

MAJOR SOURCES 4962 - 4963 ROBINSON RUN

A. Description of the Source Area

1. Sources 4962 and 4963 are located in North Fayette Township, Allegheny County, Pennsylvania. They are approximately 2,000 ft. northwest of the town of McDonald. The locations of the sources are shown on the enclosed Dwg. 4962-63 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix All.
2. The discharge from source 4963 emerges from a pipe in an indentation of a hill of a reclaimed strip mine. Coal maps of Nickle Plate Mine received from the Pittsburgh Coal Company do not indicate any mine openings near source 4963; therefore, the discharge is probably due to strip mining operations breaking into the deep mine.
3. Source 4962 is approximately 1,000 ft. downstream from source 4963. The discharge also emerges from a pipe which drains a reclaimed strip mine area. Stripping operations have probably broken into the deep mine.
4. The area surrounding the two sources has been deep and strip mined as well as auger mined. Portions of the Nickle Plate Mine located predominately in Washington County were deep mined between 1889 and 1904. Additional deep mining occurred in the period between 1944 and 1950, and as recently as 1957.
5. Strip mining was conducted between 1942 and 1950. Additional strip mining occurred in 1964. At the same time in 1964, auger mining extracted the remaining tons of coal. Coal maps indicate many places where stripping operations have broken into the deep mine north, northwest and east of the two major sources.
6. Thirteen months of field testing and laboratory analysis indicate the following maximum, minimum and weighted average parameters for the two sources:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
<u>Source 4962</u>			
pH	4.5	1.6	3.2
Flow (gpm)	480	60	131
Acidity (mg/l)	550	192	303
Iron (mg/l)	35.0	1.1	5.2
Manganese (mg/l)	5.4	0.5	2.4
Sulfate (mg/l)	1625	950	1157
Hardness (mg/l)	1600	480	971
Acid Load (lbs./day)	1843	141	487
Temperature (degrees C)	23	6	12.8

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
<u>Source 4963</u>			
pH	4.8	1.8	3.3
Flow (gpm)	480	75	148
Acidity	462	210	330
Iron (mg/l)	70.0	1.75	14.9
Manganese	3.3	2.0	2.6
Sulfate (mg/l)	1500	875	1215
Hardness (mg/l)	1460	530	8632
Acid Load (lbs/day)	1786	236	571
Temperature (degrees C)	23	6	13

2. The only significant conclusion that can be drawn from the laboratory and field data is that the highest iron concentration of the two sources was obtained at the time of the lowest temperature recorded, i.e., December 20, 1968. The two sources contribute about 2.5% of the total average acid load into Chartiers Creek. The slugging. Index for sources 4962 - 4963 is 4X.

B. Drainage

1. Surface Drainage: The source area is drained on the west by Robb Run and on the east by an unnamed tributary to Robinson Run. W.P.A. coal maps (Carnegie Sheet No. 4) and the 1910 edition of the Carnegie 15 minute topographic map indicate that a small tributary was present in the valley adjacent to the sources. Mining operations have changed the flow of the natural waters of the tributary to an acid stream.
2. Subsurface Drainage: Structure contours constructed on the base of the coal of this portion of the Nickle Plate Mine indicate that the subsurface drainage is generally to the southeast. A large subsurface level area is present approximately 1,000 ft. northwest of source 4963. The center of this area is the portion of the mine that has been extensively auger mined.

C. Field Investigations and Abatement Methods

1. Field investigations conducted north and northwest of the sources uncovered two valleys that are pocketed with sink holes. Water was observed and heard to flow into the sink holes approximately 3 to 5 ft. below the surface of the ground.
2. No natural surface drainage was observed in the valleys due to the sink holes and the leveled spoil piles intercepting and retaining the surface flows. Eventually the fresh waters will enter the deep mine and emerge as polluted waters at sources 4962 and 4963.
3. Area A: A set of sink holes was located on the 49-acre parcel belonging to J. A. Zombrek and the northwestern corner of a large parcel belonging to North Star Coal Company of Pittsburgh, Pennsylvania. The flow into the sink holes was estimated to be

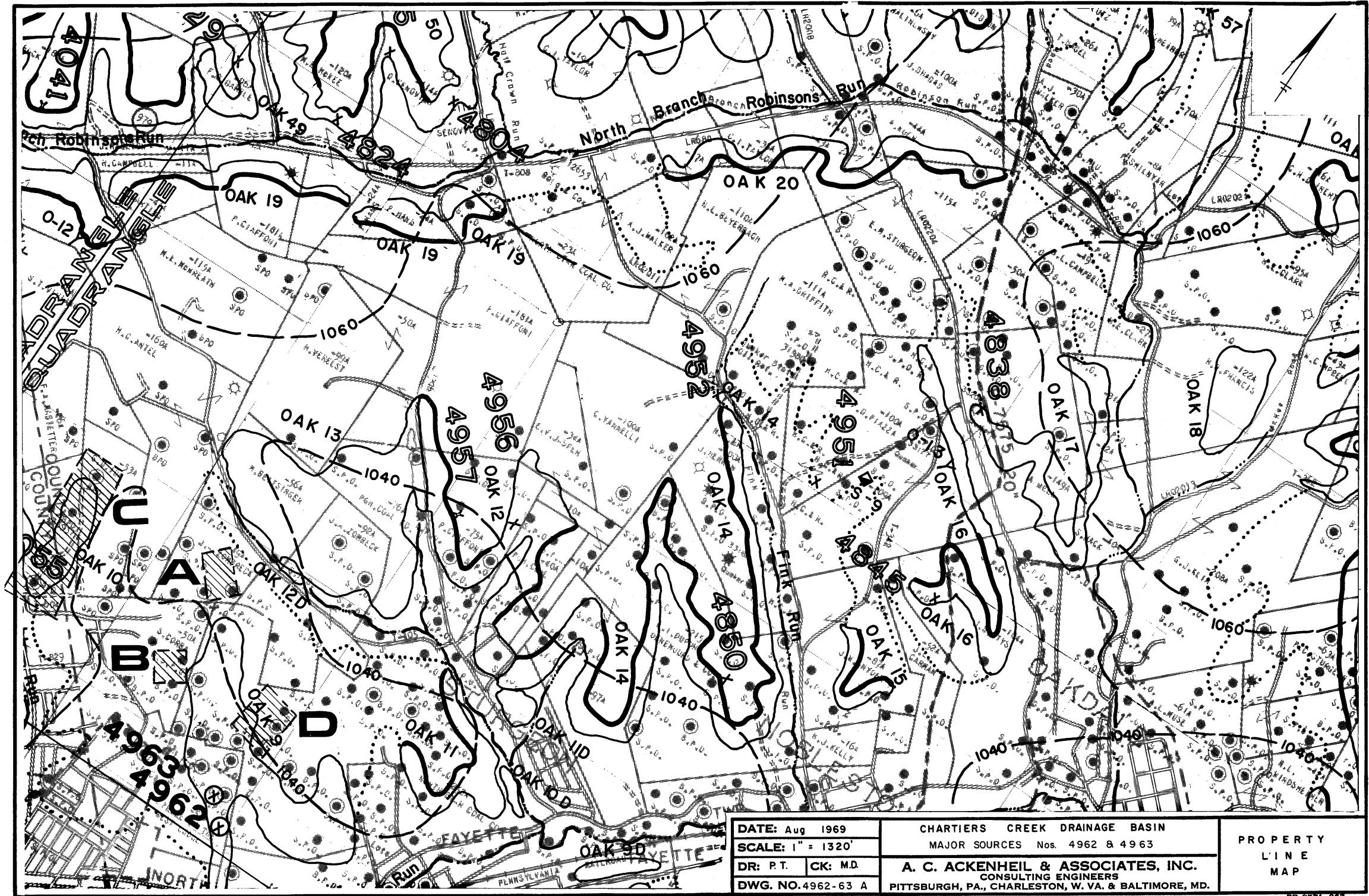
approximately 10 cpm. Area A is shown on Dwg. 4862-63 - A. Filling the sink holes and providing drainage across the sink area and the partially reclaimed strip should provide additional water into the swamp area and reduce the flow into the deep mine.

4. Area B: On the adjoining 50-acre parcel owned by S. Corba, sink holes occur in a small valley. The flow into the sink holes was estimated to be approximately 20 gpm. Area B is shown on Dwg. 4962-63 - A. To prevent the water from entering the deep mine, the sink holes should be filled and drainage provided for natural flow of water.
5. Area C: Approximately 1,000 ft. northwest of the Borough of McDonald boundary line, on a 53-acre parcel belonging to G. U. Ida, sink holes were observed in the stream channel. The flow was estimated to be 15 gpm. Filling in the sink holes and providing drainage through the reclaimed strip OAK 10 will add fresh water to the badly polluted Robb Run. This portion of the strip mine is located on a 117-acre parcel belonging to C. M. Hughey.
6. Area D: Approximately 2,000 ft. northeast of source 4963 a small stream was blocked by debris and strip spoil material. The blockage created a very small pond. Removing the blockage and providing a drainage channel through the reclaimed strip mine will add good quality water into the unnamed tributary draining the area at the time of heavy precipitation.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A</u> : J. A. Zombrek	\$24,000	4%
1. Fill in sink holes		
2. Provide drainage through the sink hole area and the partially reclaimed strip mine		
Sub-Total :	\$24,000	4%

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area B:</u> S. Corba	\$ 6,300	8%
1. Fill in sink holes		
2. Provide drainage through the sink hole area and the partially reclaimed strip		
Sub-Total:	\$30,300	12%
<u>Area C:</u> G. W. Ida	\$ 7,100	4%
1. Fill in sink holes		
2. Provide drainage through the reclaimed strip mine (OAK 10) on C. M. Hughes property		
Sub-Total:	\$37,400	16%
<u>Area D:</u> North Star Coal Co., Inc.	\$ 1,600	2%
1. Provide drainage through the reclaimed strip mine		
TOTAL:	\$39,000	18%



DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4962-63 A

CHARTIERS CREEK DRAINAGE BASIN
 MAJOR SOURCES Nos. 4962 & 4963
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY
 LINE
 MAP

MAJOR SOURCES 4957 - 4956 ROBINSON RUN

A. Description of the Source Area

1. Major sources 4957 and 4956 are located about one mile northwest of Sturgeon in North Fayette Township, Allegheny County, Pennsylvania. The locations of the sources are shown on the enclosed Dwg. 495756 - A and on the OAKDALE 7-1/2 minute quadrangle Included in Appendix All.
2. The discharge of source 4957 emerges from the base of the spoil banks in a randomly reclaimed strip mine area (OAK 12). The discharge is probably from an opening into a deep mine due to strip mining operations. This area has been deep mined and is part of the Pittsburgh Coal Company's Champion Mine complex. Additional seepage is picked up by the main flow from the various spoil banks.
3. Major source 4956 is located approximately 2,000 ft. upstream from source 4957. The main flow is discharging from a highwall, probably an opening into a deep mine from a randomly reclaimed strip mine (OAK 12). The effluent flows in a man-made ditch into a swampy area and picks up small additional seepages and runoffs from the adjoining strip mine.
4. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters for the two sources:

Major Source 4957:	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.8	2.2	3.3
Flow (gpm)	160	2	65
Acidity (mg/l)	540	108	345
Iron (mg/l)	15.0	0.2	6.7
Manganese (mg/l)	6.6	2.25	3.4
Sulfate (mg/l)	1875	825	1160
Hardness (mg/l)	1460	580	860
Acid Load (lbs/day)	1036	132	320
Temperature (degrees C)	17	10	11.4

Major Source 4956:	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	5.8	3.2	4.8
Flow (gpm)	360	15	83
Acidity (mg/l)	416	32	123
Alkalinity (mg/l)	344	0	62
Iron (mg/l)	17.5	0.5	4.0
Manganese (mg/l)	162.5	3.9	18.1
Sulfate (mg/l)	1250	200	965
Hardness (mg/l)	1720	820	1088
Acid Load (lbs/day)	1771	14	202
Alkaline Load (lbs/day)	124	0	31
Temperature (degrees C)	24	1	12.4

5. The two sources supply approximately 1.5% of the total average acid load contributed per day by the major sources into Chartiers Creek. Initial readings taken in June, 1968, indicate that the two sources are potential sluggers. The average combined flow of the two sources is about 150 gpm (slugging index 5X).

B. Drainage

- I. Surface Drainage: The area is drained by an unnamed tributary flowing west of Sturgeon, Pennsylvania. The tributary discharges its polluted waters into Robinson Run. The flow is to the southeast. In a few places north and northwest of the two sources, surface drainage has been interrupted due to the presence of sink holes.
2. Subsurface Drainage: Structure contours constructed on the base of the coal, shown on the W.P.A. Coal Map, Carnegie Sheet No. 4, indicate that the predominant trend of the subsurface flow is to the southeast, with a large subsurface level area north and east of the two major sources.

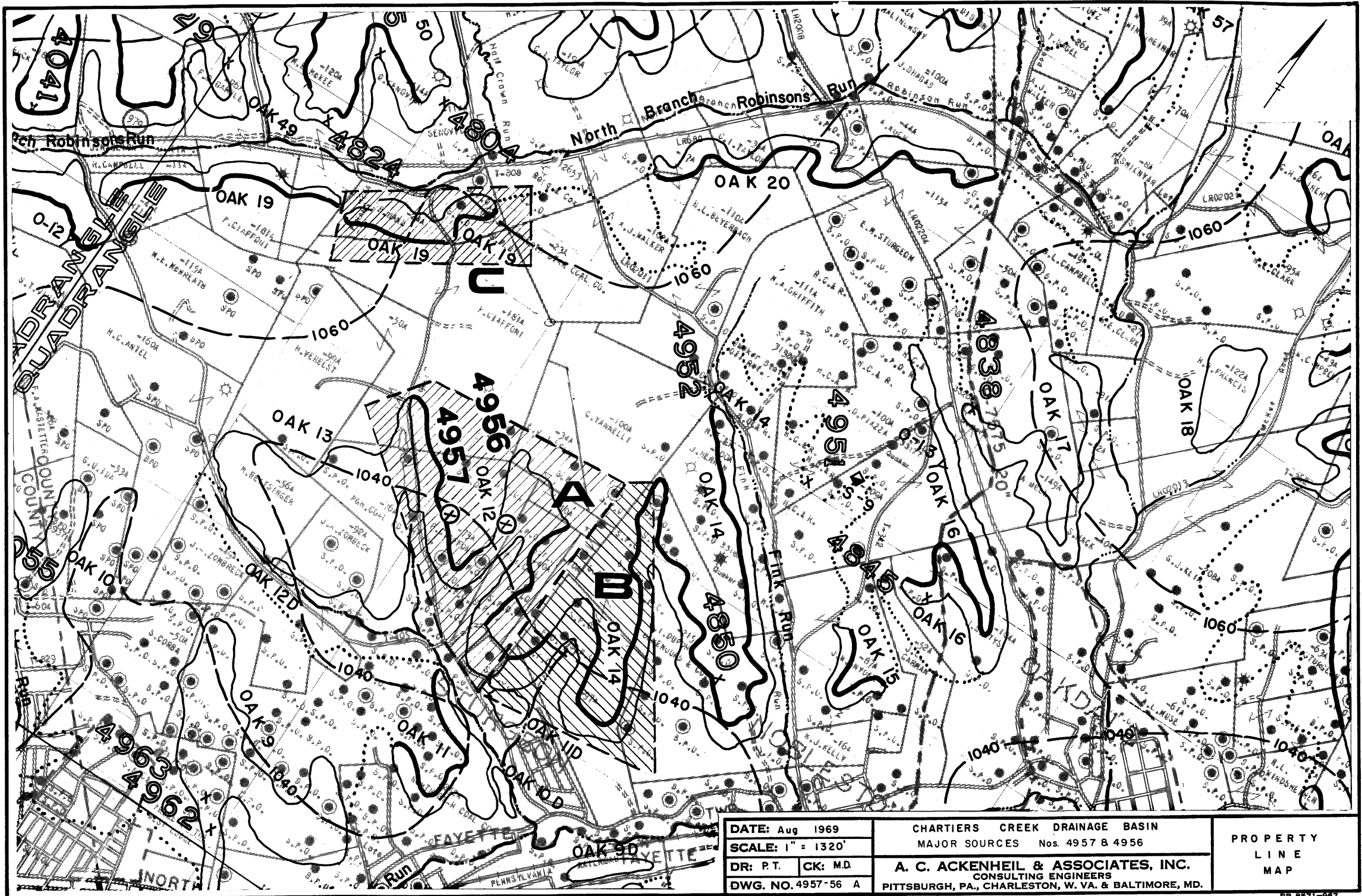
C. Field Investigations and Abatement Methods

Field studies conducted north, northwest and east of the sources show a number of places where surface drainage has been disrupted due to mine subsidence and formation of sink holes:

- I. Area A: On the 34-acre parcel belonging to E. V. Jasper, sink holes were observed in a well-defined stream channel flowing toward the randomly reclaimed strip mine (OAK 12) on properties of Pittsburgh Coal Company and P. Ciaffoni. We recommend filling up the sink holes and improving the drainage through the unreclaimed portion of the strip mine. (See Dwg. 4957-56 - A.)
2. Area B: Based on the structure contours, it appears that a percentage of the water entering randomly reclaimed strip mine OAK 14 will discharge at source 4956. Improving the drainage through the western half of the strip mine OAK 14 will prevent a percentage of water from entering the deep mine. It is our opinion, based on subsurface drainage, that the eastern portion of strip mine OAK 14 contributes to major source 4850. Improvement of the drainage through the eastern one-half of strip mine OAK 14 is recommended in the individual source report for source 4850.
3. Area C: North of sources 4957 and 4956 is strip mine OAK 19. It occupies approximately 44 acres and is classified as randomly reclaimed. The eastern portion of the strip mine is so graded that the natural drainage is toward the highwall. The drainage along the western portion is away from the highwall and hence is not considered to be a source of water for sources 4957 and 4956. Improvement of the drainage through this strip mine should reduce the flow at sources 4957 and 4956.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A:</u> E. V. Jasper (34 acres and 10 acres), Pittsburgh Coal Co. (40 acres) and P. Ciaffoni (75 acres)		
1. Fill in sink holes and provide surface drainage	\$4,000	5%
2. Improve surface drainage through portions of strip mine OAK 12	43,500	13%
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Sub-Total:	\$47,500	18%
<u>Area B:</u> E.I. DuPont de Nemours and Co. (215 acres & 97 acres)		
1. Improve surface drainage through the western portion of strip mine OAK 14	\$23,000	18%
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Sub-Total:	\$70,500	36%
<u>Area C:</u> North Star Coal Co. (23 acres), P. Hans (24 acres), P. Ciaffoni (181 acres), S. Barten (41 acres), J. Maglich (11 acres), R. Campbell (11 acres)		
1. Improve surface drainage through the eastern portion of strip mine OAK 19	\$11,100	10%
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TOTAL:	\$81,600	46%



DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4957-56 A

CHARTERS CREEK DRAINAGE BASIN
 MAJOR SOURCES Nos. 4957 & 4956
 A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY
 LINE
 MAP

MAJOR SOURCES 4952 - 4951 ROBINSON RUN

A. Description of the Source Area

1. Sources 4952 and 4951 discharge their acid waters into Fink Run, a small tributary to Robinson Run near Noblestown in Allegheny County, Pennsylvania. Source 4952 is located near the headwaters of Fink Run. The discharge emerges from a large-diameter clay pipe in a stone-wall catch basin. The area has been deep and strip mined. Source 4951 emerges from an abandoned mine opening of Carnegie Coal Company's Oakdale Mine. The locations of the sources are shown on the enclosed Dwg. 4952-51 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix All.
2. Thirteen months of study indicate that the two sources contribute approximately 1,200 lbs. of acid per day into Fink Run. This represents about 3.5% of the total average acid load contributed per day by the major sources into Chartiers Creek. Sources 4952 and 4951 are potential sluggers, with a slugging index of 3X based on the maximum acid load versus the average acid load.
3. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters for sources 4952 and 4951:

Major Source 4952	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	3.8	1.4	2.9
Flow (gpm)	180	60	115
Acidity (mg/l)	578	276	400
Iron (mg/l)	15.5	5.0	10.1
Manganese (mg/l)	4.0	1.6	2.3
Sulfate (mg/l)	1725	975	1231
Hardness (mg/l)	1430	530	838
Acid Load (lbs/day)	1935	215	676
Temperature (degrees C)	16	11	13.5

Major Source 4951:

pH	3.8	2.0	3.0
Flow (gpm)	240	45	103
Acidity (mg/l)	646	308	425
Iron (mg/l)	18.25	7.0	10.8
Manganese (mg/l)	2.6	1.5	2.2
Sulfate (mg/l)	1700	970	1207
Hardness (mg/l)	1160	570	804
Acid Load (lbs/day)	1468	222	540
Temperature (degrees C)	17	10	13

B. Drainage

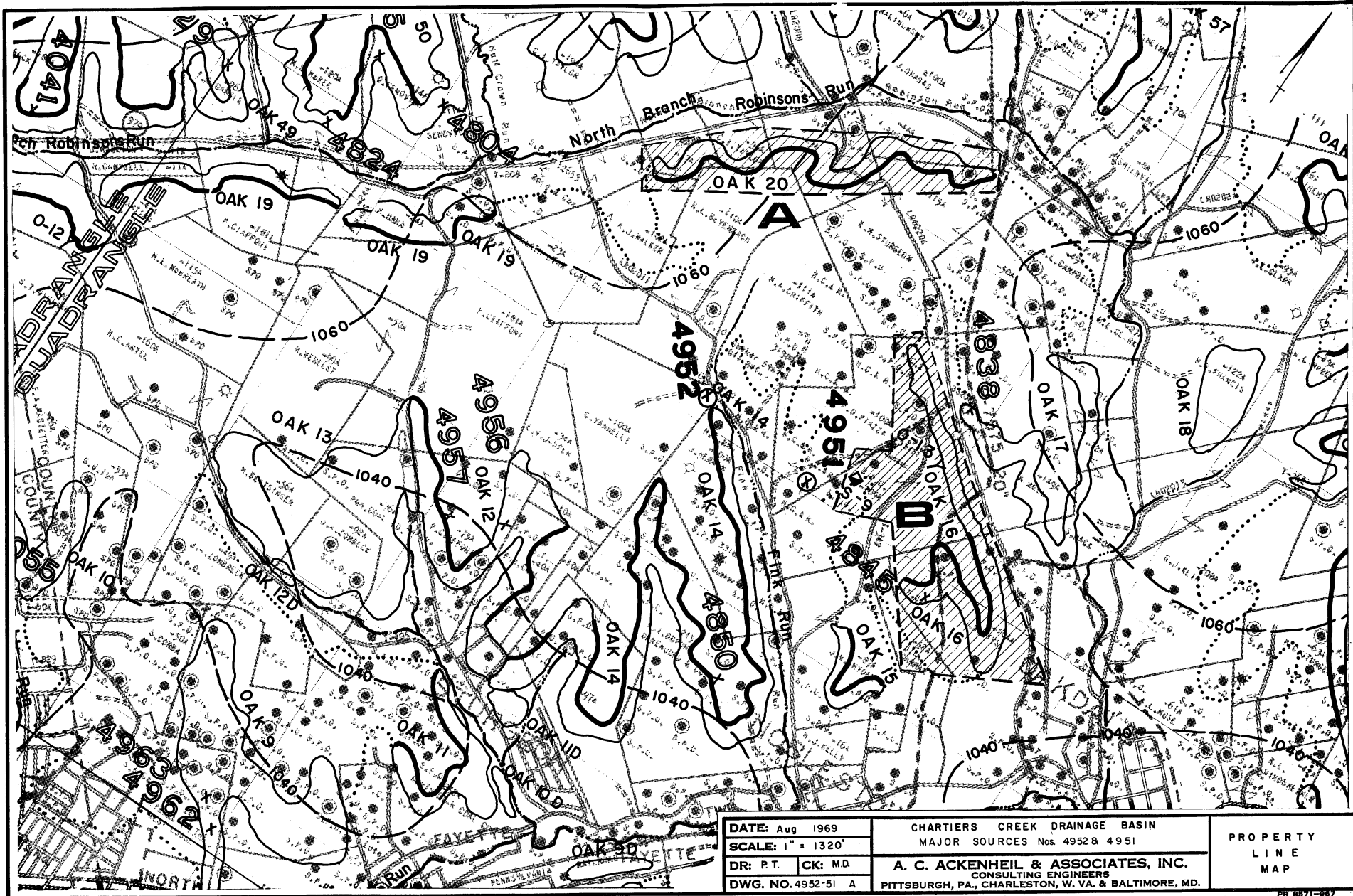
1. Surface Drainage: The area is drained by southeast-flowing Fink Run, a small tributary to Robinson Run.
2. Subsurface Drainage: Structure contours on the base of the Pittsburgh Coal (W.P.A. Map, Sheet No. 4) show that the subsurface flow is to the southeast; therefore, these sources would be affected by strip mine OAK 20 and strip mine OAK 16. (See Dwg. 4952-51 - B.)

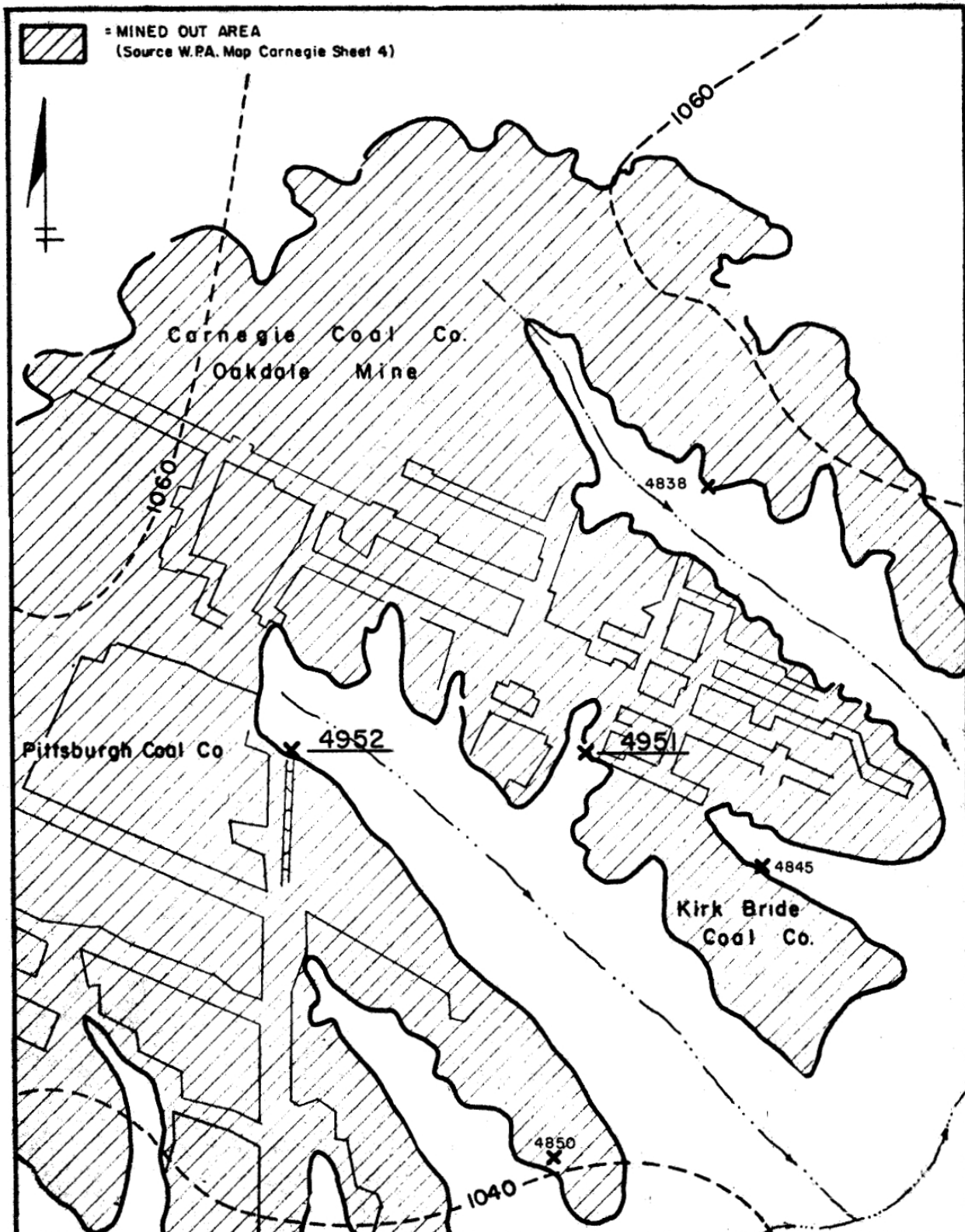
C. Field Investigations and Abatement Methods

1. Area A: North of source 4952 and 4951 is strip mine OAK 20 which occupies about 37 acres. The strip mine is unreclaimed and the coal seam is exposed in many areas along the highwall. It is estimated that this strip mine also affects major sources 4838 and 4845. Strip mine OAK 20 traverses from east to west the following properties: E. M. Sturgeon (115 and 43 acres); A. Koch (44 acres); C. 1. Taylor (35 and 194 acres); A. J. Walker (102 and 17 acres); and H. L. Beyerbach (110 acres).
2. Area B:
 - a. Several openings into the deep mine were observed in strip mine OAK 16 during our field reconnaissance. These openings have been labeled 0-13 as shown on Dwg. 4952-51 - A. Strip mine OAK 16 is randomly reclaimed and occupies approximately 90 acres. It is estimated this strip mine also has a direct effect on source 4845. The strip mine crosses the properties of J. S. Stys (104 acres), J. L. Carman (52 acres), A. Bell (109 acres), and F. D. Piazza (100 acres).
 - b. A partially caved-in mine shaft, S-9, is located on the 149-acre parcel belonging to A. Bell. Even though no water was observed to flow into the shaft, probably at times of heavy precipitation fresh water will enter the mine through the shaft. Sealing of the shaft should aid in the abatement. The location of the mine shaft is shown on Dwg. 4952-51 - A.
3. Improvement of the natural drainage through strip mines OAK 16 and OAK 20 should reduce the flow at source 4952 and 4951 and source 4845.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A:</u>		
1. Improve natural drainage through strip mine OAK 20 and reduce infiltration of surface water into the deep mine	\$59,500	13%
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Sub-Total:	\$59,500	13%
<u>Area B:</u>		
1. Improve natural drainage through strip mine OAK 16 and backfill at opening 0-13 and reduce infiltration of surface waters in the deep mine	\$91,000	25%
2. Seal Shaft S-9	3,500	--
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TOTAL:	\$154,000	38%





DATE: July 1969
 SCALE: 1" = 1200'
 DR: PT CK: I. H.
 DWG. NO. 4952-51 B

CHARTIERS CREEK DRAINAGE BASIN
 MAJOR SOURCES Nos. 4951, 4952
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

DEEP
 MINE
 MAP

MAJOR SOURCE 4850 ROBINSON RUN

A. Description of the Source Area

1. Source 4850 is located in North Fayette Township, Allegheny County, Pennsylvania, approximately 2500 ft. northwest of Noblestown. The location of the source is shown on the enclosed Dwg. 4850 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix AI I.
2. The discharge emerges from a clay pipe at the base of spoil banks in a randomly reclaimed strip mine area (OAK 14). About 300 ft. from the discharge point old mine openings are exposed in the highwall of the strip. The area has also' been deep mined and is part of Pittsburgh Coal Company's Champion Mine.
3. Thirteen months of field and laboratory studies indicate the following maximum, minimum and weighted average parameters for the source:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	5.4	2.6	4.5
Flow (gpm)	200	7	54
Acidity (mg/l)	820	24 1	85
Alkalinity (mg/l)	22	0	6
Iron (mg/l)	45	0.4	5.5
Manganese (mg/l)	4.5	1.8	3.0
Sulfate (mg/l)	1625	550	919
Hardness (mg/l)	1480	580	920
Acid Load (lbs/day)	1968	4	209
Alkaline Load (lbs/day)	11	0	2.8
Temperature (degrees C)	20	3	11

4. Calculations show that major source 4850 supplies less than 0.5% of the total acid load contributed into Chartiers Creek per day by the major sources. Analysis of the data (initial readings vs. subsequent readings) indicates that major source 4850 is a potential slugger (slugging index 9X).

B. Drainage

1. Surface Drainage: The area is drained by an unnamed tributary west of Fink Run. The tributary flows south Into Robinson Run.
2. Subsurface Drainage: Subsurface drainage to this source would be from the north. The structure contours on the base of the Pittsburgh Coal, as shown on the W.P.A. Coal Map, Carnegie Sheet No. 4, indicate that source 4850 is surrounded by a large, relatively level subsurface area.

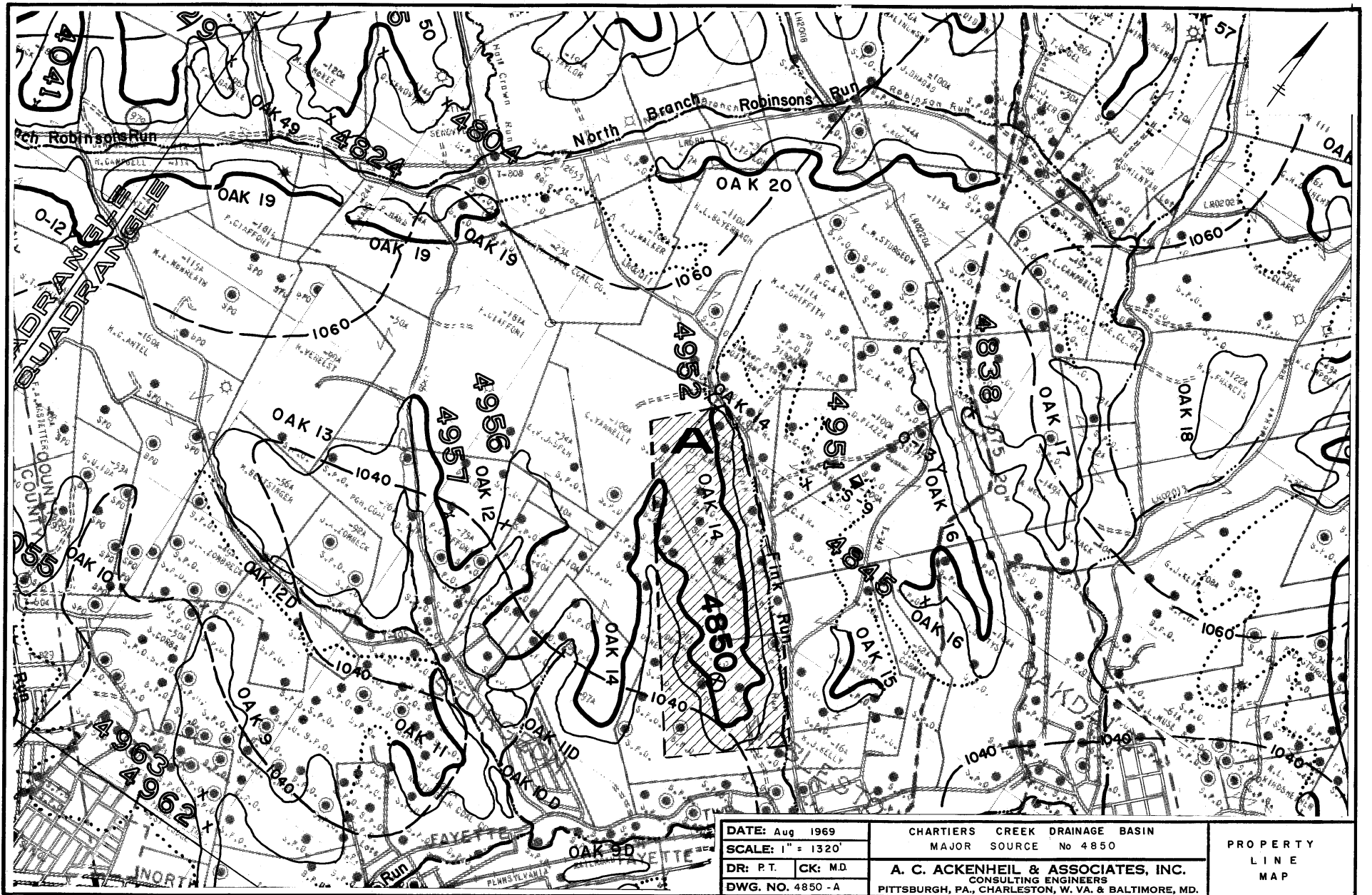
C. Field Investigations and Abatement Methods

1. Field studies conducted north and northeast of the source revealed that mine openings occur in the highwall of strip mine OAK 14, and sink holes are present in a ravine above the highwall of the strip. A portion of the strip mine has been reclaimed but in such a manner that it does not permit natural surface runoff to enter the natural drainage of the area.
2. We recommend improving the natural drainage through the eastern portion of strip mine OAK 14, filling in the sink holes in the ravine above the highwall, and providing drainage from the sink hole area to natural drainage.
3. It is estimated that approximately 43% of the water will be prevented from entering the deep mine and discharging from major source 4850.

D. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>Area A:</u> E. I. DuPont de Nemours & Co. (215 acres), J. Herron (100 acres)		43%
1. Improve the natural drainage through the eastern portion of strip mine OAK 14	\$22,000	
2. Fill in the sink holes	2,500	
3. Provide drainage from the sink hole area to natural drainage	2,000	
TOTAL:	\$26,500	43%

An additional abatement measure such as the use of a box cut between strip mines OAK 14 West and OAK 14 East, and between OAK 14 and OAK 12 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. 4850-A.



DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4850 - A

CHARTERS CREEK DRAINAGE BASIN
 MAJOR SOURCE No 4850
 A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY
 LINE
 MAP

MAJOR SOURCE 4845 ROBINSON RUN

A. Description of the Source Area

1. Source 4845 is located in North Fayette Township, Allegheny County, Pennsylvania, approximately one mile northwest of Oakdale. The location of the source is shown on the enclosed Dwg. 4845 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix All.
2. The discharge emerges from the numerous strip ponds which are fed by mine openings in the strip highwall (OAK 16). The coal is exposed in the highwall. The unnamed tributary into which the major source discharges picks up additional flow from the seepages emitting from the base of the spoil piles present along the path of the tributary. The source is located in the southeastern portion of the Carnegie Coal Company's Oakdale Mine.
3. Thirteen months of field and laboratory studies indicate the following maximum, minimum and weighted average parameters for the source:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	6.3	2.9	4.3
Flow (gpm)	600	15	95
Acidity (mg/l)	480	56	177
Iron (mg/l)	11.2	.28	2.2
Manganese (mg/l)	5.6	2.2	3.5
Sulfate (mg/l)	1225	550	802
Hardness (mg/l)	1550	590	901
Acid Load (lbs/day)	3456	13	371
Temperature (degrees C)	21	1	11

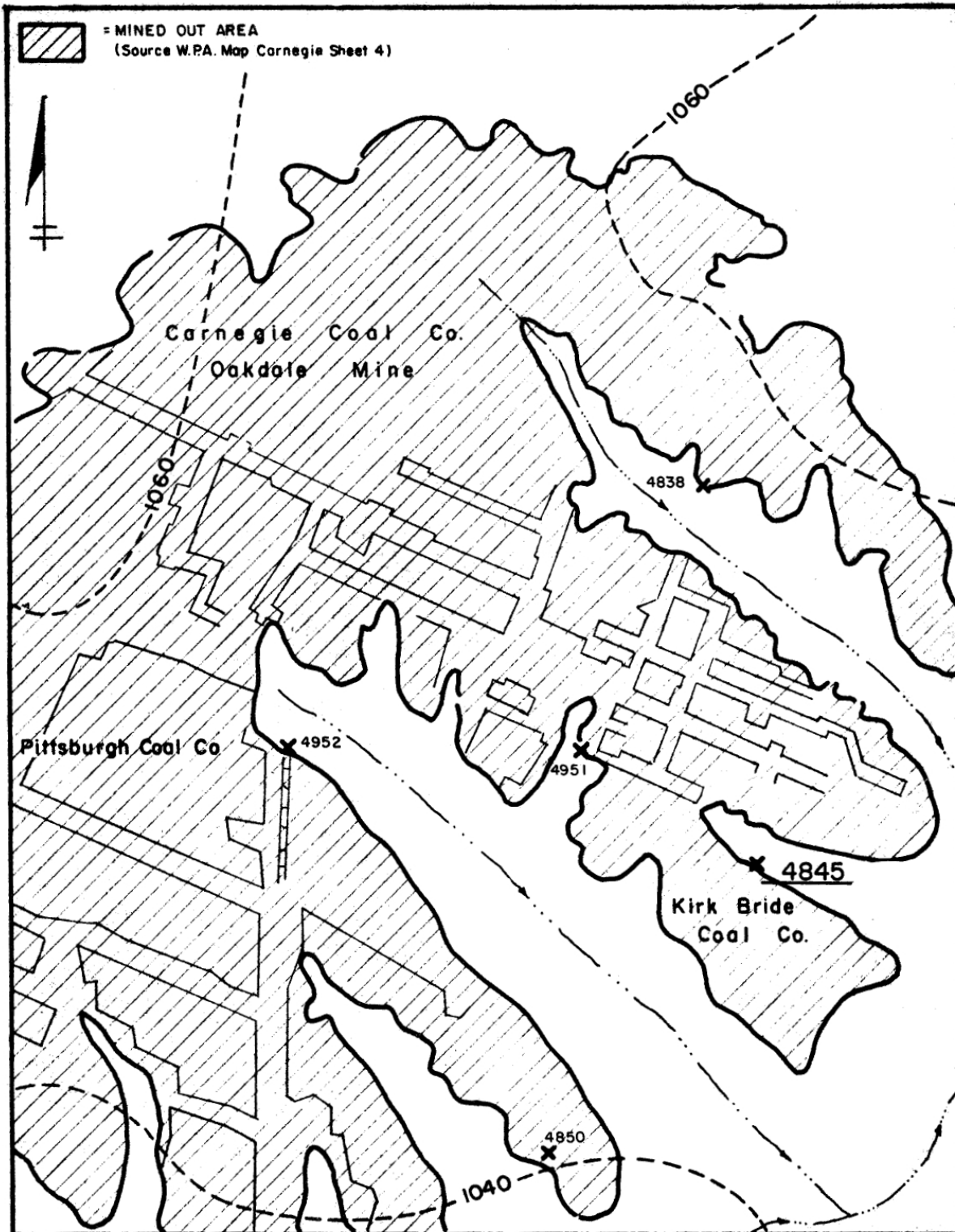
4. The comparison of figures shows that major source 4845 is a potential slugger (slugging index 9X). The highest acidity, sulfate and iron concentrations were recorded in June, 1968, at the time of the highest flow. At no time since the original reading has the iron concentration exceeded the maximum standard allowed by the Sanitary Water Board nor has acid load approached the original magnitude of loading.
5. Calculations show that the source supplied about 1.0% of the total average acid load contributed per day by the major sources into Chartiers Creek, based on thirteen months of readings.

B. Drainage

1. Surface Drainage: The area is drained to the southeast by an unnamed tributary to Robinson Run. Additional flow is supplied to this tributary by seepages from the spoil banks.
2. Subsurface Drainage: Subsurface drainage to this source would be predominantly to the southeast according to the subsurface contours shown on the W.P.A. Coal Map, Carnegie Sheet No. 4. See Dwg. 4845 - B.

C. Field Investigation and Abatement Methods

1. The abatement recommendations given for major sources 4952 and 4951 should reduce the flow at source 4845 by an estimated 40% since all three of the sources are affected by the unreclaimed strip mines OAK 20 and OAK 16.
2. Improvement of the drainage through the strip mines should also reduce the slugging potential of source 4845. The cost for improvement of the drainage through strip mines OAK 20 and OAK 16 was included with the source report for 4952 and 4951 and is estimated to be \$154,000.



DATE: July 1969		CHARTIERS CREEK DRAINAGE BASIN		DEEP MINE MAP
SCALE: 1" = 1200'		MAJOR SOURCE No. 4845		
DR: PT	CK: I. H.	A. C. ACKENHEIL & ASSOCIATES, INC. CONSULTING ENGINEERS PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.		
DWG. NO. 4845-B				

MAJOR SOURCE 4838 ROBINSON RUN

A. Description of the Source Area

1. Source 4838 is located In North Fayette Township, Allegheny County, Pennsylvania, approximately two miles northwest of Oakdale. The location of this source is shown on the enclosed Dwg. 4838 - A and on the OAKDALE 7-1/2 minute quadrangle included in Appendix All.
2. The discharge is emerging from an old drift opening into the Oakdale Mine of the Carnegie Coal Company. The effluent is temporarily retained in a concrete block catch basin. The area has been strip mined and reclaimed, with four additional catch basins downstream from major source 4838.
3. Thirteen months of field and laboratory study indicate the following maximum, minimum and weighted average parameters for source 4838:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.4	2.5	3.2
Flow (gpm)	180	15	55
Acidity (mg/l)	570	266	400
Iron (mg/l)	12.5	4.75	6.0
Manganese (mg/l)	17.5	1.6	3.1
Sulfate (mg/l)	1625	1000	1207
Hardness (mg/l)	1400	450	880
Acid Load (lbs/day)	1231	72	289
Temperature (degrees C)	16.0	12.0	13.4

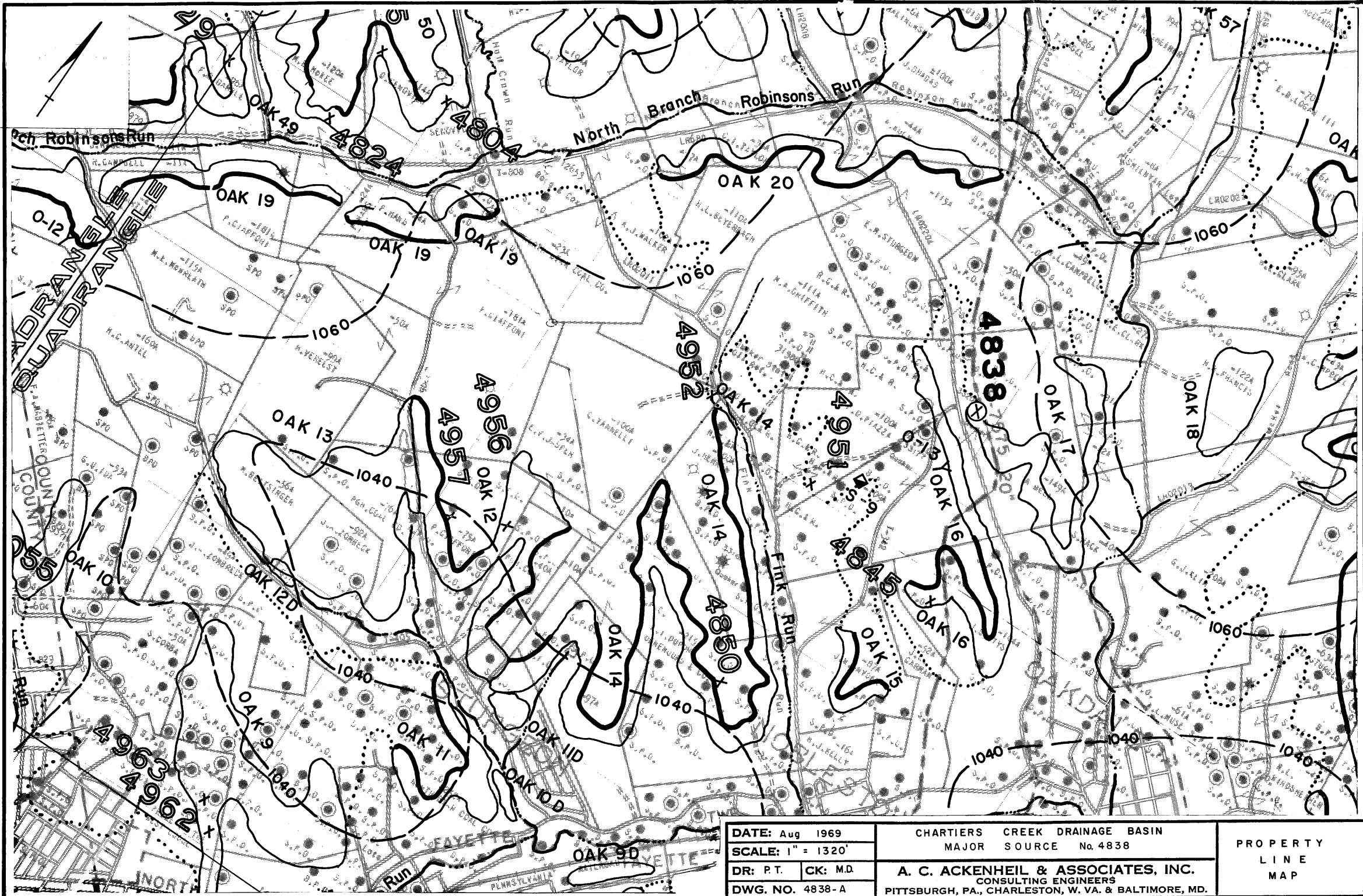
4. Source 4838 supplies approximately 1% of the total average acid load contributed per day by the major sources into Chartiers Creek, based on 13 months of readings. Analysis of the data indicates that source 4838 is a potential slugger. The slugging index is 4X based on maximum and average load of the source. The high slugging index suggests that this source is fed through openings into the mine rather than drainage just from a deep mine.

B. Drainage

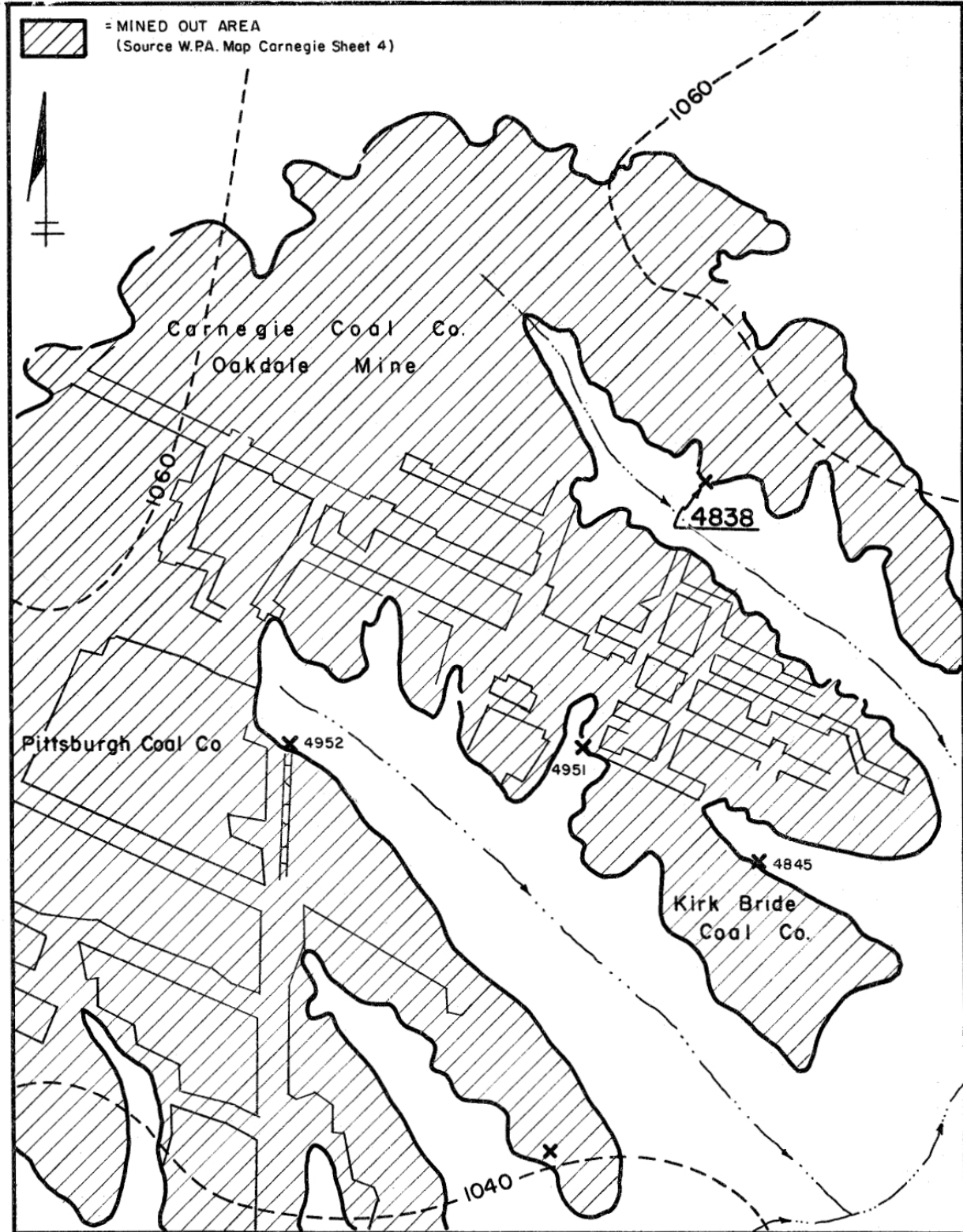
1. Surface Drainage: The drainage from the catch basins flows into an unnamed tributary to Robinson Run which flows parallel to Wittengate Road in Oakdale. The unnamed tributary flows south into Robinson Run.
2. Subsurface Drainage: The subsurface drainage is predominantly to the southwest in the vicinity of source 4838, as shown on the W.P.A. Coal Map, Carnegie Sheet Nos. 4 and 5. (See Dwg. 4838 - B.) The deep mine map of the Oakdaie Mine indicates the source map be connected to the main haulageway. Since the flow is to the southwest, correction measures to stop water infiltrating into the mine should mainly be north of the source.

C. Field Investigation and Abatement Methods

Strip mine OAK 17, on which source 4838 is located, is a reclaimed strip mine. Investigation to the north of the source indicated that strip mine OAK 20 is unreclaimed and occupies 37 acres and probably is the entry point for some waters which discharge at source 4838, as well as at sources 4845, 4952, and 4951. Improvement of the surface drainage through strip mine OAK 20, as recommended in major source report 4952-4951 will probably reduce the flow of source 4838 and reduce its slugging potential. The estimated cost for improvement of the drainage through strip mine OAK 20, as given in the report for source 4952-4951, is \$59,500.



DATE: Aug 1969		CHARTIERS CREEK DRAINAGE BASIN		PROPERTY LINE MAP
SCALE: 1" = 1320'		MAJOR SOURCE No. 4838		
DR: P.T.	CK: M.D.	A. C. ACKENHEIL & ASSOCIATES, INC. CONSULTING ENGINEERS PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.		
DWG. NO. 4838-A				



DATE: July 1969
 SCALE: 1" = 1200'
 DR: PT CK: I. H.
 DWG. NO. 4838 - B

CHARTIERS CREEK DRAINAGE BASIN
 MAJOR SOURCE No. 4838
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

DEEP
 MINE
 MAP

10 7159 ALBANENE A. & B. SMITH CO., PGH., PA.

AT - RC

PR 0487-1169

MAJOR SOURCE 4654 ROBINSON RUN

A. Description of the Source Area

1. Source 4654 is located in Collier Township, Allegheny County, Pennsylvania, approximately 2,000 ft. north of the community of Ewingsville. The location of this source is shown on the enclosed Dwg. 4654 - A and on the Pittsburgh West 7-1/2 minute quadrangle included in Appendix All.
2. The discharge emerges below the Holy Family Cemetery. It emits from that portion of a deep mine which has caved in, thus creating an opening through which acid mine drainage can flow out. Available coal maps do not indicate that there are any openings in this particular portion of the mine or that it has been strip mined.
3. Thirteen months of field and laboratory studies indicate the following maximum, minimum and weighted average parameters:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	3.5	1.8	2.9
Flow (gpm)	540	70	234
Acidity (mg/l)	710	292	400
Iron (mg/l)	4.5	0.70	1283
Hardness (mg/l)	1520	490	850
Acid Load (lbs/day)	3240	272	1075
Temperature (degrees C)	19	7	12.5

4. Calculations of the data show that major source 4654 supplies approximately 2.5% of the total average acid load contributed per day by the major sources into Chartiers Creek, and has a slugging index of 3X.
5. Associated with the major source 4654 are minor sources 4651, 4652 and 4653:
 - a. Source 4651 drains a partially reclaimed strip mine area (PGW 3). The ground in the vicinity of the source is swampy and there are many openings in the ground. The total flow as measured in May, 1968, was 20 gpm.
 - b. Sources 4652 and 4653 are discharges from the drifts into the Fort Pitt Mine. The area between the two drifts contains many sink holes. The total flow of the sources was measured to be 10 gpm.
 - c. Sources 4652 and 4653 can be eliminated by sealing the drift openings and allowing all the water to discharge through source 4654.

B. Drainage

I. Surface Drainage:

- a. The source area is drained by two unnamed creeks. The tributary north of source 4654 flows parallel to Ewing Road and discharges its waters into Chartiers Creek. The tributary which source 4654 pollutes is south of the source and flows north of and parallel to Fort Pitt Road. This unnamed tributary discharges its waters into Robinson Run. The direction of the flow of the tributaries is southeast.
- b. Source 4654 is located on a side of a hill approximately 150 ft. above the stream level. The discharge, as it emerges from the mine, flows for approximately 40 ft. on relatively level ground and then cascades down into the unnamed tributary along Fort Pitt Road. The consistent flow of the discharge has notched a path through the exposed rock formations on the side of the hill.

2. Subsurface Drainage:

- a. Structure contours on the base of the coal on the W.P.A. maps indicate that the dip of the coal is to the southeast. The source receives water from the mined out areas northwest of the discharge. See Dwg. 4654 - B.
- b. Source 4654 drains the major part of the Fort Pitt Mine of the Pittsburgh Coal Company. The portion of the mine where the source is located has been conveyed by Pittsburgh Coal Company to H. A. Keisling.

C. Supplementary Laboratory Studies

- I. To determine if the acid-mine water discharge from source 4654 has been partially neutralized by cascading over the exposed rocks, a sample was taken at the bottom of the hill above the junction with the receiving stream. The laboratory analysis performed on the sample indicates that the only significant change in the mine water is the increase in hardness concentration. Probably the flow of acid-mine water over the exposed rocks picks up additional concentrations of such ions as calcium, magnesium, lithium and others to increase the hardness concentration.

D. Field Investigations and Abatement Methods

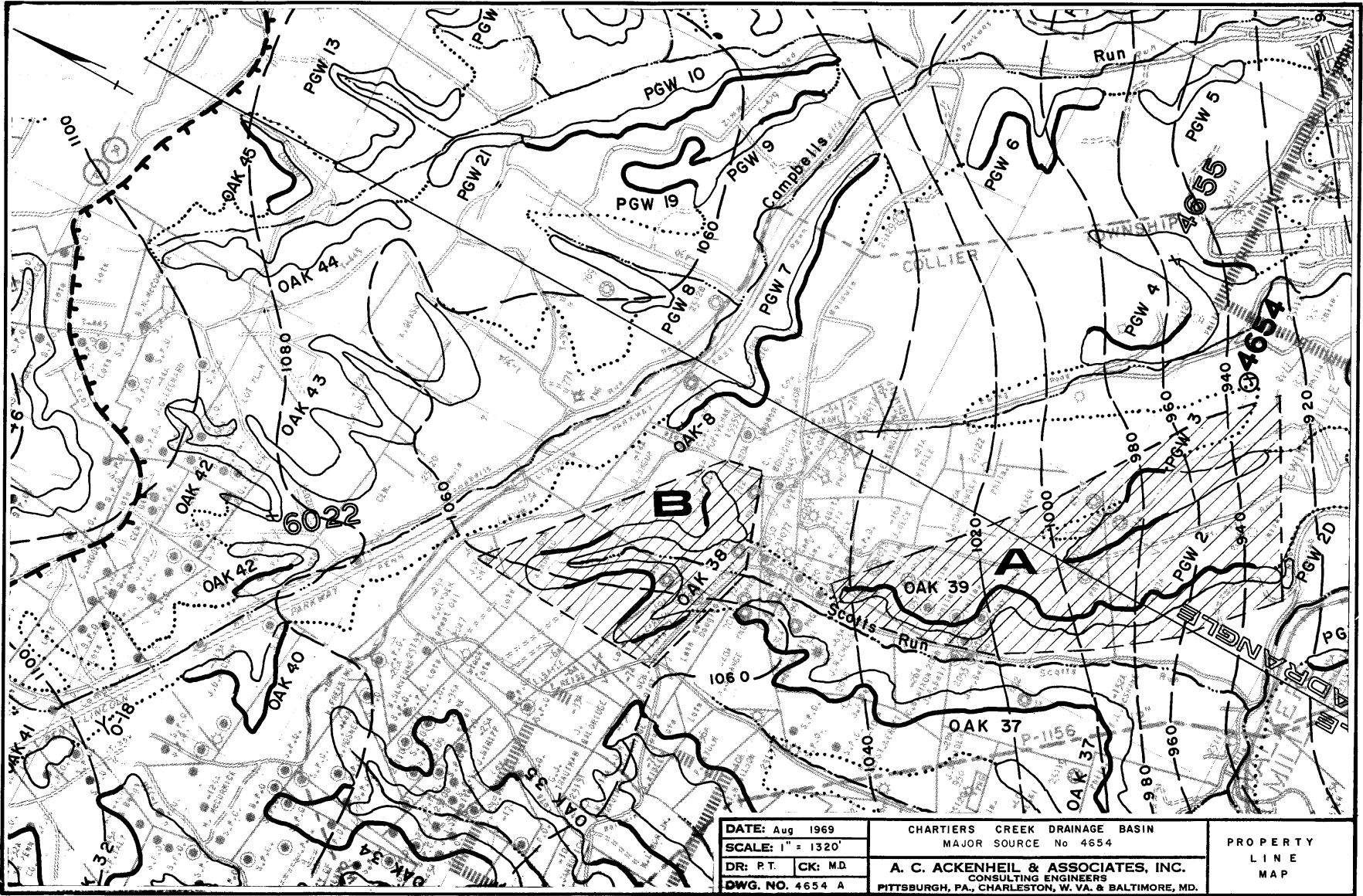
- I. Field studies were conducted north and northwest of source 4654. The updip portion of the mine was investigated to see if the drift openings and the shafts, as shown on the W.P.A. maps, are taking in fresh water. The results were negative. The coal in this particular area is approximately 100 ft. above the tributaries draining the area. Streams flowing in the head of valleys and intersecting the coal outcrop were investigated for loss of surface drainage. No loss was evident in any of the valleys.
2. The following strip mines were investigated as being possible sources of entry of water to source 4654: OAK 39, PGW 2, PGW 3, OAK 38, OAK 8-PGW 7, OAK 40 and OAK 41.
3. Area A:
 - a. Strip mine OAK 39 occupies approximately 30 acres, and aerial photographs indicate that it is unreclaimed. Strip mine PGW 2 is a partially reclaimed strip mine occupying approximately 16 acres. It has been graded in such a manner that the drainage is toward the highwall. The strip mine is heavily vegetated. Strip mine PGW 3 consists of 37 acres of partially reclaimed land graded so that drainage is toward the highwall. A high tension line occupies the center of the strip for approximately 3,500 ft.
4. Area B:
 - a. Strip mine OAK 38 occupies about 70 acres, of which 22 acres on the east side have been fully reclaimed and the remaining 48 acres have been partially reclaimed. The grading of the 48 acres is such that the natural drainage of the strip is away from the highwall. Therefore, in most probability this portion of the strip mine contributes little water to source 4654 and no correction work is necessary. The west side of this strip mine does not contribute water to source 4654.
5. Area C:
 - a. Strip mines OAK 8-PGW 7, OAK 40 and OAK 41 are also believed to be contributing water to this source. Recommendations for improvement of drainage through these strip mines have been included in source 4655. It is estimated that this correction work should reduce the flow at source 4654 by 25%.
6. To partially abate acid mine drainage from major source 4654, we recommend improving the drainage of the partially reclaimed strips and covering up the coal in the unreclaimed strips and providing drainage away from the highwall.

7. To abate the remaining acid mine drainage discharge emitting from source 4654, we recommend a modified limestone neutralization method. The laboratory analysis indicates that the acid mine water discharging from source 4654 has low iron concentrations. A rotating drum filled with limestone should reduce the acid concentrations from the discharge to a negligible factor. Pilot plant treatment tests of this method conducted by the U.S. Bureau of Mines in Pittsburgh lead to the following conclusions:
 - a. The terminal pH of water is usually between 6.0 and 6.5 when limestone is used as an acid neutralizing agent.
 - b. The terminal pH of above 8 can be obtained if:
 - (1) A large aeration surface for oxidation of ferrous iron is present
 - (2) CO₂ is removed from solution
 - (3) Abrasion can be induced to eliminate coating of limestone particles with precipitated solids and thus obtain continuous renewal of the reaction surfaces.
 - c. Using the limestone mainly as an acid neutralizer, the acid is neutralized almost instantaneously; therefore, high flow rates through the neutralizer are possible.
 - d. The conclusion drawn from the preliminary study is that adequate treatment of acid waters containing less than 165 ppm ferrous iron can be achieved at normal mine water temperatures (10 degrees C) with reaction residence time of less than five minutes.
 - e. The chemistry of the discharge and the topography over which it flows is conducive to abatement by the limestone neutralization method.
 - f. The maximum iron content of the discharge measured was 4.5 ppm. A large aeration surface is present for oxidation of iron and removal of CO₂ from solution. The average temperature of the discharge has been 12 degrees C.
8. The cost estimate for the design, construction and operation of the limestone neutralization facility will be presented upon the acceptance of this recommended method of abatement by the Department of Mines and Mineral Industries.

E. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
STRIP MINE OAK 39:		
Property owned by C.B. Nixon	\$46,500	9%
Improve drainage		
<hr/>		
Sub-Total:	\$46,500	9%
STRIP MINE PGW 2		
Property owned by C.B. Nixon	\$ 9,000	5%
Improve drainage		
<hr/>		
Sub-Total:	\$55,500	14%
STRIP MINE PGW 3:		
Property probably owned by C.B. Nixon	\$19,500	9%
Improve drainage		
<hr/>		
Sub-Total:	\$75,000	23%
STRIP MINE OAK 8-PGW 7, OAK 40, and OAK 41	*	25%
<hr/>		
TOTAL:	\$75,000	48%

*The estimated cost for reclamation of these strip mines has been included in the report for source 4655.



DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4654 A

CHARTERS CREEK DRAINAGE BASIN
 MAJOR SOURCE No 4654
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY
 LINE
 MAP



= MINED OUT AREA

(Source W.P.A. Map Carnegie Sheet 5 and 6)

