

MILLERS RUN INDEX

Source No.

Page No.

4971 - 4967 AI-152

MAJOR SOURCES 4971 and 4967
MILLERS RUN

A. Description of the Source Area

- I. Major source 4971 is located in South Fayette Township, Allegheny County, Pennsylvania, approximately 3,000 ft. southwest of the community of Cuddy Hill. Major source 4967 and minor source 4970 are located near the intersection of Routes 50 and 978 at Cuddy Hill. The location of these sources is shown on the enclosed Dwg. 4971 - A and on the CANONSBURG 7-1/2 minute quadrangle included in Appendix All.
2. The discharge of major source 4971 originates as artesian flow in an indented portion at the base of a low hill. Coal maps indicate that the discharge is probably emerging from a mine drain east of Gladden Mine butt entries No. 3 and 4 east. The discharge then forms a large pond which flows toward the railroad overpass and then discharges into Millers Run. Deposition of yellow-boy is evident in the pond and near the mouth of the discharge. The thickness of the yellow-boy in the pond could not be measured. It is possible that the total discharge, as measured under the railroad overpass, is composed of two separate discharges which form the pond. One could be emitting from a mine entry and the other from the mine drain. See Dwg. 4971 - B.
3. Approximately 3,000 ft. downstream from source 4971, Dolphin Run discharges its waters into Millers Run. Dolphin Run is polluted by an acid discharge from major source 4967. The effluent flows from an abandoned mine entry, probably the entry into Vulcan Mine. The area between the source and Dolphin Run has been excavated and a 12-in. diameter clay pipe was installed, thus eliminating a pond that had formed.
4. Associated with source 4967 is minor source 4970. The discharge of source 4970 emits from a highway cut (Pa. Rt. 50). Additional discharge is from a pond on the other side of the highway. The pond is in a shallow gully at the base of a deep mine refuse pile. The discharges merge at a concrete pipe on the pond side of the road and flow along the base of the refuse dump into Dolphin Run. The flow measured on June 14, 1968, was 300 gpm and the acid load was calculated to be 460 lbs. per day.
5. Calculations of the data show that the two major sources, 4971 and 4967, supply approximately 28.5% of the total average acid load contributed per day by the major sources into Chartiers Creek.

6. Thirteen months of field and laboratory studies indicate the following maximum, minimum and weighted average parameters:

Source 4971:	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	4.9	2.1	3.3
Flow (cfs)	9.45	1.0	3.1
Acidity (mg/l)	748	310	492
Iron (mg/l)	277.0	35.0	75.3
Manganese (mg/l)	11.25	2.2	5.3
Sulfate (mg/l)	3625	1075	2188
Hardness (mg/l)	1430	440	880
Acid Load (lbs/day)	17,520	3732	8275
Temperature (degrees C)	24	9	14.5

Source 4967:

pH	4.3	1.4	3.1
Flow (gpm)	675	20	161
Acidity (mg/l)	726	216	533
Iron (mg/l)	27.5	9.5	18.5
Manganese (mg/l)	6.5	0.6	3.3
Sulfate (mg/l)	2475	1325	1871
Hardness (mg/l)	1370	500	870
Acid Load (lbs/day)	4134	123	1039
Temperature (degrees C)	18.0	7.0	14.1

B. Drainage

- I. Surface Drainage: The source area is drained by a number of southeast flowing tributaries to Millers Run. Three of the larger tributaries are Dolphin Run, Fishing Run in Mohawk Valley, and an unnamed tributary that flows in Reissing Hollow. Field investigations show that in a number of places surface flow of Fishing Run has been interrupted by sink holes in Mohawk Valley. Dolphin Run is an alkaline stream, except for the portion below its primary contributor, source 4967. The Reissing Hollow tributary has several sink holes that interrupt surface flow.
2. Subsurface Drainage: Structure contours on the base of the Pittsburgh Coal, as presented on W.P.A. maps, show that the coal dips to the southeast at an average rate of approximately 1 ft. per 100 ft. However, structure contours constructed on the coal maps obtained from Pittsburgh Coal Company and other sources indicate that local variations, which influence the subsurface flow of the waters, are present. One of the major anomalies present on the bottom of the coal is east of Reissing. A low area extends for about 4,000 ft. eastward from Reissing. The Nos. 1 and 2 main entries occupy the center of this low area. It appears that water collected in the

northern half of the drainage area drains into the blind entries and then flows through the connecting entries between the Hastings Mine and Laurel Hill

Mines, then east in the Nos. 1 and 2 blind entries and probably in the Nos. 3 and 4 butt entries, and finally discharges at source 4971.

C. Supplementary Laboratory Investigation

I. In order to determine the effect on the acid water originating from the mine drain above source 4971 and flowing through the pond, samples of the water have been collected weekly at the mine drain since December, 1968. The maximum, minimum and average concentrations of ions are listed below:

Source 4971 - Mine Drain:	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
pH	6.8	2.7	4.8
Acidity (mg/l)	540	420	480
Iron (mg/l)	80.0	29.5	67.0
Manganese (mg/l)	10.2	2.2	6.2
Sulfate (mg/l)	3025	1250	2105
Hardness (mg/l)	1570	480	985
Temperature (degrees C)	22	7	12.6

2. In six of the nine measurements, alkalinity was present in small concentrations. The concentrations ranged between 0 and 36 ppm calcium carbonate for an average of 10.5 ppm.
3. In comparing the average concentration values of the two samples, it becomes evident that there is a slight effect on the acid water as it flows through the pond. The average pH at the point of origin is 4.8 whereas at the point of discharge it is 3.3. The average iron concentration at the point of origin is 67 ppm whereas it increases to 75.3 ppm at the point of discharge. Also, due to the flow of the discharge through the pond, the average temperature increased about 2 degrees C. No significant changes are evident in the other ions.

D. Field Investigations and Abatement Methods

I. Strip Mines:

a. Area A - CAN 1:

(1) A little over two miles northwest of source 4971, the two branches of Fishing Run in Mohawk Valley flow directly into sink holes and subsequently into the deep mine. The surface cover over the mine is estimated to be 12 to 15 ft. (Area A, Dwg. 4971 - A.) The disrupted surface flow of the two

branches was measured to be about 300 gpm. To date, this is the highest flow entering the deep mines that has been observed in this area. This represents about 20% of the combined average flow for the two major sources. Additional minor flows of water were also observed. These minor flows will be eliminated when surface restoration and channel improvements are carried out as recommended.

- (2) The west branch of Fishing Run originates from springs in the valley walls and flows for about 500 ft. until it reaches the portion of the valley which is pocketed with sink holes. There is no flow beyond the sink hole area into the main branch of Fishing Run. The area containing the sink holes is about 800 ft. long and 200 ft. wide. The sink holes vary in size from 4 ft. square to 100 ft by 25 ft., the latter entirely blocking the stream channel.
- (3) The east branch of Fishing Run is an unreclaimed strip mine for about 1800 ft. upstream from the confluence of the two branches. Beyond this point the valley is pitted by sink holes for approximately 500 ft. The surface flow of the branch drains directly into a sink hole before reaching the strip mine area. Three large ponds are present in the unreclaimed strip mine. There is no surface drainage connection between the east branch and the main branch of Fishing Run.
- (4) The main branch of Fishing Run below the confluence of the east and west branches has no surface flow. The grandstands, parking area and the buildings for the Pittsburgh International Drag Way were built on a fill placed over the stream channel. Surface water is drained from the fill area by a series of surface inlets connected to a large-diameter culvert placed under the fill. It is estimated that the maximum height of the fill is 30 ft.

b. Area B - CAN I:

Valleys to the left and right of the main branch near the confluence of the east and west branches are blocked by strip mine CAN I. (See Area B, Dwg. 4971 - A.)

c. Area C - CAN 2:

Area C is at the southern end of the drag strip area and is about 20 ft. below the grade of the raceway. It is now storage area for old mine equipment. Surface water from the drag race area emits from a culvert and flows into mine opening 0-4. The estimated flow during the site investigation was 15 gpm. An acid discharge flow, estimated

at 25 gpm, is emitting from opening 0-5 and flows southward through the area into Fishing Run. Sealing of mine entry 0-4 should stop the flow of water into the deep mine. Sealing of entry 0-5 should prevent the discharge of acid water. Channel improvement will have to be made to carry the unpolluted surface water through this area. See Area C, Dwg. 4971 - A.

d. Area D - CAN 3:

Strip mine CAN 3, which is on the east side of Mohawk Valley, has an approximate 10 acre area which is unreclaimed. The remaining 14 acres are graded so as to drain toward the exposed highwall. See Area D, Dwg. 4971 - A.

e. Area E - CAN 5:

Mine opening 0-6, which is open, is on the southern portion of strip mine CAN 5 which is located on the east side of Dolphin Run. Strip mine CAN 5 generally is graded to drain away from the highwall. See Area E, Dwg. 4971 - A.

f. Area F - CAN 6:

Field investigation and aerial photographic interpretation of the strip mines northwest of sources 4971 and 4967 have indicated that strip mine CAN 6 is unreclaimed and occupies about 25 acres. A highwall is exposed on the southern part of the strip mine. See Area F, Dwg. 4971 - A.

g. Area G - CAN 17:

To the east of strip mine CAN 6 is strip mine CAN 17 which is unreclaimed. Strip mine CAN 17 occupies about 17 acres and is shown as Area G on Dwg. 4971 - A. OAK 64, which is east of CAN 17, is a reclaimed strip mine.

h. Area H - OAK 1:

Strip mine OAK I is north of Dolphin Run and east of strip mines OAK 64 and CAN 17. Strip mine OAK I occupies about 38 acres and is classified as being a randomly reclaimed strip mine. The western portion of the strip is reclaimed, but a small pond and an opening, 0-10, were observed on the reclaimed portion. Two portions of this strip mine are unreclaimed and are directly south and west of mine dump OAK 8D. Strip mine OAK I is shown as Area H on Dwg. 4971 - A.

i. Area I - OAK 2:

East of strip mine OAK I is strip mine OAK 2, which is classified as randomly reclaimed. Strip mine OAK 2 occupies approximately 37 acres, of which 24 are graded so that drainage is toward the highwall. Strip mine OAK 2 is shown as Area I on Dwg. 4971 - A.

2. Mine Shafts:

a. Area J - S-2 and S-3:

In two places south of Primrose, on the G. M. Kelso estate and the J. T. Reynolds property, water was observed seeping into abandoned, open airshafts S-2 and S-3. The flow was estimated to be 10 to 15 gpm per shaft. Presently the shafts are being used as trash and garbage dumps. See Area J, Dwg. 4971 - A1.

b. Area K - S-5, S-6 and S-7:

(1) Mine shaft openings S-5, S-6 and S-7 were investigated in the field as possible sources for additional surface water to enter the deep mine complex. These shafts are identified as Area K on Dwg. 4971 - A and 4971 - A1.

Shaft S-5 is north of Reissing on the 155-acre plot owned by P. Ciaffoni. No water flow into the shaft was observed; however, the brick work around the corner of the two shafts is broken and the slope entry is open.

Shaft S-6 is one-half mile north of Venice, Pennsylvania, adjacent to Rt. 980. This shaft is filled.

Shaft S-7 is about three-fourths mile west of Reissing on the 195-acre property owned by D. Kemp, et. al. The shaft is covered with a concrete slab and no flow into the shaft was apparent at the time of our field investigation.

(2) Mine shaft opening S-5 should be repaired to prevent the possibility of surface water entering the slope opening. Mine shaft openings S-6 and S-7 will be visited during the restoration of drainage work in Mohawk Valley and Dolphin Run and if their condition has deteriorated, corrective measures will be recommended.

3. Sink Holes:

a. Area L - Hercules Powder Road:

On C. E. Campbell's 200-acre parcel a small stream near the Hercules Powder Company storage facilities flows over a rocky channel bottom under the access road into the storage areas. Fractures observed in the channel bottom were interrupting the flow of water in the channel. Estimated surface cover over the coal is between 20 to 30 ft. The flow measured in the channel was about 18 gpm. See Area L, Dwg. 4971 - A.

b. Area M - Reissing Hollow:

North of Reissing on the 100-acre parcel belonging to W. C. Bakzrowski, a very shallow sink hole occurs in a small stream valley. The flow was measured to be 10 gpm on February 10, 1969, the driest month in the history of western Pennsylvania. Combined with the coal structure in the vicinity of Reissing, the flow appears to be a direct contributor to 4971 due to the interrupted surface drainage. See Area M, Dwg. 4971 - A.

c. Area N - County Line:

Near the Washington-Allegheny County line, on acreage owned by Pittsburgh Coal Company, a tributary flows through a culvert beneath the road but enters a shallow sink hole before discharging into the main stream. The flow into the sink hole was measured to be 10 gpm. The water is impounded in the shallow sink hole and the original stream channel has been abandoned. See Area N, Dwg. 4971 - A.

4. Improving the natural drainage through the strip mines and sealing mine openings and mine shafts should reduce the loss of surface water into the deep mine complex surrounding sources 4971 and 4967 north of Miller Run by 39%.

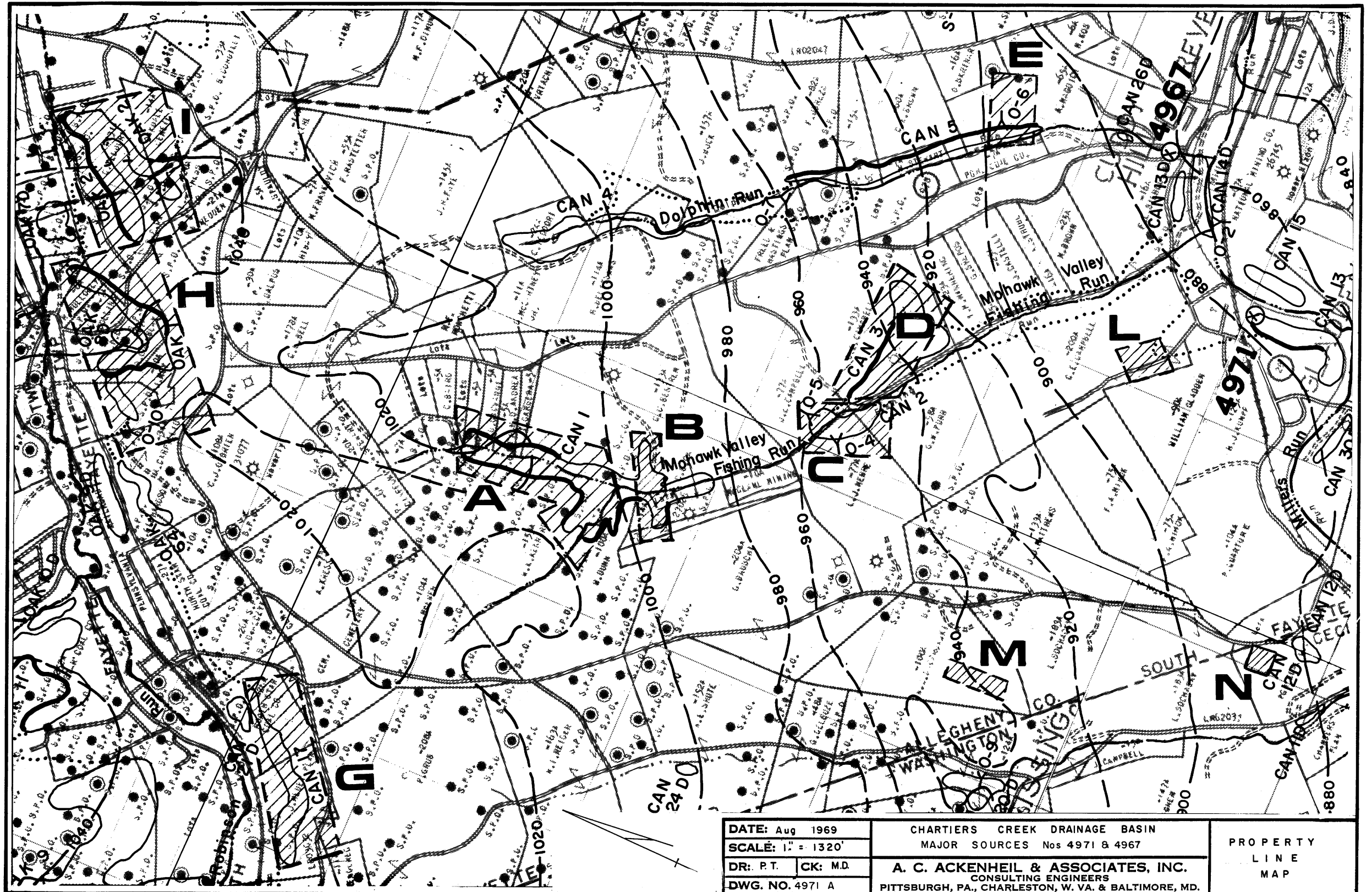
E. Cost of Methods of Abatement

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>STRIP MINES</u>		
Area A (CAN 1): See Quick Start Project No. 1 (Restoration of Mohawk Valley. For convenience a copy of Quick Start 1 is included in Part II, Appendix E	\$70,000	20%
Sub-Total:	\$70,000	20%
Area B (CAN 1): C. C. Bentrem (133 acres), C. C. Campbell (14 and 7 acres), G. Bruschi (204 acres)		
Improve drainage through strip mine CAN 1	8,000	2%
Sub-Total:	\$78,000	22%
Area C (CAN 2): L. J. Menre (77 acres), J. Campbell (77 acres)		
Seal mine openings 0-4, 0-5 and improve existing stream channel	7,000	1%
Sub-Total:	\$85,000	23%
Area D (CAN 3): C. E. Campbell (133 acres), J. E. Campbell (77 acres), I. M. Mannering (23 acres), L. J. Menre (77 acres), G. W. Purr (58 acres)		
Improve the drainage through strip mine CAN 3	15,500	1%
Sub-Total:	\$100,500	24%

Description	Estimated Cost	Estimated Per Cent Flow Reduction
AREA E (CAN 5): A. Magoich (65 acres)		
Seal opening 0-6	\$ 2,000	1%
Sub-Total:	\$102,500	25%
AREA F (CAN 6): Series of 10 lots, Pittsburgh Coal Co. (3), F. C. McGrew (3)		
Improve drainage through strip mine CAN 6	\$38,000	2%
Sub-Total:	\$140,500	27%
Area G (CAN 17): J. Meuey Plan (5), North Star Coal Co. (26 acres)		
Improve drainage through strip mine CAN 17	\$27,000	2%
Sub-Total:	\$167,500	29%
Area H (OAK 1): J. Roy (10 acres), R. Luerbeay (27 acres), C. Collins (7 acres), R. Mullooly (6 acres), Unknown (10 acres), C. Teddori (131 acres)		
Improve drainage through strip mine OAK 1 and seal opening 0-10	\$18,500	1%
Sub-Total:	\$186,000	30%
Area I (OAK 2)		
Improve drainage through strip mine OAK 2	\$13,000	1%
Sub-Total:	\$199,000	31%

<u>Description</u>	<u>Estimated Cost</u>	<u>Estimated Per Cent Flow Reduction</u>
<u>MINE SHAFTS</u>		
Area J (S-2 & S-3): J. T. Reynolds and G. M. Kelso Estate		
Fill air shafts S-2 and S-3 and provide surface drainage away from the shafts	\$ 4,000	3%
Sub-Total:	\$203,000	34%
Area K (S-5):		
Repair mine shaft opening S-5 north of Reissing (155 acre plot of P. Ciaffoni)	\$ 2,000	1%
Sub-Total:	\$205,000	35%
<u>SINK HOLES</u>		
Area L (Hercules Powder Co. Road): C. E. Campbell (200 acres)		
Provide surface flow for a stream over an area of rock fractures	\$ 11,500	2%
Sub-Total:	\$216,500	37%
Area M (Reissing): W. C. Bakzrowski (100 acres)		
Provide a surface channel by filling the sink holes and grading	\$ 3,000	1%
Sub-Total:	\$219,500	38%

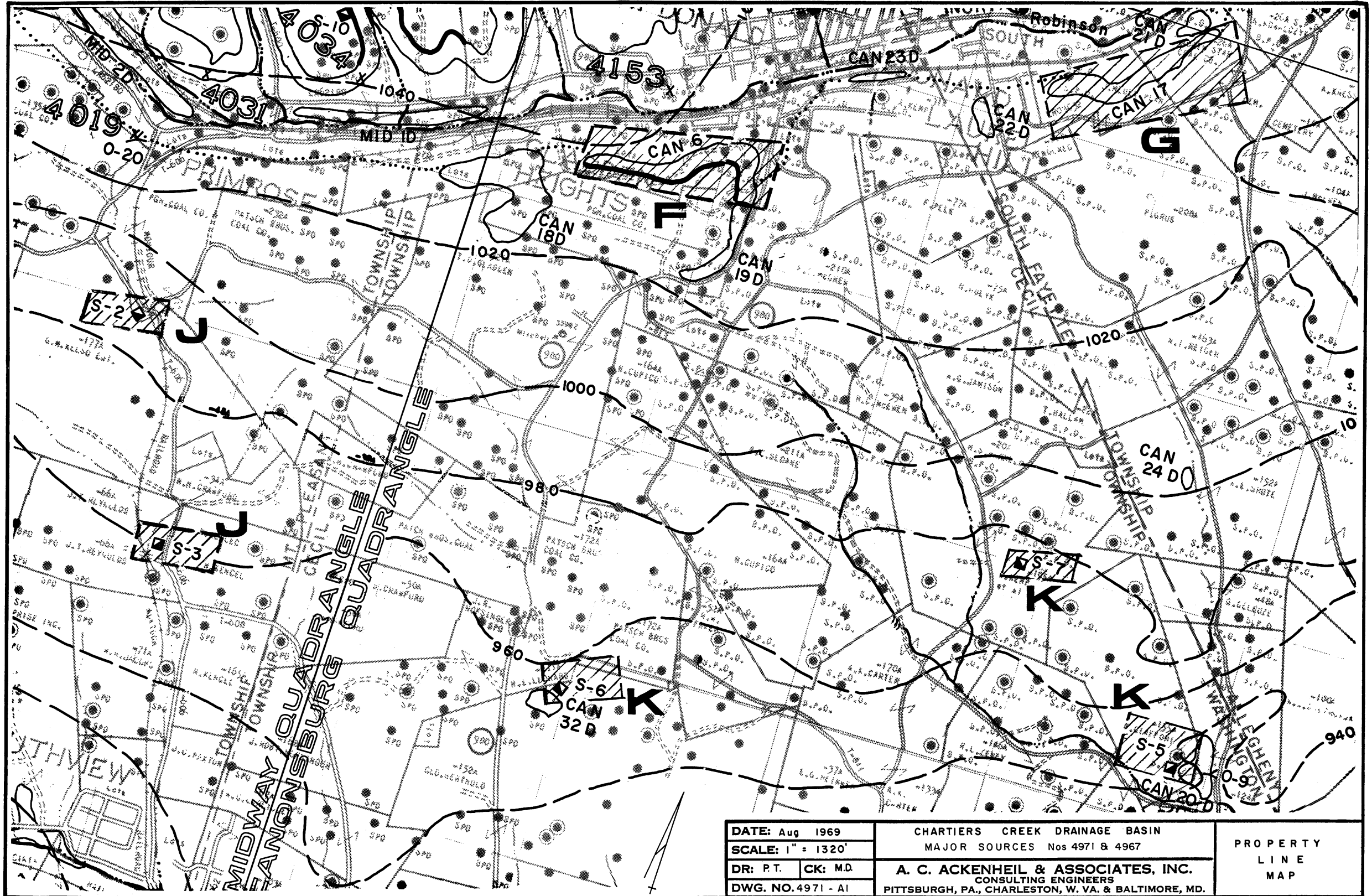
Description	Estimated Cost	Estimated Per Cent Flow Reduction
Area N (County Line): Pitts- burgh Coal Company		
Regrade channel above and below sink hole to establish natural drainage and fill in sink hole	\$ 5,500	1%
TOTAL:	\$225,000	39%



DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4971 A

CHARTIERS CREEK DRAINAGE BASIN
 MAJOR SOURCES Nos 4971 & 4967
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

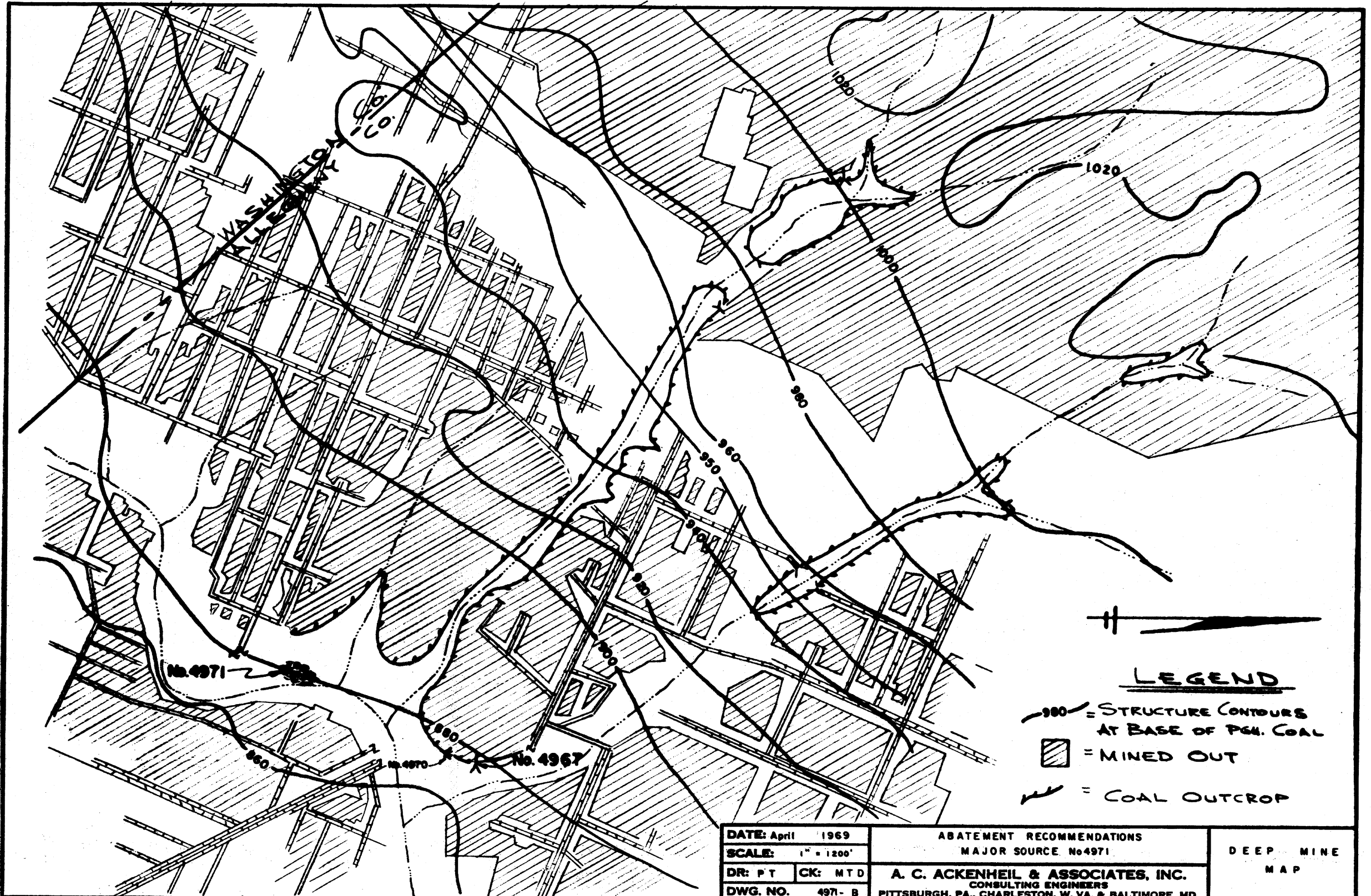
PROPERTY
 LINE
 MAP






DATE: Aug 1969
 SCALE: 1" = 1320'
 DR: P.T. CK: M.D.
 DWG. NO. 4971 - AI

CHARTIERS CREEK DRAINAGE BASIN
 MAJOR SOURCES Nos 4971 & 4967
 A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

PROPERTY
 LINE
 MAP



LEGEND

-  = STRUCTURE CONTOURS AT BASE OF PERM. COAL
-  = MINED OUT
-  = COAL OUTCROP

DATE: April 1969
 SCALE: 1" = 1200'
 DR: PT CK: MTD
 DWG. NO. 4971 - B

ABATEMENT RECOMMENDATIONS
 MAJOR SOURCE No. 4971
A. C. ACKENHEIL & ASSOCIATES, INC.
 CONSULTING ENGINEERS
 PITTSBURGH, PA., CHARLESTON, W. VA. & BALTIMORE, MD.

DEEP MINE
 MAP