MID 4, Dwg. 4034 - A) is located on the 482-acre parcel owned by Mr. F. Vegeler. Large amounts of surface runoff will accumulate in the strip pits. A portion of this ponded surface runoff will percolate into the deep mine. We recommend restoring the natural drainage of this valley.
4. The preceding recommended abatement methods should reduce the discharge at source 4034 by approximately 40% and allow clean surface water to enter Robinson Run.
5. The recommended abatement areas for source 4034 are located on a portion of the 482-acre parcel belonging to Mr. F. Vegeler.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A:</u>		
Fill sink hole and provide drainage over fill area and restore the natural drainage to the strip mine area	\$60,000	
Clear and grub area	5,000	40%
<hr/>		
TOTAL:	\$65,000	40%

An additional abatement measure such as the use of a box cut between strip mines CLN 23 and CLN 2 should be considered. Costs for this work have not been estimated but should be included during the design of abatement methods. The general location of the proposed box cut is shown on Dwg. 4034 - A.





DATE: Aug 1969  
 SCALE: 1" = 1320'  
 DR: P.T. CK: M.D.  
 DWG. NO. 4034 A

CHARTERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE No 4034  
 A. C. ACKENHEIL & ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY  
 LINE  
 MAP

MAJOR SOURCE 4045 ROBINSON RUN

A. Description of the Source Area.

1. Source 4045 is located in Robinson Township, Washington County, Pennsylvania, near McAdams. The location of this source is shown on the enclosed Dwg. 4045 - A and on the CLINTON 7-1/2 minute quadrangle included in Appendix AI I.
2. The discharge from source 4045 is emerging from a pipe which is located in strip mine CLN 6. The area was deep mined in the late 1920's and strip mined in 1952 and 1956. It is part of Pittsburgh Coal Company's Montour No. 9 complex. The strip mine at the source (CLN 6) has been partially reclaimed.
3. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters for source 4045:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.0	1.7	3.3
Flow (gpm)	60	13	30
Acidity (mg/l)	1750	298	659
Iron (mg/l)	70.0	3.25	48.7
Manganese (mg/l)	11.0	1.85	5.8
Sulfate (mg/l)	2610	1250	1735
Hardness (mg/l)	1310	518	850
Acid Load (lbs/day)	1260	67	261
Temperature (degrees C)	18.0	11.0	14.2

4. Calculations show that source 4045 supplies less than 1.0% of the total average acid load contributed per day by the major sources into Chartiers Creek, based on thirteen months of readings. Source 4045 is a slugger with a slugging index of 5X.

B. Drainage

1. Surface Drainage: Source 4045 is at the headwater of an unnamed tributary to North Branch Robinsons Run. The waters of North Branch Robinsons Run receive pollution from sources 4019, 4031 and 4034 prior to receiving pollution from source 4045.
2. Subsurface Drainage: W.P.A. coal maps (Burgettstown Sheet No. 6) show that the predominant subsurface drainage is to the southeast. Correctional work northwest of the source should reduce the amount of pollution that source 4045 is contributing to the Chartiers Creek Basin.

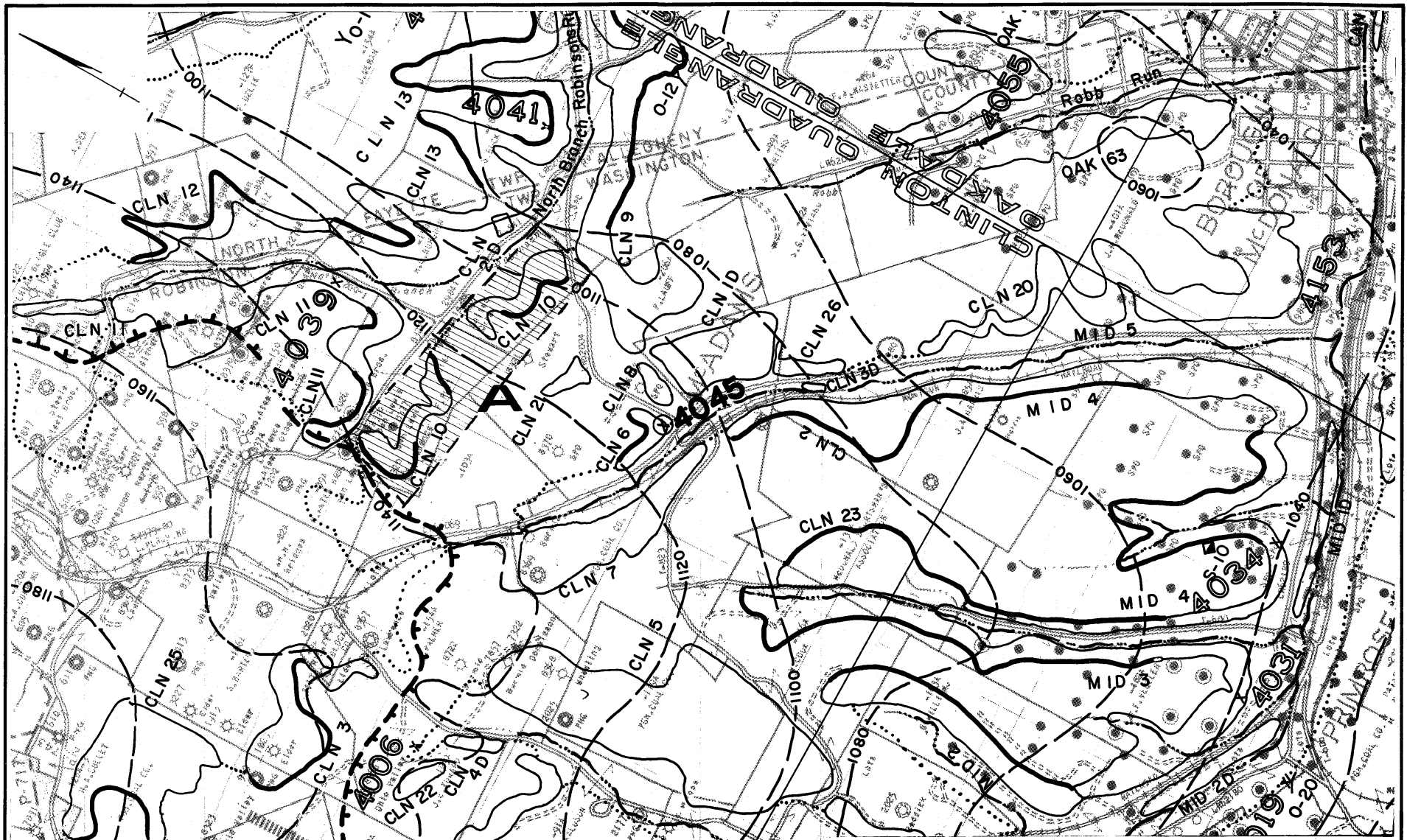
C. Field Investigation and Abatement Methods

To evaluate the relationship between strip mining and the discharge at source 4045 field investigation and aerial photograph interpretation was performed.

1. Source 4045 is located on strip mine CLN 6 which occupies about 6 acres and is graded so the majority of the drainage is away from the highwall.
2. North and northwest of source 4045 is strip mine CLN 10 which occupies about 40 acres. Twenty-five acres are graded so that the natural drainage flows toward the highwall. On eight acres the drainage is away from the highwall and the remaining seven acres are reclaimed. (Area A - Dwg. 4045 - A.)
3. Strip mine CLN 21, which is north of source 4045, is reclaimed and probably contributes little water to the source.
4. East of source 4045 is CLN 8 which is unreclaimed. Subsurface contours indicate this strip mine should affect source 4153 rather than source 4045. Correction work for strip mine CLN 8 is recommended in the report for source 4153.
5. Improvement of the natural drainage through strip mine CLN 10 should reduce the flow at source 4045 and possibly at source 4153.

D. Cost of Methods of Abatement

Description	Estimated Cost	Estimated Per Cent Flow Reduction
<hr/>		
<u>Area A: Properties of</u>		
E. Putt (114 acres) and		
R. C. Burgoon (150 acres)	\$13,000	50
1. Improve the surface drainage through strip mine CLN 10		
<hr/>		
TOTAL:	\$13,000	50%



DATE: Aug 1969		CHARTERS CREEK DRAINAGE BASIN		PROPERTY LINE MAP
SCALE: 1" = 1320'		MAJOR SOURCE NO. 4045		
DR: P.T.	CK: M.D.	A. C. ACKENHEIL & ASSOCIATES, INC.		
DWG. NO. 4045 - A		CONSULTING ENGINEERS PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.		

MAJOR SOURCE 4153 ROBINSON RUN

A. Description of the Source Area

1. Source 4153 is located in Robinson Township, Washington County, Pennsylvania, approximately 2,000 ft. southwest of McDonald. The location of this source is shown on the enclosed Dwg. 4153 - A and on the CANONSBURG 7-1/2 minute quadrangle included in Appendix All.
2. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters of source 4153:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.9	2.7	3.4
Flow (gpm)	120	60	76
Acidity (mg/l)	2340	254	561
Iron (mg/l)	280	5.0	47.2
Manganese (mg/l)	13.5	3.2	7.0
Sulfate (mg/l)	3200	1075	1807
Hardness (mg/l)	1410	622	967
Acid Load (lbs/day)	1690	183	491
Temperature (degrees C)	25	5	14.5

3. Source 4153 supplies approximately 1.5% of the total average acid load contributed by the major sources per day Into Chartiers Creek, based on 13 months of readings. Comparison with the initial readings indicates that source 4153 has a slugging index of 3X.

B. Drainage

- I. Surface Drainage: The area is drained by Robb Run on the northeast side and an unnamed tributary that runs parallel to Rt. 980 on the southwest side. The two streams flow to the southeast and discharge their waters into Robinson Run.
2. Subsurface Drainage: W.P.A. coal maps (Carnegie Sheet No. 4 and Burgettstown Sheet No. 6) show that the predominant subsurface drainage is to the southeast. A 3,000 ft. long subsurface level area is located northwest of the source. The depth of the coal is between 40 and 140 ft. below the surface of the ground.

C. Field Investigations and Abatement Methods

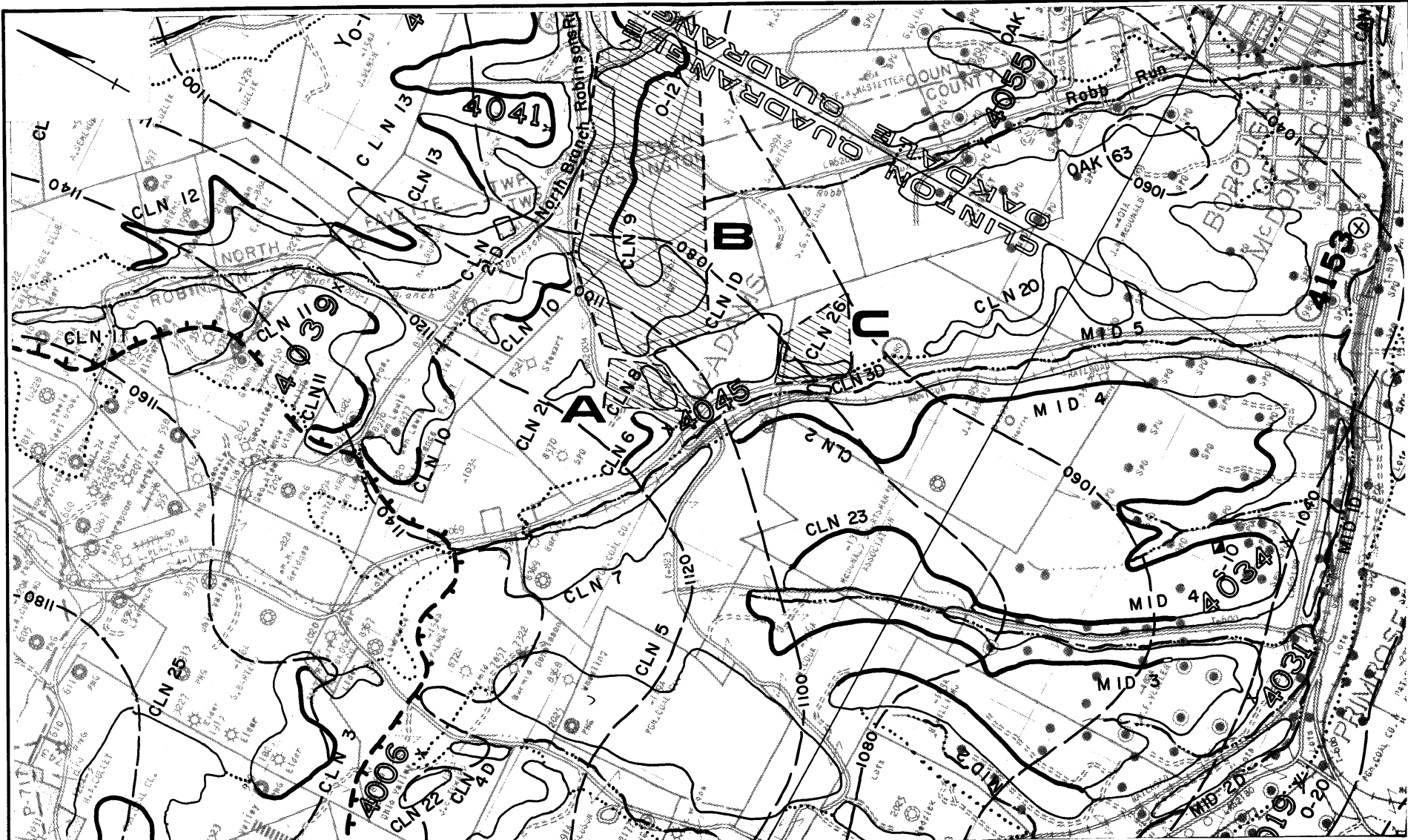
Field studies conducted north and northwest of the source and supplemented by aerial photographs show that in these areas surface water could enter the deep mine through unreclaimed strip mines.

- I. Area A: CLN 8 near McAdams is a 6 acre, totally unreclaimed strip mine located on a 206-acre parcel belonging to P. Lauff. Immediately adjacent to this strip mine is a mine dump (CLN D-1) for Montour No. 9 mine.
2. Area B: CLN 9 is a randomly reclaimed strip mine located on the 188-acre parcel belonging to S. Bock and on the 206-acre parcel belonging to P. Lauff which is northeast of McAdams, Pennsylvania. The strip mine occupies about 69 acres of which 37 are graded to drain away from the highwall. In this area of the strip mine two strip ponds and a mine opening (0-12) were observed.
3. Area C: Southwest of strip mine CLN 9 is strip mine CLN 26 which occupies about 8 acres and is classified as unreclaimed.
4. OAK 63, CLN 20 and MID 5 strip mines have been reclaimed or graded so that drainage is away from the highwall. There should be little or no contribution of water to the source from these strip mines.

D. Cost of Methods of Abatement

Description	Estimated Cost	Estimated Per Cent Flow Reduction
Area A: Strip mine CLN 8	\$ 9,200	6
I. Restore the natural drainage and cover the coal exposed in the highwall		
Sub-Total:	\$ 9,200	6%
Area B: Strip mine CLN 9	9,600	10
1. Fill in strip ponds		
2. Provide drainage away from the highwall		
3. Seal mine opening 0-12		
Sub-Total:	\$18,800	16%

Description	Estimated Cost	Estimated Per Cent Flow Reduction
Area C: Strip mine CLN 26	\$12,000	6
I. Improve drainage through the strip mine		
TOTAL:	\$30,800	22%



DATE: Aug 1969		CHARTERS CREEK DRAINAGE BASIN		PROPERTY LINE MAP
SCALE: 1" = 1320'		MAJOR SOURCE NO. 4153		
DR: P.T.	CK: M.D.	A. C. ACKENHEIL & ASSOCIATES, INC.		
DWG. NO. 4153 - A		CONSULTING ENGINEERS PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.		



MAJOR SOURCE 4055 ROBINSON RUN

A. Description of the Source Area

1. Source 4055 is located in Robinson Township, Washington County, Pennsylvania. It is located near Valley Street, 1.5 miles northwest of McDonald. The source location is shown on the enclosed Dwg. 4055 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix All.
2. The discharge emerges from a clay pipe in a reclaimed strip mine area (OAK 6). The area was deep mined in the 1930's and strip mined in 1947 - 1948. Coal maps supplied by Pittsburgh Coal Company show that in a few places deep mining operations have broken through to daylight, and stripping operations have broken into the deep mine. The source itself appears to discharge from an opening created by a cave in.
3. The area is the southeastern portion of the Montour No. 9 Mine, Pittsburgh Coal Company. In the immediate vicinity of the discharge, the coal maps indicate a number of country pits, old workings, and pit mouths.
4. The results of 13 months of field and laboratory tests on the discharge from source 4055 indicate the following maximum, minimum and weighted average parameters:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	2.5	3.8	3.3
Flow (gpm)	300	45	111
Acidity (mg/l)	1210	274	432
Iron (mg/l)	24.5	12.5	18.6
Manganese (mg/l)	7.5	1.4	4.3
Sulfate (mg/l)	2125	1375	1690
Hardness (mg/l)	1740	444	1010
Acid Load (lbs/day)	4356	190	740
Temperature (degrees C)	17	12	13.5

5. Our calculations, based on the total average daily acid load contributed by the major sources, indicates that this source contributes about 2.0% of the daily pollution into Chartiers Creek.
6. Source 4055 is a potential slugger, as shown by the high flows recorded in May and June of 1968. The slugging index is 6X.

B. Drainage

- I. Surface Drainage : The source area is drained on the northeast by Robb Run and on the southwest by an unnamed stream flowing parallel to Route 980. The two streams are badly polluted and discharge their waters into Robinson Run.

2. Subsurface Drainage: Structure contours constructed on the base of the Pittsburgh Coal seam show that the subsurface drainage is to the southeast, with a large level area on both sides of major source 4055 (see Dwg. 4055 - B). The source appears to be draining a portion of the Montour No. 9 mine northwest of source 4055.

### C. Field Investigations and Abatement Methods

#### 1. Area A:

Approximately 1,000 ft. northwest of source 4055 on a property called Robb Valley Farm, owned by C. M. Hughey, a large sink hole with a direct opening into the subsurface prevents the natural drainage of the valley. We recommend filling in the sink hole and restoring the natural drainage into Robb Run.

#### 2. Area B:

Approximately 3,000 ft. southeast of McAdams, on the west side of Route 980, a large drainage area was observed to lack a natural outlet. We recommend providing drainage out of this valley into a polluted, unnamed tributary that flows parallel to Route 980.

#### 3. Area C:

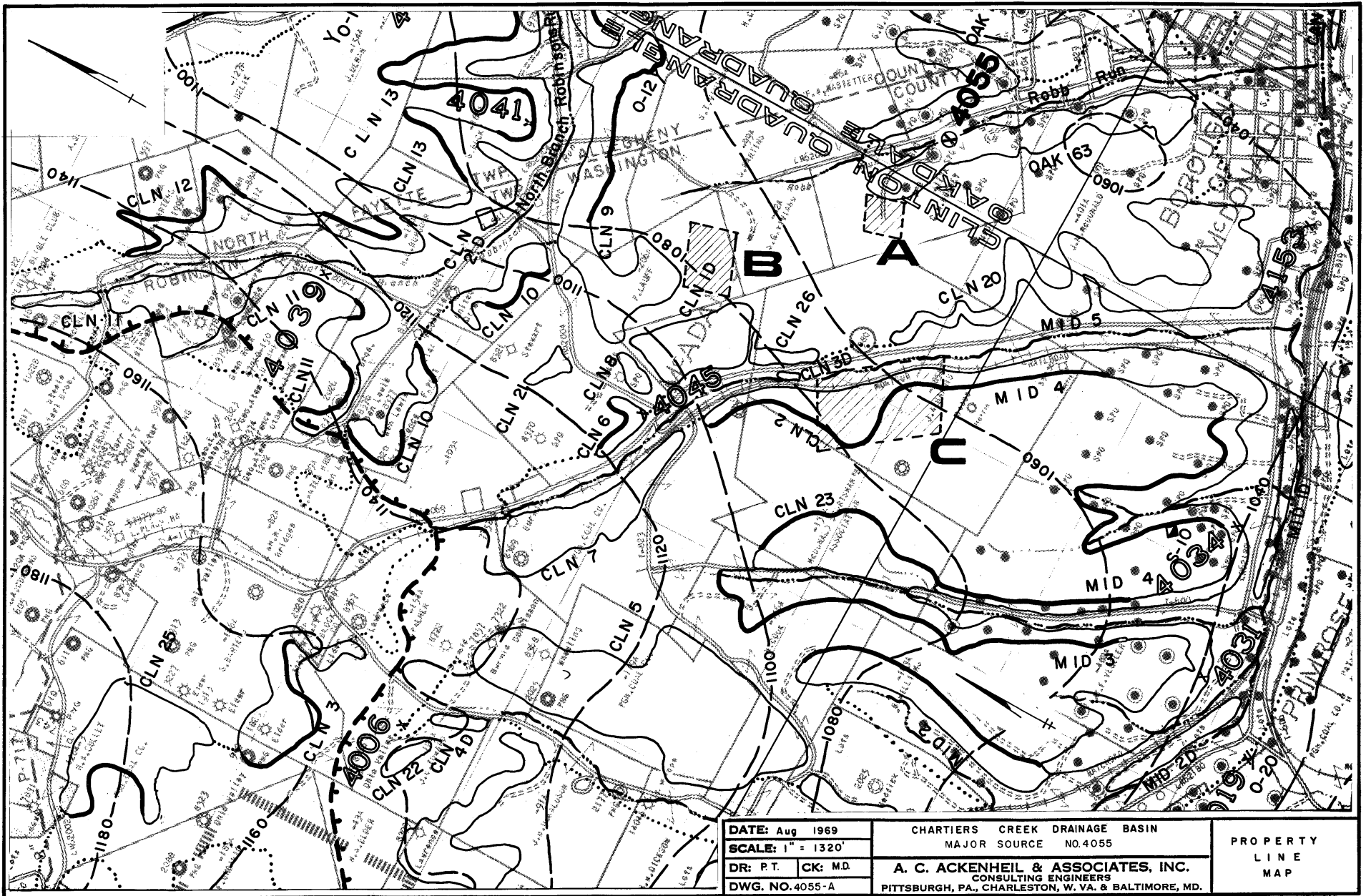
a. During our field investigation northwest of the source, near McAdams on the east side of Route 980, we discovered a large valley blocked by the dump from Montour No. 9. No rainfall or runoff can leave the valley through the natural drainage course because of the blockage (Dump No. CLN D-I). The approximate dimensions of this valley are 750 by 1,000 ft. It is believed that all rainfall entering this valley percolates into the deep mine. The overburden cover above the mine in the bottom of the valley is uneven, indicating mine subsidence has occurred. WPA mine maps indicate entries running from beneath this valley to the area of source 4055.

b. Providing drainage from the enclosed valley through the deep mine dump to natural drainage courses may help reduce the amounts of water entering the deep mine. Also, a paved drainage ditch along the valley bottom will be needed to convey runoff into a proposed pipe beneath the dump. We have no real assurance that this method will provide satisfactory results.

c. Three alternative methods of reduction are tunneling under the dump, filling-in the valley with the dump material, and partial excavation of the dump to provide drainage. At the present time we feel that the cost of providing the drainage can not be justified on the basis of percentage reduction of pollution from major source 4055.

D. Cost of Methods of Abatement

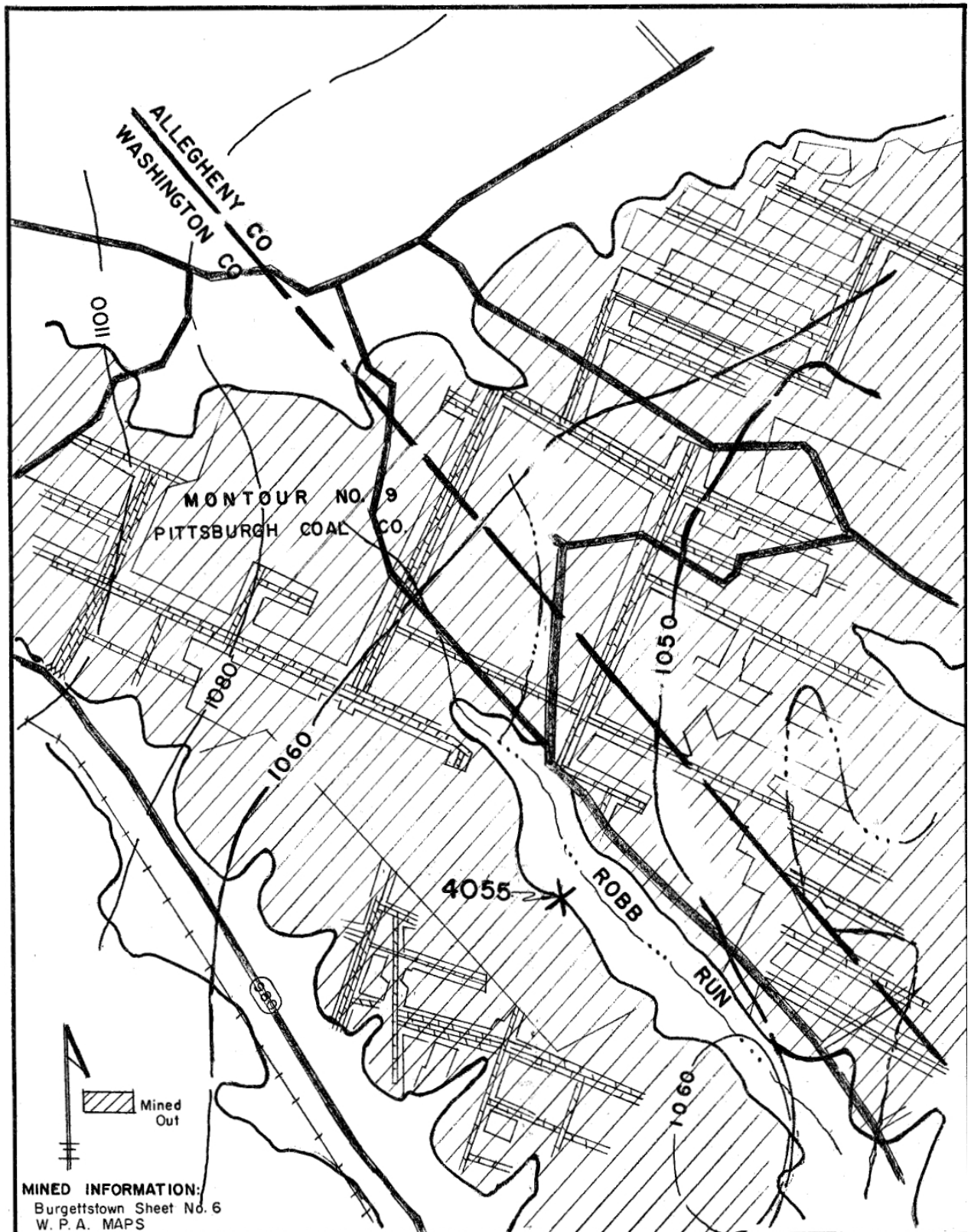
Description	Estimated Cost	Estimated Per Cent Flow Reduction
<u>Area A:</u>	\$ 3,000	8%
1. Fill in sink hole		
2. Provide drainage into Robb Run		
Sub-Total:	\$ 3,000	8%
<u>Area B:</u>	\$21,000	12%
1. Provide drainage from the blocked valley to the unnamed tributary		
Sub-Total:	\$24,000	20%
<u>Area C :</u>	--	-
No recommended treatment at this time		
TOTAL:	\$24,000	20%



DATE: Aug 1969  
 SCALE: 1" = 1320'  
 DR: P.T. CK: M.D.  
 DWG. NO.4055-A

CHARTIERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE NO.4055  
 A. C. ACKENHEIL & ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY  
 LINE  
 MAP



**MINED INFORMATION:**  
 Burgettstown Sheet No. 6  
 W. P. A. MAPS

**DATE:** June 6, 1969  
**SCALE:** 1" = 1200'  
**DR:** S.K.    **CK:** I.H.  
**DWG. NO.** 4055-B

CHARTIERS CREEK DRAINAGE BASIN  
 MAJOR SOURCE NO. 4055  
**A. C. ACKENHEIL & ASSOCIATES, INC.**  
 CONSULTING ENGINEERS  
 PITTSBURGH, PA. & CHARLESTON, W. VA.

DEEP MINE  
 MAP