# MINE DRAINAGE ABATEMENT SURVEY

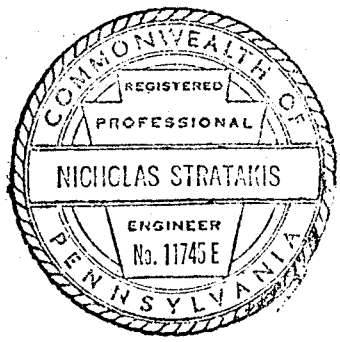
# YELLOW CREEK WATERSHED

# BUTLER COUNTY, PENNSYLVANIA

Commonwealth of Pennsylvania
Milton J. Shapp, Governor

Department of Environmental Resources
Maurice Goddard, Secretary

October, 1974

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October 30, 1974

Commonwealth of Pennsylvania
Department of Environmental Resources
512 Education Building
Harrisburg, Pennsylvania

Attention: Dr. Maurice K. Goddard, Secretary

Re: Mine Drainage Abatement Survey
Yellow Creek Watershed
Our File No. 7053
Project No. SL-158

Gentlemen:

We are pleased to present our Report on the Yellow Creek Watershed Mine Drainage Abatement Survey, Project No. SL-158, located in Muddy Creek and Lancaster Townships, Butler County. This Report contains our findings, recommendations and a preliminary cost estimate for the work needed to be performed to minimize the discharge of acid mine drainage into Yellow Creek and its tributaries.

We appreciate the opportunity of serving as your Consultant and assure you of our continued cooperation throughout the implementation of this program.

Respectfully submitted,

GREEN ENGINEERING COMPANY

N. Stratakis, Vice President
Environmental Engineering Division

NS:dag

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## 1.0 INTRODUCTION

The Yellow Creek Watershed, located in Muddy Creek and Lancaster Townships of Butler County, Pennsylvania, has been an area of intensive mining activity since the late nineteenth century. While no subsurface mining activity is being performed at present, extensive strip mining operations are still taking place. Drainage from these strip mining operations and their associated refuse piles, and drainage from abandoned deep mines has severely degraded stream quality within the watershed.

In December of 1970 the Pennsylvania Department of Mines and Mineral Industries, presently part of the Pennsylvania Department of Environmental Resources, engaged Green Engineering Company to conduct an engineering survey of the Yellow Creek Watershed under the "Operation Scarlift" land reclamation program. The survey was performed for the purpose of determining the extent of pollution within the watershed due to acid mine drainage and for determining appropriate abatement measures that could be utilized to reduce the pollution load. The data collected during the survey should be utilized in preparing construction plans and specifications for the recommended drainage control facilities within the study area.

## 2.0 DESCRIPTION OF THE STUDY AREA

The Yellow Creek Watershed lies within Muddy Creek and Lancaster Townships of Butler County, Pennsylvania, within the Appalachia Plateau and is a maturely dissected region where the tributary streams such as Yellow Creek, have cut the uplands into numerous narrow ridges with steep hillsides rising from generally narrow valley bottoms.

Yellow Creek has its source in Muddy Creek Township and flows nearly due south 7.2 miles to its confluence with Little Connoquenessing Creek approximately 2 miles northeast of Harmony, Pennsylvania. This Basin is roughly rectangular in shape with a length of approximately 7 miles and an average width of approximately 2.5 miles. The drainage area above the mouth of Yellow Creek is approximately 16.4 square miles. Although the stream pattern of the basin could be considered dendritic, it has some rectangular characteristics with a predominant number of its tributaries flowing into the main channel from a northwesterly direction. Yellow Creek has three principal tributaries, Little Yellow Creek and two unnamed tributaries dubbed here as Bauder Road Tributary and Kelly Road Tributary. Each of these tributaries drains an area of approximately one to two square miles. Plates 1 and 2 delineate the location of the study area and the streams within the Study Basin.

The Yellow Creek Drainage Basin has experienced extensive mining activity since the late nineteenth century. The valley bottom is characterized by deep mine openings from dog hole country bank mines to extensive deep mining operations similar to the Stanford Number 1 and 2 mining complex. There are no active deep mines in operations working at present. The hillsides are characterized by extensive strip mines, several of which are still being actively mined within the Basin. During the course of the study, many of the older un-restored strip mines were stripped again for an underlying seam of coal and then restored. This restoration should have a measurable impact on the improvement of the water quality in Yellow Creek.

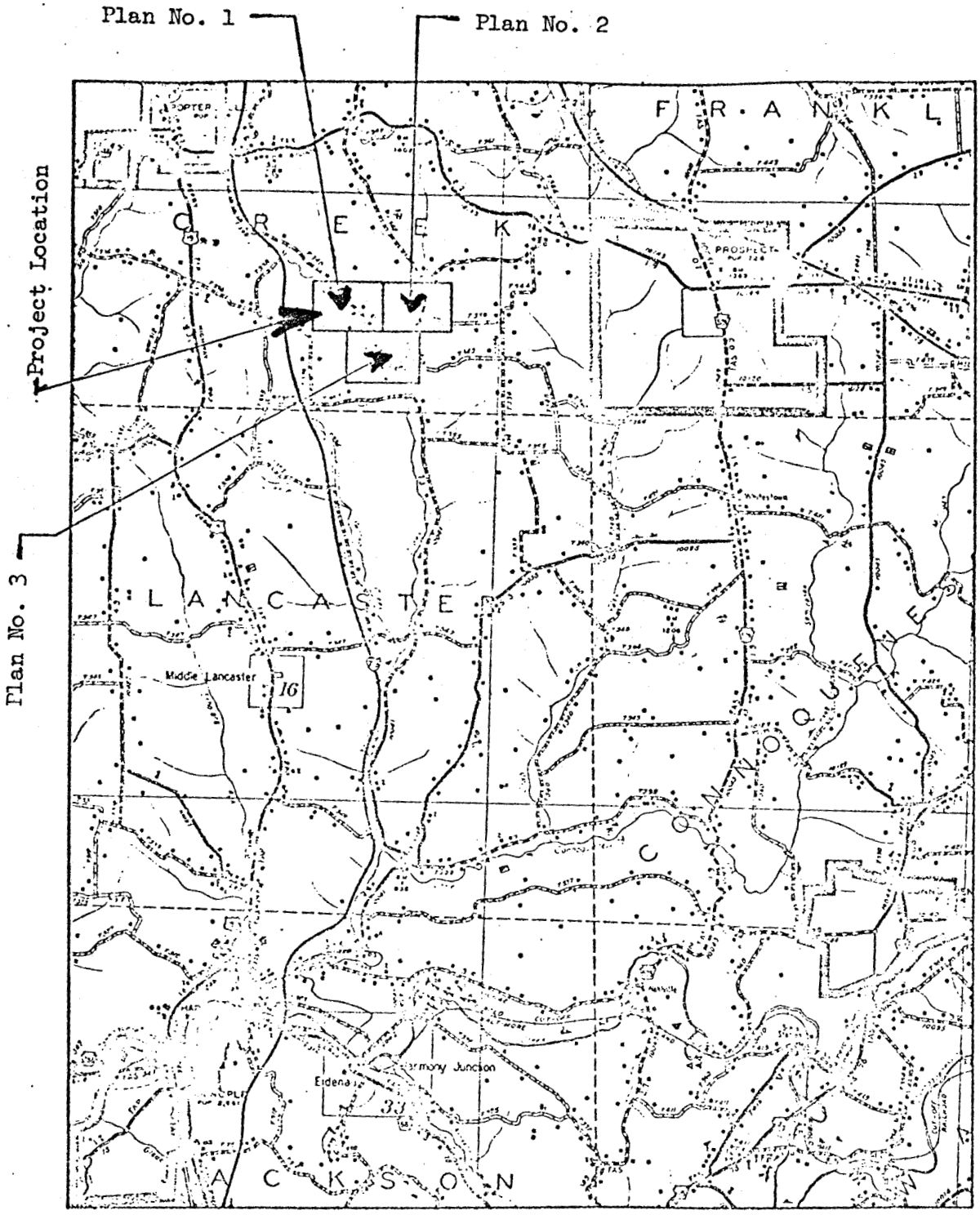



PLATE - 1

# VICINITY MAP

YELLOW CREEK DRAINAGE BASIN - PROJECT LOCATION

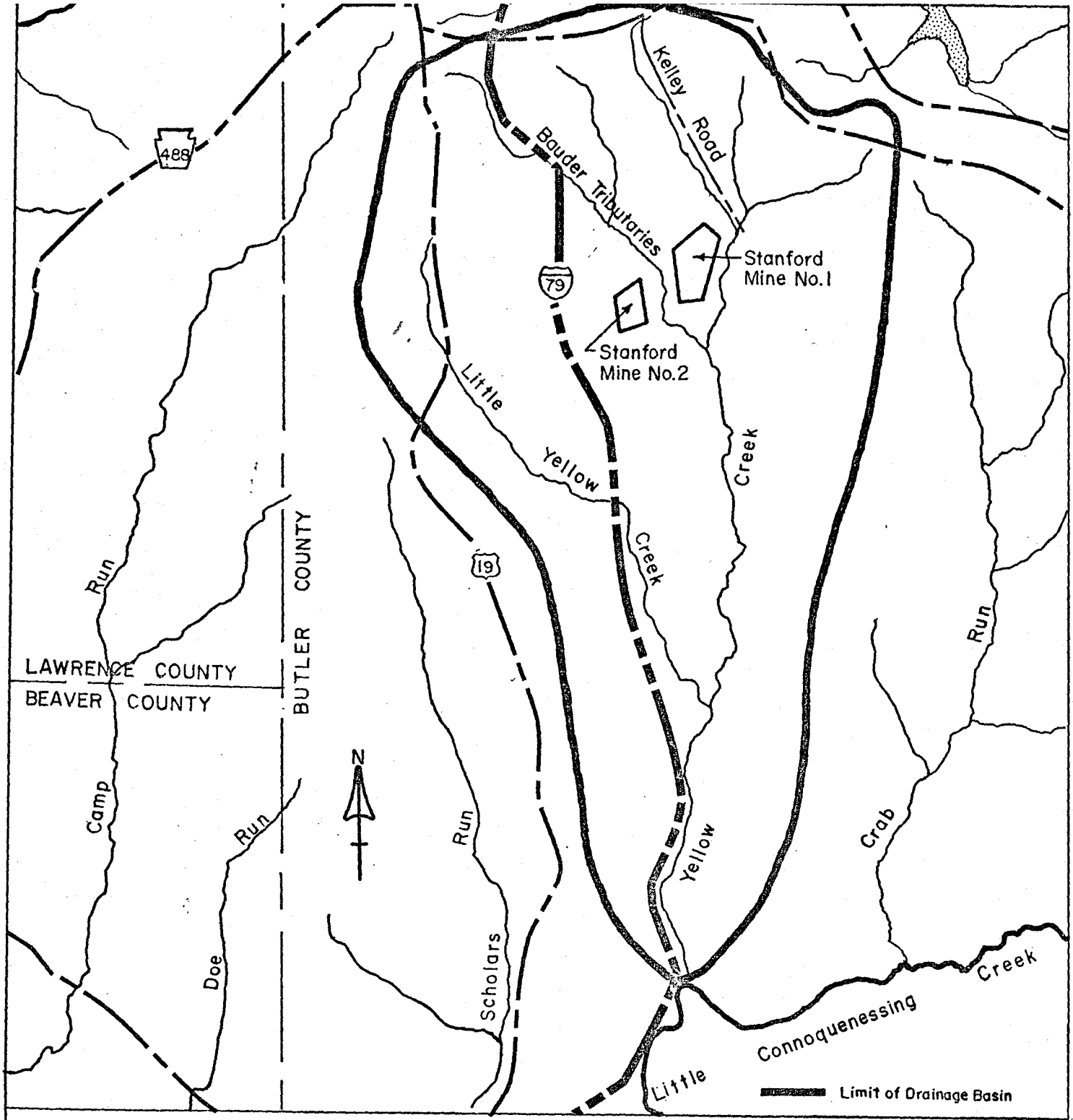



Plate 2

# Location & Drainage Area Map of Yellow Creek Drainage Basin

MUDDY CREEK & LANCASTER TOWNSHIPS · BUTLER COUNTY · PENNSYLVANIA

Green Engineering Company · Consulting Engineers · Sewickley Pennsylvania

## 3.0 METHODOLOGY

In January of 1971, preliminary investigations of the Yellow Creek Watershed began. Field Engineers walked the Yellow Creek Valley and its tributaries during a period from January to April to locate and identify sources of mine drainage. Measurements of pH and flow were taken at selected discharges and at regular intervals along the streams. Flow determinations were made with a stop watch and container at small discharges and weirs were installed wherever possible at larger discharges. Flow was also measured by cross sectional area and by using a Gurley Velocity Meter to determine flow in the stream bed itself. In all, over 260 monitoring stations were established for preliminary investigation.

Subsequent investigations were instituted at regular intervals throughout 1971 in a continuing atempt to pinpoint the major sources of mine drainage. In addition to field pH and flow measurements, samples were obtained and sent to the Seewald Laboratory in Williamsport, Pennsylvania for analysis of pH, alkalinity, acidity, total iron concentration, ferrous iron and sulfate concentration. After completion of these analyses, a sulfate balance was performed as a reliability check. In addition to the field explorations and sampling program, all available mine maps, aerial photographs and mine drainage permits issued within the study area were evaluated to determine the extent of mining within the Yellow Creek Drainage Basin.

Subsurface information needed for the proper design of mine seals and grout curtains was obtained by awarding a contract for core borings and pressure testing in accordance with contract documents prepared

for this purpose. This contract was awarded by the Department of Environmental Resources, with resident inspection performed by Green Engineering Company.

## L.0 GEOLOGY OF STUDY AREA

Physiographically, Yellow Creek Basin is in the Pittsburgh Plateaus Section of the Appalachian Plateaus Province. The area is characterized by a series of steep-sided ridges bisected by narrow valleys. The crests of the numerous ridges rise, in general, to elevations between 1,200 to 1,300 feet above sea level. Valley floors vary in elevation between 850 to 900 feet, the higher elevations being in the northern area of the Basin. The normal topographic relief in the project limits is in the magnitude of 250 to 350 feet.

Tributary streams arranged in dendritic patterns provide the drainage of the east-west cross valleys of the Basin. These streams empty into the southerly flowing Yellow Creek, which in turn joins Little Connoquenessing Creek approximately two miles above Harmony Borough. Drainage from the area ultimately reaches the Ohio River by way of Connoquenessing Creek.

### Bedrock Geology

The rock strata within the project area are sedimentary in origin. Outcropping rocks include the tower portion of the Conemaugh and upper portion of the Allegheny formations. These are members of the Pennsylvanian Period and the Carboniferous System.

Conformably overlying the Allegheny formation, the Conemaugh formation consists of a sequence of shale, sandstone, thin discontinuous

limestone, and coal beds. The predominant Conemaugh rocks in the project area are shales and sandstones which are gradationally variable to claystone and siltstone. The members of the formation present are restricted to those of the Lower Mahoning below the Brush Creek coal horizon.

The bedrock units exposed in the highwalls of strip mines and other outcroppings indicate that the shales are deeply weathered and vary from sandy to clayey. The Mahoning sandstones here are shale and appear grayish when fresh, to buff colored when exposed or, weathered.

Members of the Allegheny formation present and outcropping in the Yellow Creek Basin extend from the Upper Freeport Coal to those strata lying between the Middle and Lower Kittanning Coals. Similar to the Conemaugh formation, the Allegheny consists of a variable sequence of shale, sandstone, limestone and coal seams. However, the coal beds of the Allegheny are extremely valuable and have been extensively exploited in the Basin.

Coal beds of influence within the project limits, in descending order, are the Upper Freeport, Lower Freeport, Upper Kittanning, Middle Kittanning and Lower Kittanning. These are commonly referred to as the E, D, C', C and B seams, respectively.

The Generalized Geologic Column (Plate 3) at the end of this section, depicts the conformable occurrence of the geologic strata in the project area. In addition, the occurrence of the geologic formations within the Basin are shown on the Aerial Geology Map, (Plate 4). Included thereon, are the regional structural contours drawn on the Vanport

Limestone. These have been extracted from the publication, "Geology and Mineral Resources of the Butler and Zelienople Quadrangles, Pennsylvania, U.S.G.S. Bulletin 873."

Mining

Generally, deep mining within the Basin was completed prior to 1936, however, a few exceptions such as the Stanford Mines were active into the mid 1960's.

On the other hand, strip mining activities are presently in operation within the Basin. Much of the past strip mining was completed prior to the advent of stripping regulations. Consequently, the scars of past stripping operations remain in many areas.

For the most part, deep mining operations appear to have been confined to the coals of the Middle Kittanning and underlying seams. Again, there are exceptions and "country bank" openings in the higher coal seams are in evidence. Some deep mines in the higher coals have now been obliterated by stripping operations completed after the deep mines were abandoned.

In several areas of the Basin, as many as three strip mine levels are visible. However, these are predominantly restricted to the extreme northern end of the Basin and the normal, pattern would appear to be confined to. the stripping of the Upper and Lower Freeport seams.

Structure

The area of the project is located on the southeastern limb of the Homewood anticline. The anticline plunges southwesterly in the direction of Ellwood City, Beaver County, and the axis of this structure

crosses the northwestern corner of the Zelienople Quadrangle some five to six miles north and west of the project area.

Measurements taken of the bedding attitudes in the Basin indicate the axis of the anticline strikes between N 340° W and N 355° W with the Geologic Structure plunge varying from 7°S to 15° S. Therefore, the major rock strata dip is toward the westerly side of the Yellow Creek Valley walls and the north side of the major cross valleys.

Ground Water

In accordance with the direction of the rock strata dip, groundwater was observed on the west and north walls of the valleys where springs and/or seepage from deep mines were observed. Extensive ponding in strip mines not backfilled was not observed, and it is concluded that the major volumes of gravitational water normally finds outlet in the abandoned deep mine workings.

The springs which were noted are considered to be the result of "Semi-perched" conditions created when gravitational waters encounter a less permeable strata such as a clayey shale. In these cases, the groundwater moves along the less permeable strata and emerges from the subsurface as springs on the hillside.

The greatest concentration of flows observed appear in the areas of the Stanford Mines Complex. Here the extensive mine workings act as reservoirs into which gravitational waters flow and are stored to be released through mine openings and along the crop line of the adjacent strip mines.

Core Boring and Pressure Testing Data

Following the determination that reclamation work within the Basin should be confined to the areas adjacent to and including the Stanford

Number 1 and 2 deep mines and strip mines, a core boring and pressure testing program was completed to more accurately define the characteristics of the bedrock strata above and below the coal seam. This work was accomplished by Geo-Mechanics, Incorporated under contract SL-158-101.5 with the Pennsylvania Department of Environmental Resources. The Contractor's activities were supervised and inspected by Green Engineering Company personnel as the work progressed during August and September, 1972.

Core Boring Statistics

During the time core boring work was in progress, a total of sixteen (16) holes were drilled into the undisturbed rock strata adjacent to mine drifts between the mine workings and the crop line. The aggregate depth drilled throughout the project was 892.0 linear feet. Diamond drill core samples of the rock were obtained from the borings and these, together with the soil samples of the overburden, were logged in detail by the Consultant's Geologists. The geologist's logs are included in this report in Appendix "A". The hole numbers shown on the logs are not consecutive, as it was found that certain of the scheduled borings were not necessary for the evaluation of the rock strata.

Pressure Testing Statistics

In addition to obtaining core samples of the bedrock and samples of the overburden soils, pressure testing of the bedrock, where considered pertinent, was completed to further define the characteristics of the strata. This was accomplished for the purpose of establishing a need for grout curtains to seal the coal seam along the crop line adjacent to the mine workings.

The pressure testing was performed in the field using an NX-size double packer with the packers spaced five (5) feet apart and connected with a perforated pipe.

The tests were performed in two (2) parts. First, the packer was set at the prescribed depth and a Flow Test run for five (5) minutes at a pressure determined by the Engineer. Secondly, a Holding Test was performed immediately after the Flow Test. The pressure gauge was read as to the amount of time that was required for the water pressure to drop in 10 pound increments.

The pressure tests were confined for the most part to the strata immediately above the coal, the coal seam and the strata subjacent to the coal seam. On the other hand, the holding tests were conducted to include the rock strata up to a maximum of twelve (12) feet above the top of the coal.

A summary of the pressure testing results is shown in the following Table, and Work Sheets submitted by the Contractor are included in Appendix "B".

DATA ON FLOW TESTS

| Boring No. | Depth From | To | Rock Type | Press. Gauge PSI | Water Injected Gals./Min. |
|---|---|---|---|---|---|
| 2 | 50.0 | 55. | Coal | 50 | 23.9 |
| | 55.0 | 60.0 | Siltstone | 50 | 20.1 |
| | +8.5 | 53.5 | Coal | 50 | 26.0 |
| | 53.5 | 58.5 | Claystone | 30 | 13.3 |
| 4 | 49.5 | 54. | Coal | 20 | 16.8 |
| | 54.5 | 59.5 | Claystone | 24 | 17.0 |
| 5 | 35.0 | 40.0 | Siltstone | 50 | 00.0 |
| | 40.0 | 45. | Coal | 50 | 19.8 |
| | 45.0 | 50.0 | Claystone | 50 | 20.0 |
| 21 | 59.0 | 64.0 | Coal | 50 | 19.4 |
| 22 | 65.0 | 70.0 | Coal | 50 | 21.3 |
| | 70.0 | 75.0 | Claystone | 50 | 25.2 |

From the results of the pressure testing, it was determined that the permeability of the various strata range from 625 to 1,800 feet per year. This is indicative of the fact that the rocks have a capability to transmit water at rates varying from moderate to high.

Summary

A study of the core boring logs indicates that claystone, shale, sandstone and siltstone strata are the rock types present within the zone which will be directly affected by the mine pools after sealing has been completed. As shown on the boring logs, numerous vertical fractures were noted in the cores and the relatively thin bedded nature of the strata is evidenced by the extremely low Rock Quality Designation (RQD) measurements predominating throughout the cores.

The combination of thin bedding and fracturing is conducive to transmission of water through the rock strata. The pump testing results verified this condition; therefore, it will be necessary to include grout curtains at the more critical points along the crop lines.

For purposes of determining the hydrostatic head which will be built up within the mine workings after sealing, several factors must be considered:

1) The Stanford Mines are, in fact, isolated areas, since strip mining and deep mining have been completed to the north, south, northeast and east of their locations.

2) Ample flows of water from these adjacent mines preclude the possibility of a continuous head being built over a large area.

3) The maximum elevation that the mine pool will be allowed to reach in the Stanford No. 1 Mine is between 1,100 and 1,105. A control facility should be provided in the design to regulate flow at this elevation.

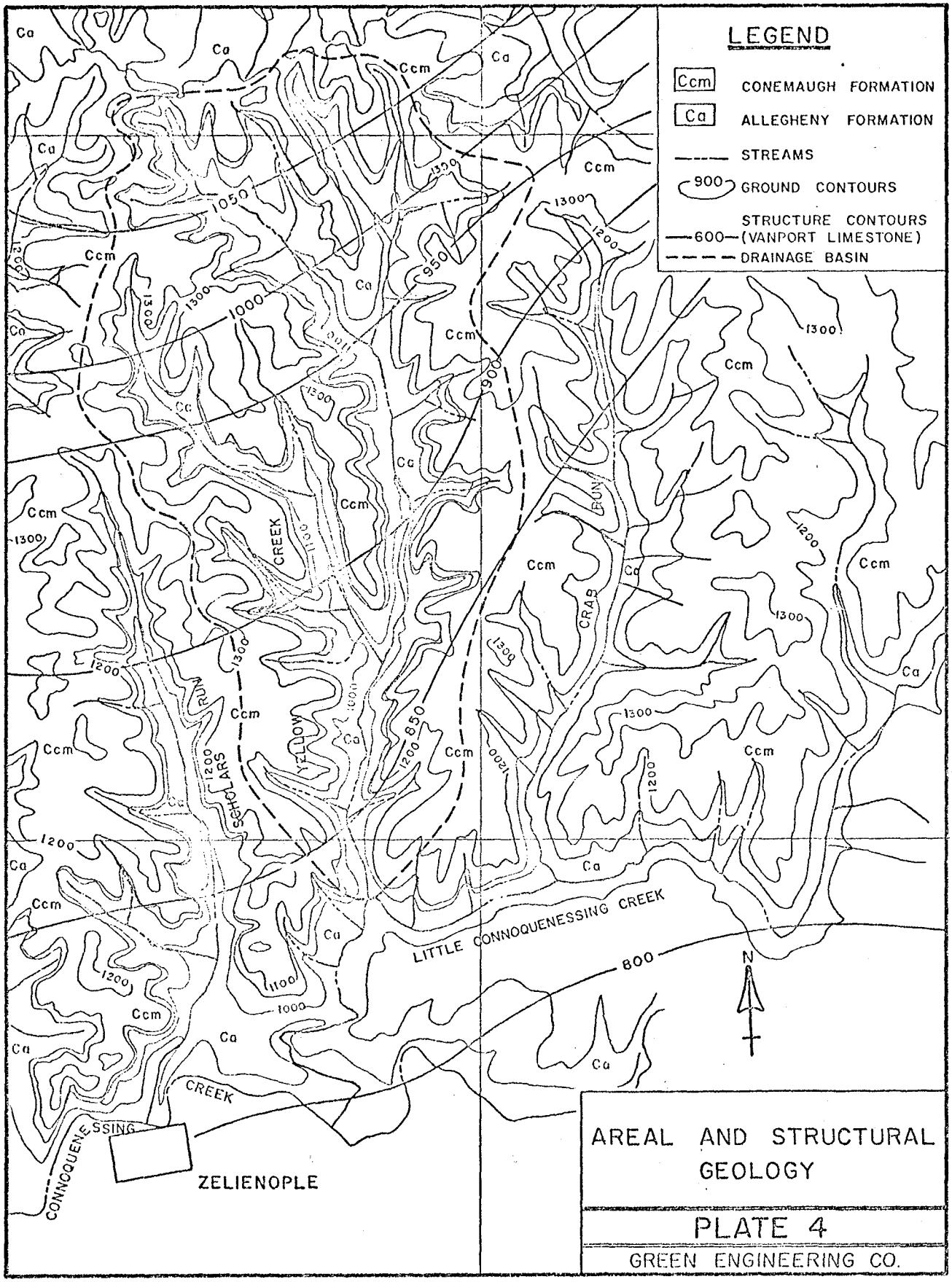
4) The rock strata dips away from the openings of the Stanford Number 2 Mine; that is, the coal elevation of the openings is at the highest point in the mine.

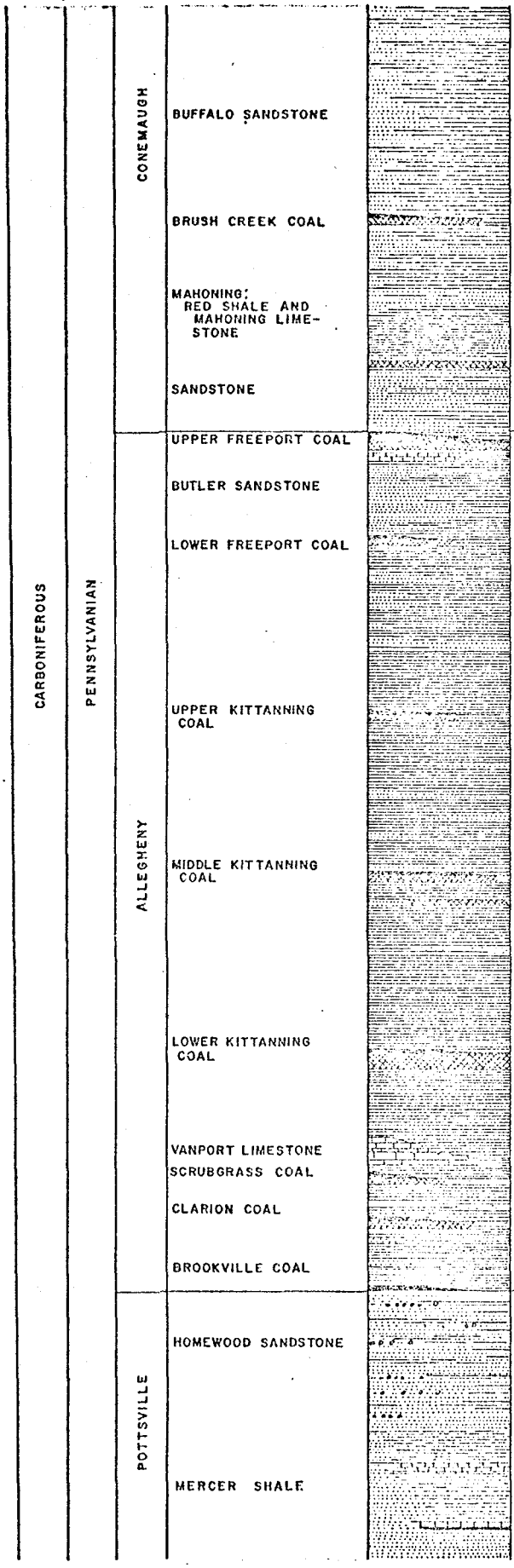
5) The pool elevation in the Stanford Number 2 Mine should also be regulated at 1,100 to 1,1105 by inclusion of a control facility in the design.

As a result of these factors, the maximum hydrostatic head of water within each of these mines will be equivalent to the difference in elevation between the highest points and/or the elevation of the control facility and the lowest elevation of the coal at crop line.

The control facility should be a structure similar to an air-seal lock.

In the Stanford Number 1 Mine, the hydrostatic head is anticipated to be the difference between elevation 1,105 and elevation 1,060, or 45 feet. In terms of pounds per square inch, this is the equivalent of 19.5 p.s.i. Almost identical conditions will result in the Stanford Number 2 Mine. It is probable, therefore, that a successful grout curtain can be achieved since the head will not be excessive.


LEGEND
Ccm CONEMAUGH FORMATION
Ca ALLEGHENY FORMATION
STREAMS
900 GROUND CONTOURS
STRUCTURE CONTOURS
600 (VANPORT LIMESTONE)
DRAINAGE BASIN
LITTLE CONNOQUENESSING CREEK
CONNOQUENESSING CREEK
ZELIENOPLE
SCHOLARS RUN
YELLOW CREEK
CRAB RUN
N
AREAL AND STRUCTURAL GEOLOGY
PLATE 4
GREEN ENGINEERING CO.




# GENERALIZED GEOLOGIC COLUMN

VERT. SCALE 1"=50'

## PLATE 3

GREEN ENGINEERING CO.

## 5.0 STREAM QUALITY EVALUATION

The field sampling and analysis program initiated for this study revealed a proliferation of mine drainage discharges from abandoned strip mines and deep mines scattered throughout the watershed, but the major concentration of pollutants enter the stream near the headwaters of Yellow Creek above the junction of Yellow Creek and the Bauder Road Tributary. Samples taken near the mouth of Yellow Creek, while high in iron and sulfate concentrations, exhibit a residual alkalinity. The residual alkalinity is attributed to alkaline tributaries entering Yellow Creek below the major mine drainage discharges located in the headwaters of the Basin.

The abandoned Stanford Number 1 and 2 mining complex, located in the headwaters of the basins and consisting of deep mines, strip mines and refuse piles, was determined to be the major source of acid mine drainage pollution. Flow measurements and chemical composition indicated that these discharges had the largest flows, highest concentration of iron, sulfate and acidity, and the lowest pH.

### Harmony Borough Water Authority

The Harmony Borough Water Authority obtains its source of water from Little Connoquenessing Creek. The water treatment plant intake is located approximately 2.1 miles below the confluence of Yellow Creek and Little Connoquenessing Creek. The Authority has submitted an analysis of the raw water for the years 1955 to 1968 inclusive and for the year 1974 and claims that the acidity has been increasing because of acid mine drainage from abandoned coal mines located in the Yellow Creek Drainage Basin.

A tabulation of the average pumping rates and associated acidity and alkalinity expressed in milligrams per liter for the years 1955 to 1972 and for the year 1974 is given in the following Table. These results were supplied by the Harmony Borough Water Authority.

HARMONY BOROUGH WATER AUTHORITY
AVERAGE RAW WATER ANALYSIS DATA

| Year | Total Water Pumped Gallons/day | pH | Raw Water Analysis Acidity (1) mg./L. | Alkalinity (2) mg./L. | Excess (1) Acidity mg./L. | Excess (2) Alkalinity mg./L. |
|---|---|---|---|---|---|---|
| 1955 | 42,400 | | 15 | 20 | | 5 |
| 1956 | 39,800 | | 15 | 8 | 7 | - |
| 1957 | 43,800 | | 10 | 15 | | 5 |
| 1958 | 50,200 | | 16 | 10 | 6 | - |
| 1959 | 49,400 | | 13 | 16 | | 3 |
| 1960 | 50,800 | | 15 | 15 | | |
| 1961 | 51+,100 | | 16 | 19 | | 3 |
| 1962 | 53,000 | | 13 | 16 | | 3 |
| 1963 | 51+,400 | | 17 | 19 | | 2 |
| 1964 | 60,900 | 6.8/7. | 20 | 22 | | 2 |
| 1965 | 83,700 | 6.8/7. | 20 | 21 | | 1 |
| 1966 | 80,700 | | 19 | 23 | | 4 |
| 1967 | 86,000 | 6.8/8. | 27 | 22 | 5 | |
| 1968 | 97,500 | 6.4/7. | 27 | 23 | 4 | |
| 1969 | | 6.2/6. | 23 | 23 | | |
| 1970 | | 6.2/7. | 23 | 24 | | 1 |
| 1971 | | 6.4/7. | 23 | 24 | | 1 |
| 1972 | | 6.6/7. | 24 | 27 | | 3 |
| 1974 | 125,000 | | 23 | 22 | 1 | |

(1) Acidity expressed as calcium carbonate
(2) Alkalinity expressed as calcium carbonate

This Table indicates that the daily water consumption has increased from 42,400 to 125,000 gallons per day between 1955 and 1974. The Table also indicates that the acidity and alkalinity slightly increased between 1955 and 1964 and that these constituents have remained fairly constant for the years 1964 to 1974. The Harmony Borough Water Authority's analysis also indicates, in general, an excess alkalinity from 1955 to

1966 of approximately 3 milligrams per liter. During the years of 1967 through 1974 there was, in general, an excess acidity of approximately 2 milligrams. per liter. The analysis of alkalinity performed for this study generally confirms the concentration range being reported by the Authority. The excess of alkalinity or acidity in the range of 2 to 3 milligrams per liter would be classified as insignificant, since a precision of $\pm$ 1 milligram per liter and an accuracy of $\pm$ 3 milligrams per liter expressed as $CaCO_3$ is reported by Standard Methods for the tests.

PH measurements indicate that the water quality as measured by this parameter has remained stable for the years of 1964 to 1972. A more detailed analysis submitted by the Authority also indicates that the pH is higher during the summer months, a period of low flows. This occurs because of the photosynthesis process of algae using carbon dioxide.

The present laws regulating strip mine and deep mine coal operations should prevent any further increase in acidity due to future mining operations, and the proposed abatement plan will provide for a decrease in the acidity of Yellow Creek. Therefore, the overall alkalinity - acidity balance from the Yellow Creek Watershed should be improved.

Stream Quality

During the initiation of this study, Field Engineers walked the Yellow Creek Basin in an effort to locate discharges from abandoned strip mines and deep mines. The field reconnaissance was performed from January to April, 1971, and 261 sampling stations were selected for pH and flow measurements.

Appendix "C" lists the pH, flow measurements and general location of the 261 sampling stations, and Plate 5 shows the location of the sampling stations which were selected during this first sampling program. This Plate is color-coded to indicate the pH of discharges into Yellow Creek and its tributaries and the pH of the streams. The sampling station numbers marked with an "X" denotes a stream sampling station and a number without an "X" denotes a discharge sampling station discharging into a natural stream. The color code used on the Plate is as follows:

| | |
|---|---|
| Blue | pH 7.0 - 8.5 |
| Green | pH 6.0 - 7.0 |
| Orange | pH 1+.0 6.0 |
| Red | pH 2.0 - 4.0 |

The Plate shows that 24 out of the 261 sampling stations had a pH of 2.0 to 1+.0 with 20 out of 24 stations being discharges from abandoned and deep mines, which include seepages and overland flow. The remaining 4 stations monitored resultant stream quality. Most of the acid mine discharges were located in the headwaters of the Basin and, more specifically, emanated from the Stanford Number 1 and 2 mining complex located near the confluence of Bauder Road Tributary and Yellow Creek.

Sampling stations monitoring direct discharges and resultant water quality from the Stanford Number 1 and 2 mining complex with a pH of 2.0 to 4.0 are as follows

| Sampling Stations Stanford No. 1 | Sampling Stations Stanford No. 2 |
|---|---|
| 197X | 171 |
| 200X | 175X |
| 203 | 176 |
| 201+ | |
| 232 | |

The foregoing acid mine drainage discharge sampling stations had the highest flows and the most degrading effect upon stream quality within the Basin. The discharges had the distinct orange-red coloration of an acid mine discharge which stained the road ditches along Bauder Road and caused the standard "Yellowboy" coloration of the Bauder Road Tributary to Yellow Creek.

Subsequent investigations were instituted at regular intervals throughout 1971 in an attempt to pinpoint the major sources of mine drainage. Appendix "D" shows the results of flow measurements; pH, acidity, alkalinity, total iron, ferrous iron and sulfate for three sampling periods of March 29 to April 16, 1971; May 28 and June 14, 1971.

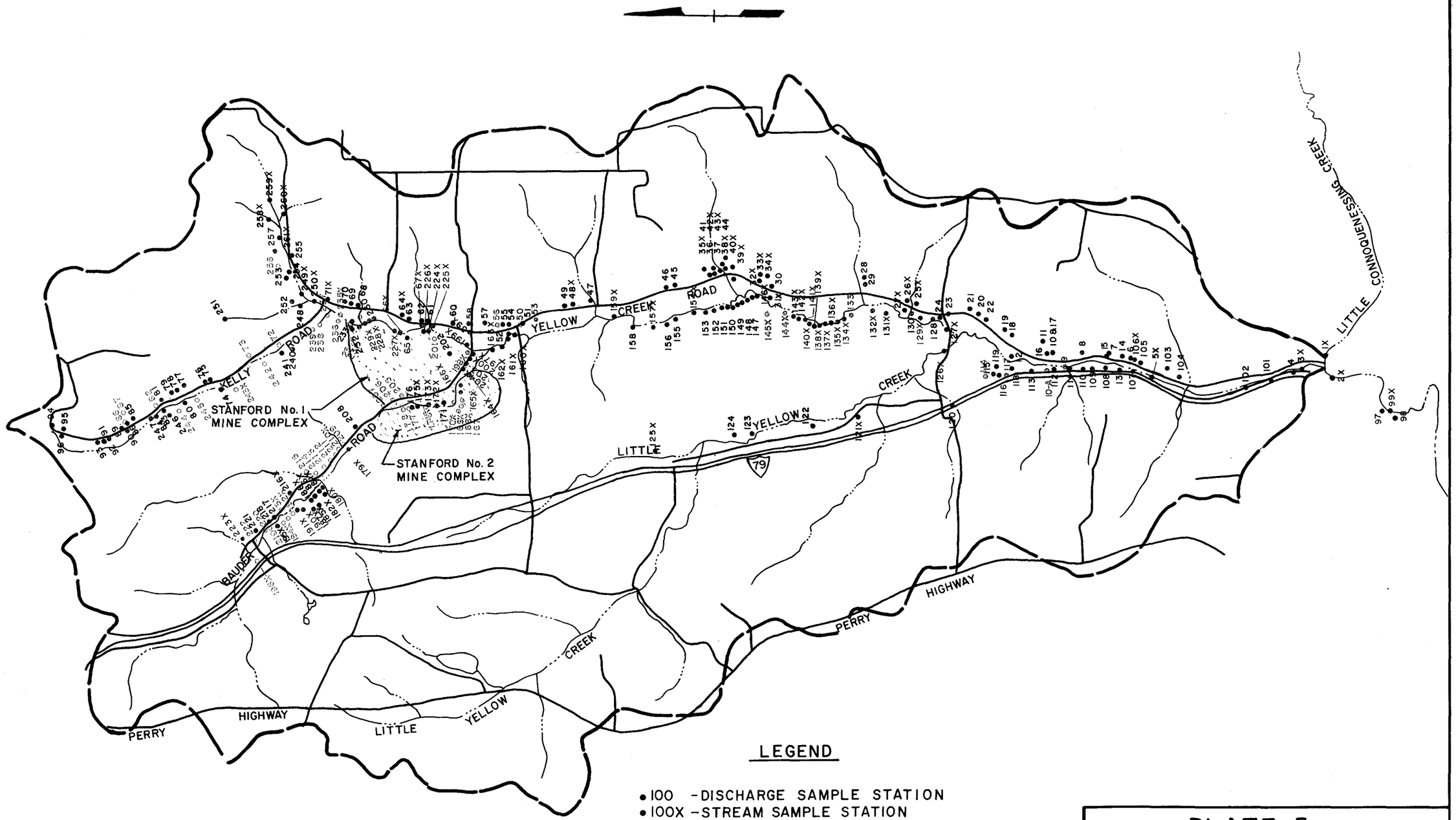
The May 28 and June 14, 1971 samples were used to develop Plate 6, which gives the water quality of Yellow Creek, Bauder Road Tributary and Kelly Road Tributary in pounds per day. This data was used to develop the sulfate balance which was used to verify the validity of the chemical constituents and flow measurements.

An evaluation of the stream water quality parameters measured during the study for the sampling stations noted on Plate 5 to Pennsylvania Department of Environmental Resources and United States Public Health Service recommended water quality standards is as follows:

| Parameter | DER Stream Standards | USPHS Drinking Water Standards | Stream Sampling Stations Average Water Quality Measured | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 71X | 237BX | 235X | 199AX | 164X | 163X | 141X | 3X |
| pH | 6.0-8.5 | - | 7.0 | 5.8 | 6.7 | 4.6 | 6.0 | 4.3 | 4.6 | 6.9 |
| Total Iron | 1.5 mg/L | 0.3 mg/L | 3.3 | 2.9 | 3.0 | 10.7 | 3.6 | 16.3 | 6.5 | 1.1 |
| Sulfates | - | 250 mg/L | 340 | 360 | 365 | 420 | 420 | 430 | 370 | 185 |

Stream sampling station 163X located below the confluence of Yellow Creek and its Bauder Road Tributary exhibited the worse water quality. This station measured the combined effects of the Stanford Number 1 and 2 mining complex plus other miscellaneous abandoned mines in the headwaters. The degraded stream water quality persisted to the confluence of Yellow Creek and Little Yellow Creek. Below this confluence Yellow Creek's water quality improved because of the dilution and alkaline waters of Little Yellow Creek and other small alkaline tributaries.

The sampling and analysis program for pH, acidity, alkalinity, total iron and sulfate indicate that the water quality at the mouth of the Yellow Creek would be an acceptable source of water for a municipal water supply system. The 'average sulfate concentration of 185 milligrams per liter is higher than would be found in a watershed without coal mining, but is still less than the 250 milligrams per liter set by the U. S. Public Health Service as the maximum concentration limit for potable water.

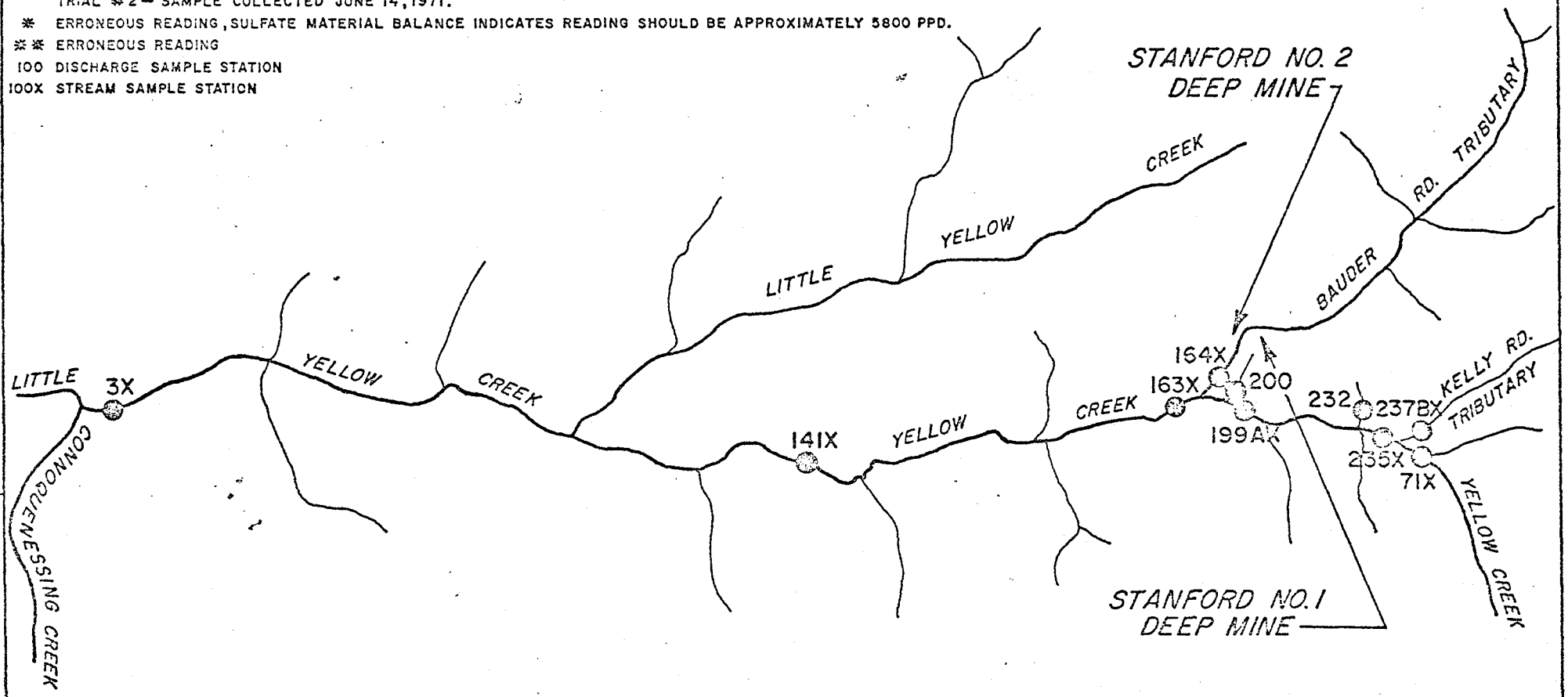



# PLATE 5

YELLOW CREEK DRAINAGE BASIN
POLLUTION ABATEMENT PROJECT
LOCATION OF SAMPLING STATIONS

| STATION NO. | 3X | | 141X | | 163X | | 164X | | 200 | | 199AX | | 232 | | 235X | | 237BX | | 71X | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRIAL NO. | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| DATA | | | | | | | | | | | | | | | | | | | | |
| P H | 6.7 | 7.0 | — | 4.6 | 4.0 | 4.6 | 5.7 | 6.2 | 2.6 | 2.9 | 5.1 | 4.1 | 2.7 | 3.0 | 6.3 | 7.1 | 5.7 | 5.9 | 6.9 | 7.0 |
| G. P. M. | 5584 | 6840 | — | 2870 | 2659 | 1590 | 1147 | 640 | 6.8 | 20 | 1929 | 980 | 130 | 87 | 941 | 870 | 1094 | 545 | 792 | 325 |
| ACIDITY PPD | — | — | — | 2757 | 1468 | 76 | 220 | — | 114 | 257 | 1065 | 351 | 1014 | 522 | — | — | 105 | — | — | — |
| ALKALINITY PPD | 1340 | 29 | — | — | 0 | 0 | — | 61 | 0 | 0 | — | 0 | 0 | 0 | 203 | 397 | — | 118 | 494 | 187 |
| TOTAL IRON PPD | 47 | 1.4 | — | 224 | 718 | 191 | 62 | 20 | 16 | 47 | 463 | 16** | 218 | 167 | 6 | 57 | 53 | 11 | 29 | 14 |
| SULFATE PPD | 14072 | 160 | — | 12746 | 15316 | 7250 | —* | 3226 | 212 | 725 | 9257 | 5143 | 2496 | 1566 | 3840 | 4072 | 5251 | 2093 | 3517 | 1209 |

TRIAL #1 — SAMPLE COLLECTED MAY 28, 1971.
TRIAL #2 — SAMPLE COLLECTED JUNE 14, 1971.
* ERRONEOUS READING, SULFATE MATERIAL BALANCE INDICATES READING SHOULD BE APPROXIMATELY 5800 PPD.
** ERRONEOUS READING
100 DISCHARGE SAMPLE STATION
100X STREAM SAMPLE STATION




GREEN ENGINEERING COMPANY CONSULTING ENGINEERS

PLATE 6

## 6.0 PROPOSED ABATEMENT PROGRAM

The proposed abatement program which would provide the most effective water quality improvement in the Yellow Creek Drainage Basin consists of the elimination of acid mine drainage discharges from the Stanford Number 1 and 2 mining complex. This will require the sealing of all mine openings, the restoration, including revegetation of two adjacent strip mine areas, the installation of grout curtains, and the disposal of mine refuse piles adjacent to the Bauder Road Tributary.

Drawings 1, 2 and 3 show the general location of the proposed grout curtains, the refuse piles which require disposal, and the general location of the deep mine openings which were located during this study and which will require seals. These drawings also show the location of the core borings performed and the contours of the Upper Kittanning Coal as interpreted from the core borings.

We recommend that the following acid mine drainage pollution abatement program be initiated in two phases:

-Phase I will consist of the installation of deep mine seals and grout curtains in the Stanford Number 1 and 2 mining complex.

-Phase II will be initiated after the results of the deep mine sealing have been evaluated and will generally consist of the removal of and burial of refuse piles against the highwalls of Strip Mine "A" and "B", regrading of refuse areas and strip mine reclamation.

PHASE I - Deep Mine Sealing Program

A. Stanford Number 1 Mine Complex

The sixteen (16) drift entries located during the study should be hydraulically sealed and one (1) controlled overflow installed to insure that the mine pool does not rise above an elevation of 1,105 feet. If the mine pool rises above this elevation, seepage may occur through the backfill of the reclaimed strip mine north and west of the deep mines. (See Drawings No. 1, 2 and 3)

A grout curtain should also be constructed above the highwall of Strip Mine Area "A" to insure that no excessive seepage will occur through this highwall. (See Drawing No. 3)

B. Stanford Number 2 Mine Complex

The three (3) drift entries located during this study should be hydraulically sealed and one (1) controlled overflow installed to insure that the-mine pool does not. rise above an elevation of 1,100 feet. If the mine pool rises above this elevation, seepage may occur through the backfill of the partially reclaimed strip mine to the north of Strip Mine Area "B". (See Drawing No. 3)

A grout curtain should also be constructed above the highwall of Strip Mine Area "B" to insure that no excessive seepage will occur through this highwall. (See Drawing No. 3)

PHASE II - Strip Mine Reclamation Program

Phase II should be initiated after all of the deep mine seals have been installed and the mines filled with water. The Department of Environmental Resources should observe the highwalls and deep mine openings for any signs of seepage. If all the deep mine seals have been effective in reducing the pollution load and volume of drainage, then Phase II should be implemented.

Phase II will consist of the removal, burial and regrading of deep mine refuse piles; and the complete reclamation of Strip Mine Areas "A" and "B" as shown on Drawings Nos. 1, 2 and 3.

A. Deep Mine Refuse Pile Removal and Burial

The refuse piles designated Area "D", "E" and "J" should be removed and buried against the highwall of Strip Mine Area "B". Refuse piles designated Area "F", "G" and "H" should be removed and buried against the highwall of Strip Mine Area "A". Area "C" and "C-l" are waste piles which are predominantly clay and should be used to seal the bony. (See Drawings No. 1, 2 and 3)

After the refuse piles are removed and buried, the disturbed areas should be regraded, covered with soil and revegetated with grass.

B. Strip Mine Reclamation

Strip Mine Area "A" and "B" should be terrace backfilled and revegetated with a grass cover to minimize infiltration and percolation of surface water through the spoil material. The location of the Strip Mine Areas to be reclaimed are shown on Drawing Number 3.

## 7.0 PRELIMINARY COST ESTIMATE

A cost estimate for the implementation of the proposed Pollution Abatement Project for the Stanford Number 1 and 2 Mine Complex is as follows:

PHASE I - Deep Mine Sealing Program

A. Deep Mine Sealing

The nineteen (19) mine openings scheduled to be sealed are mostly caved at the portal; therefore, the installation of these mine seals will be performed through drilling procedures. After the mine seals have been placed, pressure grouting operations will be performed in the adjacent strata, 50 feet each side of the opening. The pressure tests indicate an average porosity for grout intake of 15 percent with moderate permeability ranging from 625 feet per year to 1,800 feet per year.

B. Controlled Overflow

Two mine entries will be converted to air seal lock type of controlled overflow structures.

The estimated cost includes all necessary materials, labor and equipment to perform the work plus the cost of all access roads and the restoration thereof.

C. Pressure Grout Curtains

Pressure grout curtains are proposed to be placed between the mine seal grouting in seepage areas above the highwalls of Strip Mine Area "A" and "B". We estimate that the drilling operations will be performed on ten (10) foot centers and that the average grout intake void space is estimated at 15 percent.

The estimated costs include the drilling and pumping costs for the placement of the grout to a height of ten (10) feet above the coal and the costs for the construction of all access roads and their restoration. It is estimated that approximately 3,300 lineal feet of grout curtain between mine seals, at a cost of approximately $106 per lineal foot will be required for control of seepage

| | |
|---|---|
| Sub-Total: PHASE I | $772,000 |

PHASE II - Strip Mine Reclamation Program

A. Strip Mine Reclamation

Strip Mine Reclamation work will include erosion and sedimentation control; clearing and grubbing; dewatering; terrace backfilling and grading; construction of diversion ditches, flumes, rip-rap channels, endwalls; and revegetation.

A detailed estimate of these costs is as follows:

| | |
|---|---|
| Erosion and Sedimentation | $5,000 |
| Clearing and Grubbing(5acres@$400/acre) | $2,000 |
| Dewatering Impoundments(3 each at $500/each) | $1,500 |
| Backfilling and Grading(65,00 cy at $0.60/cy) | $39,000 |
| Rip Rap Channel(150sy at $20/sy) | $3,000 |
| Revegetation(20 acres at $700/acre) | $14,000 |
| TOTAL | $64,500 |

B. Refuse Pile Disposal

The refuse pile disposal will consist of the removal, transportation and burial of 3,400 c.y. of refuse piles in the strip mine areas. Refuse piles "E" and "J" will be removed and buried against the highwall of Strip Mine Area “B”. Refuse piles “F”, “G” and “H” should be removed and buried against the highwall of Strip Mine Area "A". The cost per cubic yard will include all labor, materials, equipment, revegetation and miscellaneous work for the implementation of this work item.

| | |
|---|---|
| $3,400 cy at $3/cy | $10,000 |
| Sub Total Phase II | $74,700 |
| TOTAL for PHASE I and PHASE II | $846,700 |

## 8.0 SUMMARY AND CONCLUSION

It is the recommendation of this study that the greatest benefit to water quality in the Yellow Creek Watershed could be achieved by eliminating the acid mine drainage from the Stanford Numbers 1 and 2 mine complex. This will require the sealing of all deep mine openings, the sealing of two strip mine highwalls with a grout curtain, the restoration including revegetation of two adjacent strip mine areas and the disposal of mine refuse piles.

The effect of this action would be to remove an average of 1,000 pounds per day of acidity, 420 pounds per day of total iron and 7,300 pounds per day of sulfate from the Watershed if 100 percent effective abatement is implemented. These values will fluctuate with the many variables regulating groundwater and surface water flows such as precipitation, runoff, infiltration, percolation, porosity, etc. The following table indicates the estimated maximum, minimum and a verage removal of mine drainage constituents from Yellow Creek with the imple mentation of the pollution abatement project. These concentrations were observed during the sampling and analysis program as reported on Plate 6. Estimated removal of mine drainage chemical constituents was determined by assuming the implementation of the pollution abatement project would result in a water quality similar to sample station 235X located upstream of the proposed project area. Therefore, the estimated water quality improvement is the difference between sample stations 163X and 235X.

TABLE

Estimated Removal of Mine Drainage Chemical Constituents

| Data | Maximum | Minimum | Average |
|---|---|---|---|
| Acidity (PPD) | 1,670 | 470 | 1,000 |
| Total Iron (PPD) | 710 | 135 | 420 |
| Sulfate (PPD) | 11,500 | 3,180 | 7,300 |

The average cost effectiveness for the implementation of the pollution abatement project for the removal of one pound per day of acidity originating from the Stanford Mine Complex is estimated at$81+6.70.

The estimated average stream quality at the mouth of Yellow Creek, resulting at the completion of the proposed pollution abatement project, would be a water with a pH greater than 7.5 and less than 8.0 a total iron concentration of less than 1.0 milligrams per liter, an alkalinity of 50 milligrams per liter and a sulfate concentration in the range of 100 milligrams per liter. This water quality will be satisfactory for most forms of aquatic life.

The foregoing estimate is based on the difference between the existing water quality of Yellow Creek at sampling station 3X and the estimated removal of mine drainage constituents listed in the foregoing table.

Drawings Number 1, 2 and 3 show the general location of the proposed deep mine seals, the grout curtain, the refuse piles which require disposal and the general location of the mine openings. These drawings also show the location of the core borings performed in the aforementioned contract and the preliminary geologic structure of the Upper Kittanning Coal as interpreted from the project core borings.

# APPENDIX "A"
# CORE BORING LOGS

GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-2 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 4+60 75LT. Baseline "A" GROUND ELEVATION 1112.0

FEATURE

DATE STARTED 9-15-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 28.5

DATE COMPLETED 9-22-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-29-72 51.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy & Showers

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 20 |
| 0.5 - 5.0 | Sandy Silt, Brown, Moist, Dense with Trace Shale Fragments | | | | | | 70 |
| | | | | | | | 130 |
| 5.0 - 11.1 | Sand Stone, Med., Brown | 0 | 0 | 5.0 - 7.0 | 2.0 | 100 | 190 |
| | Fine Grain, Laminated, Fractured | | | 7.0 - 10.0 | 3.0 | 100 | 205 |
| 11.1 - 19.4 | Shale, Sandy, Med. Brown & Gray Laminated | 0 | 0 | 10.0 - 15.0 | 5.0 | 100 | |
| | Fractured, with Silty Interbeds | | | 15.0 - 20.0 | 5.0 | 100 | |
| 19.4 - 51.3 | Silt Stone, Med Hard, Gray, Massive with Sandy Interbeds | 18.7 | 59 | 20.0 - 25.0 | 4.9 | 98 | |
| | Vertical Fractures | | | 25.0 - 30.0 | 5.0 | 100 | |
| | 41.0 - 41.2, 46.8 - 47.6 | | | 30.0 - 35.0 | 5.0 | 100 | |
| 51.3 - 54.8 | Coal, Black, Fractured | 0 | 0 | 35.0 - 40.0 | 5.0 | 100 | |
| 54.8 - 56.5 | Claystone, Dark Gray, Med. Hard, Underclay | 0 | 0 | 40.0 - 45.0 | 4.9 | 98 | |
| 56.5 - 59.2 | Siltstone, Gray, Hard | 0.4 | 15 | 45.0 - 50.0 | 5.0 | 100 | |
| 59.2 - 60.0 | Sandstone, Gray, Hard, Fine Grained | 0 | 0 | 50.0 - 55.0 | 5.0 | 100 | |
| | Lost Water @ 5.5 | | | 55.0 - 60.0 | 5.0 | 100 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-3 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 8+00 77 LT. Baseline "A" GROUND ELEVATION 1122.0

FEATURE

DATE STARTED 9-25-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 41.1

DATE COMPLETED 9-26-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-29-72 53.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy & Showers

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 4 21 |
| 0.5 - 5.0 | Sandy, Silt, Brown, Moist, Dense, with Trace of Shale Fragments | | | | | | 68 |
| 5.0-9.0 | Sandstone, Brown, Hard, Fine Grained | 0 | 0 | | | | 89 |
| 9.0-13.3 | Shale, Sandy, Soft-Med., Grayish Brown, | 0 | 0 | 5.0 - 7.0 | 2.0 | 100 | 140 |
| | Laminated, Fractured, with Few Water Stained Seams | | | 7.0 - 10.0 | 3.0 | 100 | |
| 13.3 - 23.4 | Shale, Silty, Gray, Med., Laminated, Fractured | 0 | 0 | 10.0 - 15.0 | 5.0 | 100 | |
| | with Sandy Brown Stained Interbeds | | | 15.0 - 20.0 | 5.0 | 100 | |
| | 16.5 - 16.7 Vertical Fracture | | | 20.0 - 25.0 | 5.0 | 100 | |
| 23.4 - 27.0 | Silt Stone, Gray, Med., Fractured, | 0 | 0 | 25.0 - 30.0 | 5.0 | 100 | |
| | with Sandy Interbeds, Vertical | | | 30.0 - 35.0 | 5.0 | 100 | |
| | Fracture 24.3 - 27.0 | | | 35.0 - 40.0 | 5.0 | 100 | |
| 27.0 - 49.2 | Siltstone, Gray, Med. Hard, Massive, with | 12.5 | 56 | 40.0 - 45.0 | 5.0 | 100 | |
| | Few Sandy Interbeds | | | 45.0 - 50.0 | 5.0 | 100 | |
| | Vertical Fracture 37.0 - 37.6 | | | 50.0 - 55.0 | 5.0 | 100 | |
| 49.2 - 52.5 | Coal, Black, Fractured | 0 | 0 | 55.0 - 60.0 | 5.0 | 100 | |
| 52.5 - 60.0 | Claystone, Gray, Med. Hard, Massive, with | 3.0 | 40 | | | | |
| | few Sandy Interbeds, Slightly Fractured | | | | | | |
| | Lost Water 6.5 | | | | | | |

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A-2

GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-4 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 10+09 87 LT. Baseline "A" GROUND ELEVATION 1137.0

FEATURE

DATE STARTED 9-18-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 53.2

DATE COMPLETED 9-20-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 52.6

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy & Rain

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 19 |
| | | | | | | | 67 |
| 0.5 - 7.0 | Sandy Silt, Brown, Moist, Dense, with Trace of Sandy Shale Fragments | | | | | | 69 |
| 7.0 - 9.0 | Sandstone, Brown, Med. Hard, Fine | 0 | 0 | 7.0 - 9.0 | 1.5 | 75 | 59 |
| | | | | | | | 73 |
| | Grained, Fractured | | | 9.0 - 11.0 | 2.0 | 100 | 137 |
| 9.0 - 15.0 | Shale Sandy, Brown & Gray, Soft to Med. | 0 | 0 | 11.0 - 15.0 | 4.0 | 100 | 183 |
| | Badly Fractured and Weathered and Stained | | | 15.0 - 20.0 | 5.0 | 100 | |
| 15.0 - 25.0 | Shale Sandy, Gray, Med. Hard | 0 | 0 | 20.0 - 25.0 | 5.0 | 100 | |
| | Fractured, Laminated, Vertical Fracture | | | 25.0 - 30.0 | 5.0 | 100 | |
| | at 16.0 - 16.3 23.0 - 23.3 | | | 30.0 - 35.0 | 4.7 | 94 | |
| 25.0 - 49.8 | Siltstone, Gray, Med. Hard, Massive, with | 16.8 | 68 | 35.0 - 40.0 | 5.0 | 100 | |
| | Sandy Interbeds | | | 40.0 - 45.0 | 5.0 | 100 | |
| | Vertical Fractures 27.8 - 28.0 39.5 - 40.0 | | | 45.0 - 50.0 | 5.0 | 100 | |
| | 41.0 - 41.5 | | | 50.0 - 55.0 | 4.4 | 88 | |
| 49.8 - 54.5 | Coal, Black, Fractured | 0 | 0 | 55.0 - 60.0 | 5.0 | 100 | |
| 54.5 - 55.0 | Clay, Seam, Gray, Soft | 0 | 0 | | | | |
| 55.0 - 63.0 | Claystone, Gray, Med-Hard, Fractured with few Sandy | 3.0 | 38 | | | | |
| | Interbeds 61.5 - 63.0 Clay Galls Lost Water 7.3 | | | | | | |

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GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-5 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 15+72 219 LT. Baseline "A" GROUND ELEVATION 1122.0
FEATURE
DATE STARTED 9-13-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 15.3
DATE COMPLETED 9-14-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-19-72 46.8
CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy & Rain

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 9 |
| 0.5 - 8.5 | Sandy Silt, Brown, Moist, Stiff, with Trace of Sandy Shale Fragments | | | 8.5 - 10.0 | 1.1 | 73 | 14<br>29 |
| 8.5 - 15.0 | Shale, Sandy Brown, Med., Moderately Fractured | 0 | 0 | 10.0 - 12.0 | 1.8 | 90 | 20<br>29 |
| | Weathered, Laminated, Vertical Fracture 14.0-14.5 | | | 12.0 - 15.0 | 3.0 | 100 | 38 |
| 15.0 - 20.0 | Shale, Silty, Gray, Med., Moderately Fractured with | 0 | 0 | 15.0 - 20.0 | 4.0 | 80 | 44<br>30 |
| | Brown Sandy Stained Interbeds | | | 20.0 - 25.0 | 4.9 | 98 | 657.5 |
| 20.0 - 40.5 | Siltstone, Gray, Med. Hard, Massive, with | 9.3 | 45 | 25.0 - 30.0 | 4.9 | 98 | |
| | Sandy Interbeds, Vertical Fractures @ | | | 30.0 - 35.0 | 4.4 | 88 | |
| | 22.0 - 22.5, 24.0 - 25.0, 28.8 - 29.3, 40.0 - 40.5 | | | 35.0 - 40.0 | 4.8 | 96 | |
| | Thin Bedded 34.5 - 40.5 | | | 40.0 - 45.0 | 5.0 | 100 | |
| 40.5 - 43.6 | Coal, Black, Fractured | 0.6 | 19 | 45.0 - 50.0 | 5.0 | 100 | |
| | 43.3 - 43.5 Pyrite inclusions | | | | | | |
| 43.6 - 45.0 | Clay Seam, Gray, Soft | 0 | 0 | | | | |
| 45.0 - 50.0 | Clay Stone, Gray, Med.-Hard, Massive | 4.4 | 88 | | | | |
| | with few Silty Zones | | | | | | |
| | | | | | | | |
| | Lost water 17.0 | | | | | | |

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GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-7 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 33+ 12 305 LT. Baseline "A" GROUND ELEVATION 1120.00

FEATURE

DATE STARTED 8-25-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 23.0

DATE COMPLETED 8-28-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-20-72 43.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny & Hot

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 36 |
| | | | | | | | 47 |
| 0.5 - 5.0 | Sandy Silt, Brown, Dense, Moist, with Trace of Sandy Shale fragments | | | | | | 72 |
| | | | | | | | 246 |
| 5.0 - 12.0 | Shale, Sandy, Med., Gray & Brown, Stained | 0 | 0 | 5.0 - 7.0 | 2.0 | 100 | 305 |
| | Fractured, Laminated | | | 7.0 - 12.0 | 5.0 | 100 | |
| 12.0 - 17.0 | Shale, Silty, Gray, Med., Fractured & Stained, | 0 | 0 | 12.0 - 17.0 | 5.0 | 100 | |
| | with Sand Interbeds, Laminated | | | 17.0 - 22.0 | 5.0 | 100 | |
| 17.0 - 48.0 | Silt Stone, Med., Gray, with Sandy Interbeds | 8.9 | 29 | 22.0 - 27.0 | 5.0 | 100 | |
| | Vertical Fractures 19.5 - 19.7, 34.3 - 34.5 | | | 27.0 - 32.0 | 5.0 | 100 | |
| | | | | 32.0 - 37.0 | 5.0 | 100 | |
| 48.0 - 51.7 | Coal, Black, Fractured | 0 | 0 | 37.0 - 42.0 | 5.0 | 100 | |
| 51.7 - 53.5 | Clay Seam, Gray, Soft | 0 | 0 | 42.0 - 47.0 | 5.0 | 100 | |
| 53.5 - 57.0 | Clay Stone, Gray, Med. Hard, with Sandy | 1.7 | 32 | 47.0 - 52.0 | 4.9 | 98 | |
| | Interbeds | | | 52.0 - 57.0 | 5.0 | 100 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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TEST BORING RECORD

BORING NO. CB-9 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 4+31 115 RT Baseline "B" GROUND ELEVATION 1124.0

FEATURE

DATE STARTED 9-14-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 44.0

DATE COMPLETED 9-15-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 72 HRS. 46.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy & Rain

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 6 |
| | | | | | | | 13 |
| 0.5 - 5.0 | Sandy Silt, Brown, Moist, Dense, with Trace of Sandy Shale Fragments | | | | | | 45 |
| 5.0 - 19.5 | Shale, Sandy, Brown & Gray, Med, Fractured, | 1.0 | 7 | 5.0 - 7.0 | 2.0 | 100 | 136 |
| | | | | | | | 241 |
| | Laminated | | | 7.0 - 12.0 | 5.0 | 100 | |
| 19.5 - 47.0 | Silt Stone, Gray, Med. Hard, Massive with | 18.0 | 65 | 12.0 - 17.0 | 5.0 | 100 | |
| | Sandy Interbeds | | | 17.0 - 22.0 | 5.0 | 100 | |
| | Vertical Fracture at 21.0 - 21.5, | | | 22.0 - 27.0 | 5.0 | 100 | |
| | 27.0 - 27.5, 31.0 - 32.0, 43.5 - 44.5 | | | 27.0 - 32.0 | 5.0 | 100 | |
| 47.0 - 50.0 | Coal, Black, Fractured | 0 | 0 | 32.0 - 37.0 | 5.0 | 100 | |
| 50.0 - 56.0 | Claystone, Gray, Med.-Hard, Massive | 4.5 | 75 | 37.0 - 42.0 | 5.0 | 100 | |
| | with few Sandy Interbeds | | | 42.0 - 47.0 | 5.0 | 100 | |
| | Lost Water @ 6.0 | | | 47.0 - 52.0 | 4.6 | 92 | |
| | | | | 52.0 - 56.0 | 4.0 | 100 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

DRILLING COMPANY Geo. Mechanics, Inc. DRILLER August Martos INSPECTOR E. W. Cunningham

GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-10A SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 27136 156 RT. Baseline "B" GROUND ELEVATION 1130.0

FEATURE

DATE STARTED 9-11-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 9.0

DATE COMPLETED 9-12-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-18-72 Caved 38.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Cloudy and Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 16 |
| | | | | | | | 37 |
| 0.5 - 4.0 | Sandy Silt, Brown, Dense, Moist, with Trace of Shale Fragments | | | | | | 286 |
| | | | | | | | 341 |
| 4.0 - 11.0 | Shale Sandy, Brown, Med. Hard, Moderately Fractured, | 0 | 0 | 4.0 - 6.0 | 2.0 | 100 | |
| | Laminated | | | 6.0 - 11.0 | 4.8 | 96 | |
| 11.0 - 38.7 | Silt Stone, Gray, Med. Hard, Massive, Highly | 12.6 | 45 | 11.0 - 16.0 | 5.0 | 100 | |
| | Fractured 21.5 - 23.0 with Sandy Interbeds | | | 16.0 - 21.0 | 5.0 | 100 | |
| | | | | 21.0 - 26.0 | 5.0 | 100 | |
| 38.7 - 41.6 | Coal, Black, Fractured | 0 | 0 | 26.0 - 31.0 | 5.0 | 100 | |
| 41.0 - 46.0 | Clay Stone, Gray, Med. Hard, Massive | 2.4 | 48 | 31.0 - 36.0 | 5.0 | 100 | |
| | | | | 36.0 - 41.0 | 5.0 | 100 | |
| | | | | 41.0 - 46.0 | 5.0 | 100 | |
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TEST BORING RECORD

BORING NO. CB-10C SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 24+64 180 RT. Baseline "B" GROUND ELEVATION 1125.0

FEATURE

DATE STARTED 8-21-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 16.0

DATE COMPLETED 8-22-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. Caved @ 18.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny - Humid

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Topsoil | | | | | | 34 |
| | | | | | | | 75 |
| 0.5 - 8.5 | Clay, Silty, Brown, Dense, with Trace of Shale Fragments | | | | | | 105 |
| 8.5 - 12.0 | Shale, Sandy, Soft, Gray, Fractured, | 0 | 0 | 8.5 - 10.0 | 1.5 | 100 | 106 |
| | | | | | | | 192 |
| | Water Stained | | | 10.0 - 15.0 | 5.0 | 100 | 276 |
| | | | | | | | 391 |
| 12.0 - 14.5 | Shale, Silty, Med., Gray, Laminated | 0 | 0 | 15.0 - 20.0 | 5.0 | 100 | 507 |
| 14.5 - 29.5 | Siltstone, Gray, Med. to Med. Hard, with few Sandy Interbeds | 0.4 | 2 | 20.0 - 25.0 | 4.9 | 98 | |
| 29.5 - 32.5 | Coal, Black, Fractured | 0 | 0 | 25.0 - 30.0 | 4.2 | 84 | |
| 32.5 - 35.0 | Clay Seam, Gray, Soft | 0 | 0 | 30.0 - 35.0 | 4.5 | 90 | |
| | | | | 35.0 - 38.0 | 2.9 | 97 | |
| 35.0 - 37.5 | Claystone, Gray, Med. | 0 | 0 | | | | |
| 37.5 - 38.0 | Limestone, Gray, Hard, Fractured | 0 | 0 | | | | |

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BORING NO. CB-12 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 29+89 127RT. Baseline "B" GROUND ELEVATION 1155.0
FEATURE
DATE STARTED 9-7-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 60.0
DATE COMPLETED 9-8-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-18-72 50.0
CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny & Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| | | | | | | | 12 |
| 0.0 - 0.5 | Topsoil | | | | | | 39 |
| | | | | | | | 110 |
| 0.5 - 5.0 | Sandy, Silt, Brown, Dense, Moist with Shale Fragments | | | | | | 245 |
| 5.0 - 13.0 | Shale, Sandy, Brown, Med., Fractured | 0 | 0 | 5.0 - 7.0 | 2.0 | 100 | 349 |
| | Laminated | | | 7.0 - 12.0 | 4.8 | 96 | |
| 13.0 - 17.0 | Sandstone, Gray, Fine Grain, Med., Fractured, Laminated | 1.9 | 48 | 12.0 - 17.0 | 5.0 | 100 | |
| 17.0 - 52.5 | Silt Stone, Gray, Hard, Massive, with Sandy Interbeds | 23.4 | 65 | 17.0 - 22.0 | 5.0 | 100 | |
| | Vertical Fracture 18.0 - 18.3, 45.9 - 46.2 | | | 22.0 - 27.0 | 4.9 | 98 | |
| 52.5 - 56.0 | Coal, Black, Fractured | 0 | 0 | 27.0 - 32.0 | 5.0 | 100 | |
| 56.0 - 61.0 | Clay Stone, Gray, Med.-Hard | 3.0 | 60 | 32.0 - 37.0 | 5.0 | 100 | |
| | | | | 37.0 - 42.0 | 5.0 | 100 | |
| | Lost Drill Water Return @ 9.0 | | | 42.0 - 47.0 | 4.5 | 90 | |
| | | | | 47.0 - 52.0 | 5.0 | 100 | |
| | | | | 52.0 - 57.0 | 4.5 | 90 | |
| | | | | 57.0 - 61.0 | 4.0 | 100 | |
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TEST BORING RECORD

BORING NO. CR-13 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 31+77 112 RT Baseline "B" GROUND ELEVATION 1146.0

FEATURE

DATE STARTED 9-6-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 25.0

DATE COMPLETED 9-7-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 45.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny-Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 10 |
| 0.5 - 5.0 | Sandy Silt, Brown, Dense, Moist, with trace of shale frag- | | | | | | 17 |
| | ments. | | | | | | 92 |
| 5.0 - 16.0 | Shale, Sandy, Brown & Gray, Med, Fractured, | 0 | 0 | 5.0 - 7.0 | 1.6 | 80 | 174 |
| | Laminated, Vertical Fracture 15.4-15.5 | | | 7.0 -12.0 | 5.0 | 100 | 300 |
| 16.0 - 20.0 | Silt Stone, Gray, Med Hard, Fractured, Laminated | 1.0 | 25 | 12.0 -17.0 | 5.0 | 100 | |
| | with sandy interbeds | | | 17.0 -22.0 | 5.0 | 100 | |
| 20.0 - 43.2 | Silt Stone, Hard, Gray, Massive, with sandy interbeds, | 14.7 | 63 | 22.0 -27.0 | 5.0 | 100 | |
| | Vertical fracture 20.0 - 20.2, | | | 27.0 -32.0 | 5.0 | 100 | |
| | 34.5 - 34.6, 35.0 - 35.4, 40.0 - 40.2 | | | 32.0 -37.0 | 5.0 | 100 | |
| 43.2 - 47.0 | Coal, Black, Fractured | 0 | 0 | 37.0 -42.0 | 5.0 | 100 | |
| 47.0 - 52.0 | Clay Stone, Med-Hard, Gray, Massive | 3.2 | 64 | 42.0 -47.0 | 5.0 | 100 | |
| | Vertical Fracture 51.0 - 51.4 | | | 47.0 -52.0 | 5.0 | 100 | |
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TEST BORING RECORD

BORING NO. CB-14 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 32+24 110 RT Baseline "B" GROUND ELEVATION 1141.0

FEATURE

DATE STARTED 9-1-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 42.0

DATE COMPLETED 9-5-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 42.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny and Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | 5.0 - 7.0 | 2.0 | 100 | 13 |
| 0.5 - 5.0 | Sandy Silt, Brown, Dense, Moist, with trace of shale fragments | | | 7.0 - 10.0 | 2.6 | 87 | 36 40 |
| 5.0 - 11.5 | Shale, Sandy, Brown, Med, Fractured, | 0 | 0 | 10.0 - 15.0 | 5.0 | 100 | 182 |
| | Laminated | | | 15.0 - 20.0 | 5.0 | 100 | 182 .0 |
| 11.5 - 13.5 | Shale, Silty, Gray, Med-Hard, Laminated, | 0 | 0 | 20.0 - 25.0 | 5.0 | 100 | |
| | Fractured, Vertical Fracture 12.3 - 12.7 | | | 25.0 - 30.0 | 5.0 | 100 | |
| 13.5 - 25.0 | Silt Stone, Gray, Hard, Laminated, with sandy interbeds | 1.5 | 13 | 30.0 - 35.0 | 5.0 | 100 | |
| | Vertical Fracture 20.0 - 20.5 | | | 35.0 - 38.0 | 3.0 | 100 | |
| 25.0 - 38.0 | Silt Stone, Dark Gray, Hard, Highly Fractured, | 0.5 | 4 | 38.0 - 42.0 | 0.0 | 0 | |
| | Vertical Fractures 33.0 - 33.3, 37.0 - 38.0 | | | 42.0 - 47.0 | 4.8 | 96 | |
| 38.0 - 42.0 | Void | | | | | | |
| 42.0 - 44.0 | Clay stone, Gray, Med, Fractured | 0.4 | 20 | | | | |
| 44.0 - 47.0 | Clay Shale, Hard, Gray, Massive | 1.9 | 63 | | | | |
| | | | | | | | |
| | Lost Water @38.0 | | | | | | |
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A-11

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SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-17 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 35+55 90 RT. Baseline "B" GROUND ELEVATION 1146.0

FEATURE

DATE STARTED 8-30-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 40.0

DATE COMPLETED 8-31-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 40.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny and Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 9 |
| 0.5 - 4.0 | Sandy Silt, Brown, Very Stiff, Moist with trace of Shale | | | | | | 75<br>138 |
| | Fragments | | | | | | |
| 4.0 - 10.0 | Shale, Clayey, Brown, weathered | 0 | 0 | 4.0 - 6.0 | 1.8 | 90 | |
| | Laminated, Highly fractured | | | 6.0 - 11.0 | 4.0 | 80 | |
| 10.0 - 17.0 | Silt Stone, Soft-Med, Gray, Laminated | 0 | 0 | 11.0 - 16.0 | 5.0 | 100 | |
| | | | | 16.0 - 21.0 | 5.0 | 100 | |
| 17.0 - 39.4 | Silt Stone, Hard, Dark Gray, Massive | 13.4 | 60 | 21.0 - 26.0 | 5.0 | 100 | |
| | 19.0 - 19.3, 22.5 - 22.9, 38.3 - 39.0, Vertical fractures | | | 26.0 - 31.0 | 5.0 | 100 | |
| | 27.0 - 39.4, Very fine grain | | | 31.0 - 36.0 | 5.0 | 100 | |
| 39.4 - 41.5 | Coal, Black, fractured, | 0 | 0 | 36.0 - 41.0 | 5.0 | 100 | |
| 41.5 - 46.0 | Clay Stone, Gray, Med-Hard, | 1.2 | 27 | 41.0 - 46.0 | 4.6 | 92 | |
| | Fractured | | | | | | |
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TEST BORING RECORD

BORING NO. CB - 19 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 16+11 10½ LT. Baseline "C" GROUND ELEVATION 1151.0

FEATURE

DATE STARTED 8-29-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. Dry

DATE COMPLETED 8-29-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER Caved @ 53.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL WEATHER Sunny & Hot

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 24 |
| 0.5 - 10.0 | Clayey Silt, Brown, Stiff to dense, Moist, with trace of | | | | | | 29 |
| | shale fragments. | | | | | | 55 |
| 10.0 - 21.0 | Sand Stone, Brown, Med Hard, Fine-Grain, | 0 | 0 | 10.0 - 12.0 | 1.2 | 60 | 72 |
| | Laminated, with clay seams | | | 12.0 - 14.0 | 1.8 | 90 | 100 |
| 21.0 - 49.0 | Silt stone, Gray, Med hard, Massive, with | 14.6 | 52 | 14.0 - 19.0 | 3.4 | 68 | 274 |
| | Sandy Interbeds | | | 19.0 - 21.0 | 1.9 | 95 | 433 |
| 49.0 - 54.0 | Shale, Silty, Med, Black, Carbonaceous | 0.8 | 13 | 21.0 - 24.0 | 2.9 | 97 | |
| | Fractured, Laminated, Fossiliferous | | | 24.0 - 29.0 | 5.0 | 100 | |
| 54.0 - 57.0 | Coal, Black, Fractured | 0 | 0 | 29.0 - 34.0 | 5.0 | 100 | |
| 57.0 - 58.5 | Clay, Seam, Soft and Gray | 0 | 0 | 34.0 - 39.0 | 5.0 | 100 | |
| 58.5 - 61.0 | Clay Stone, Med-Hard, Gray Massive | 1.9 | 76 | 39.0 - 44.0 | 4.7 | 94 | |
| | | | | 44.0 - 49.0 | 5.0 | 100 | |
| | Lost Water @ 10.5 | | | 49.0 - 54.0 | 4.8 | 96 | |
| | | | | 54.0 - 58.5 | 4.5 | 100 | |
| | | | | 58.5 - 61.0 | 2.3 | 92 | |
| | | | | | | | |

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SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-20 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 12+03 102'LT Baseline "C" GROUND ELEVATION 1145.0

FEATURE

DATE STARTED 8-22-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. Dry

DATE COMPLETED 8-24-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. Dry 9-18-72 49.0 caved

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER sunny and hot

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 33 |
| 0.5 - 5.0 | Clayey silt, Brown, Dense, Moist with trace of shale fragments | | | | | | 39<br>55 |
| 5.0 - 17.0 | Shale, Sandy, Med-Hard, Brown, | 0 | 0 | 5.0 - 7.0 | 0.7 | 35 | 205<br>359 |
| | Fractured, Water Stained, | | | 7.0 - 9.0 | 1.8 | 90 | |
| 17.0 - 22.0 | Shale, Sandy, Gray, Med-Hard, Fractured, | 0 | 0 | 9.0 - 14.0 | 3.5 | 70 | |
| | Water-stained, with silt stone interbeds | | | 14.0 - 19.0 | 4.9 | 98 | |
| 22.0 - 24.0 | Shale, silty, med, Gray, | 0.5 | 25 | 19.0 - 24.0 | 4.9 | 98 | |
| | Moderately fractured | | | 24.0 - 29.0 | 5.0 | 100 | |
| 24.0 - 52.2 | Silt stone, Gray, Med-hard, Massive, with | 14.5 | 51 | 29.0 - 34.0 | 4.9 | 98 | |
| | Sandy Interbeds | | | 34.0 - 39.0 | 5.0 | 100 | |
| | 25.0 - 25.2 Calcareous 25.6 - 26.0, | | | 39.0 - 44.0 | 5.0 | 100 | |
| | Vertical Fracture 34.0 - 34.5 | | | 44.0 - 49.0 | 4.7 | 94 | |
| 52.2 - 55.7 | Coal, Black, Fractured | 0 | 0 | 49.0 - 54.0 | 5.0 | 100 | |
| 55.2 - 59.0 | Clay stone, Gray, Soft to med-hard, | 1.3 | 34 | 54.0 - 59.0 | 5.0 | 100 | |
| | Fractured, Calcareous 58.6 - 58.7 | | | | | | |
| | Clay seam @ 56.2 - 56.6 | | | | | | |
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GREEN ENGINEERING COMPANY
SEWICKLEY, PENNSYLVANIA
TEST BORING RECORD

BORING NO. CB-71 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA 7+83 343 LT Baseline "C" GROUND ELEVATION 1134.0

FEATURE

DATE STARTED 8-29-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 35.0

DATE COMPLETED 8-31-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 22.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny and mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 43 |
| 0.5 - 7.0 | Sandy Silt, Brown, Dense, Moist, with trace of sandy Shale | | | | | | 85 |
| | fragments | | | | | | 105 |
| 7.0 - 16.5 | Sand Stone, Med, Brown, Fractured | 0 | 0 | 7.0 - 9.0 | 0.9. | 45 | 153 |
| | with Soft Clay Seams | | | 9.0 - 11.0 | 1.6 | 80 | 357 |
| | | | | 11.0 - 14.0 | 0.5 | 17 | 396 |
| | | | | 14.0 - 16.0 | 0 | 0 | 444 |
| | | | | 16.0 - 16.5 | 50/.5 | | |
| 16.5 - 24.0 | Sandstone, Soft, Brown, Med, Coarse | 0.6 | 8 | 16.5 - 19.1 | 1.6 | 62 | |
| | Grained with many clay seams | | | 19.1 - 24.0 | 1.2 | 24 | |
| 24.0 - 26.0 | Clay Seam, Soft, Dark Gray | 0 | 0 | 24.0 - 26.0 | 2.0 | 100 | |
| 26.0 - 34.0 | Siltstone, Med hard, Dark Gray, Sandy | 0.7 | 9 | 26.0 - 29.0 | 3.0 | 100 | |
| | Slightly fractured 28.3 - 28.5 | | | 29.0 - 34.0 | 5.0 | 100 | |
| | 32.6 - 32.8 Vertical Fracture | | | 34.0 - 39.0 | 5.0 | 100 | |
| 34.0 - 58.1 | Siltstone, Hard, Dark Gray to very Dark Gray | 12.2 | 51 | 39.0 - 44.0 | 4.9 | 100 | |
| | Massive, 41.4-41.6, 42.7 - 42.9, 70° Fracture | | | 44.0 - 49.0 | 5.0 | 100 | |
| 58.1 - 61.0 | 51.8 - 52.3, 53.3 - 53.7, Vertical Fractures Coal, Black, Fractured | 0 | 0 | 49.0 - 54.0 54.0 - 57.5 | 5.0 3.5 | 100 100 | |

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TEST BORING RECORD

BORING NO. CB-21 SHEET 2 OF 2

PROJECT Yellow Creek Drainage Basin LOCATION STA. 7+83 343 LT Baseline "C" GROUND ELEVATION 1134.0

FEATURE

DATE STARTED 8-29-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 35.0

DATE COMPLETED 8-31-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 24 HRS. 22.0

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny and mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 61.0 - 62.0 | Clay Seam, Gray, Soft | 0 | 0 | 57.5 - 64.0 | 5.6 | 86 | |
| 62.0 - 64.0 | Clay Stone, Gray, Hard, 62.9 - 63.0, 63.1 - 63.2 | 1.3 | 65 | | | | |
| | Soft Gray Clay Seams | | | | | | |
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BORING NO. CB-22 SHEET 1 OF 1

PROJECT Yellow Creek Drainage Basin LOCATION STA. 5+41 74 RT Baseline "C" GROUND ELEVATION 1131.0

FEATURE

DATE STARTED 9-5-72 TYPE OF SAMPLER DIAMETER OF AUGER GROUND WATER 0 HRS. 31.0

DATE COMPLETED 9-6-72 SAMP. SIZE WEIGHT OF HAMMER FALL GROUND WATER 9-12-72 59.5

CASING SIZE 4 WEIGHT OF HAMMER 300 FALL 24 WEATHER Sunny and Mild

| DEPTH FROM-TO | DESCRIPTION OF EACH STRATUM | R.Q.D. Length | % R.Q.D. | Sample or Run From To | Blows or Rec. | % Rec. | Casing Blows |
|---|---|---|---|---|---|---|---|
| 0.0 - 0.5 | Top Soil | | | | | | 35 |
| 0.5 - 10.0 | Silty clay, Brown, Moist stiff to dense with shale fragments | | | | | | 36<br>41 |
| 10.0 - 23.0 | Sandstone, Gray, Brown, Med Grain, Hard | 6.0 | 46 | 10.0 - 13.0 | 3.0 | 100 | 46<br>51 |
| | Fractured, Laminated | | | 13.0 - 18.0 | 5.0 | 100 | 53 |
| 23.0 - 25.0 | Sandstone, Brown, Hard, Fractured, Med Grained, | 0 | 0 | 18.0 - 23.0 | 5.0 | 100 | 61<br>104 |
| | with clay seams | | | 23.0 - 28.0 | 4.8 | 96 | 432 |
| 25.0 - 31.5 | Sandstone, Gray- Brown, Hard, Med grained, | 2.6 | 40 | 28.0 - 33.0 | 5.0 | 100 | 435 |
| | Laminated | | | 33.0 - 38.0 | 5.0 | 100 | |
| 31.5 - 67.0 | Siltstone, Dark gray, Hard, Massive | 28.8 | 81 | 38.0 - 43.0 | 5.0 | 100 | |
| | with sandy interbeds | | | 43.0 - 48.0 | 5.0 | 100 | |
| 67.0 - 70.0 | Coal, Black, Fractured | 0 | 0 | 48.0 - 53.0 | 5.0 | 100 | |
| 70.0 - 75.0 | Clay stone, Gray, Soft, Highly fractured | 0 | 0 | 53.0 - 58.0 | 5.0 | 100 | |
| | Calcareous 74.5 - 75.0 | | | 58.0 - 63.0 | 5.0 | 100 | |
| | Lost Water 23.0 | | | 63.0 - 68.0 | 5.0 | 100 | |
| | | | | 68.0 - 75.0 | 7.0 | 100 | |
| | | | | | | | |
| | | | | | | | |

DRILLING COMPANY GEO. MECHANICS, INC. DRILLER Barry Baltich INSPECTOR E. W. Cunningham

# APPENDIX "B"
# PRESSURE TESTING DATA

Sheet No. 1 of 1
Date 9-27-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek ; River Yellow Creek ; Hole No. 2 ; Rig No. 1

Location of Hole 4+60 75' LT Baseline "A"

Contractor Geo. Mechanics, Inc. ; Driller Bob Copechal ; Elev. top of Hole 1112.0

Type & No. of Pump beam ; No. of Meter 20792925 ; Elev. top of rock

PART I — DATA ON FLOW TEST

| Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Press. Gauge lbs./sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 55.0 | 60.0 | | | 50 | 9:30 | 9:35 | 5 | 3144.0 | 3244.5 | 100.5 | |
| 50.0 | 55.0 | | | 50 | 9:40 | 9:45 | 5 | 3280.0 | 3399.5 | 119.5 | |
| | | | | | | | | | | | |
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PART II — HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Time on Each 10 lb. Drop — Gauge pressure at test intervals from 50-40 lb. (or higher pressures if necessary) | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 55.0 | 60.0 | | | No Hold | | | | | |
| 50.0 | 55.0 | | | No Hold | | | | | |
| 45.0 | 50.0 | | | 1 min. 30 sec. | 2 min. | 6 min. | 2 min. 30 sec. | 30 min. | To 8 p.s.i |
| 40.0 | 45.0 | | | 1 min 20 sec. | 3 min. | 8 min. | 15 min. | 30 min. | To 5 p.s.i |
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Description of operations and general information:

1.85 hrs.

Sheet No. 1 of 1
Date 9-27-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek; River Yellow Creek; Hole No. 3; Rig No. 4

Location of Hole STA. 8+00 77' LT Base line "A"

Contractor Geo. Mechanics; Driller Bob Copechal; Elev. top of Hole 1122.0

Type & No. of Pump beam; No. of Meter 20792925; Elev. top of rock

PART I DATA ON FLOW TEST

| Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Press. Gauge lbs./sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 53.5 | 58.5 | | | 50 | 1:05 | 1:10 | 5 | 3510.5 | 3576.5 | 66.5 | |
| 48.5 | 53.5 | | | 30 | 1:15 | 1:20 | 5 | 3690.0 | 3820.0 | 130.0 | |
| | | | | | | | | | | | |
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PART II HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Time on Each 10 lb. Drop Gauge pressure at test intervals from 50-40 lb. | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. (or higher pressures if necessary) | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 53.5 | 58.5 | | | No Hold | | | | | |
| 48.5 | 53.5 | | | No Hold | | | | | |
| 43.5 | 48.5 | | | 7 min. | 15 min. | 30 min. | -- | -- | To 23 p.s.i. |
| 38.5 | 43.5 | | | 1 min. 10 sec. | 3min.15 sec. | 8 min. | 18 min. | 30 min. | To 3 p.s.i. |
| | | | | | | | | | |
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| | | | | | | | | | |

Description of operations and general information:

2.05 hrs.

Sheet No. 1 of 1
Date 9-28-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek; River Yellow Creek; Hole No. 4; Rig No. 4

Location of Hole STA 10+09 87 LT Base line "A"

Contractor Geo. Mechanics; Driller Bob Copechal; Elev. top of Hole 1137

Type & No. of Pump Beam; No. of Meter 20792925; Elev. top of rock

PART I — DATA ON FLOW TEST

| Section of hole tested | | | | Press. Gauge lbs./ sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth | | Elevation | | | | | | At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
| From | To | From | To | | | | | | | | |
| 54.5 | 59.5 | | | 24 | 8:30 | 8:35 | 5 | 3860 | 3945 | 85 | |
| 49.5 | 54.5 | | | 20 | 8:50 | 8:55 | 5 | 3960 | 4044 | 84 | |
| | | | | | | | | | | | |
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PART II — HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested | | | | Time on Each 10 lb. Drop — Gauge pressure at test intervals from (or higher pressures if necessary) | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| Depth | | Elevation | | 50-40 lb. | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. | |
| From | To | From | To | | | | | | |
| 54.5 | 59.5 | | | No Hold | | | | | |
| 49.5 | 54.5 | | | No Hold | | | | | |
| 44.5 | 49.5 | | | 1 min. 15 sec. | 3 min. | 6 min. 15 sec. | 10 min. 30 | | To 7 p.s.i. |
| 39.5 | 44.5 | | | 1 min. 20 sec. | 4 min. | 8 min. 15 " | 14 min. 30 | | To 8 p.s.i. |
| | | | | | | | | | |
| | | | | | | | | | |
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Description of operations and general information:

2 hrs.

Sheet No. 1 of 1
Date 9-15-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek; River Yellow Creek; Hole No. 5; Rig No. 4

Location of Hole 15+72 219' LT Baseline "A"

Contractor Geo. Mechanics; Driller Bob Copechal; Elev. top of Hole 1122.0

Type & No. of Pump bean royal; No. of Meter 20792925; Elev. top of rock

PART I — DATA ON FLOW TEST

| Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Press. Gauge lbs./sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45.0 | 50.0 | | | 50 | 9:15 | 9:20 | 5 | 2380.0 | 2480.0 | 100 | |
| 40.0 | 45.0 | | | 50 | 9:35 | 9:40 | 5 | 2565.0 | 2664.0 | 99 | |
| 35.0 | 40.0 | | | 50 | HOLD | NO FLOW | | | | | |

PART II — HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Time on Each 10 lb. Drop Gauge pressure at test intervals from 50-40 lb. (or higher pressures if necessary) | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 35.0 | 40.0 | | | 30 sec. | 1 min. | 2 min. 30 sec. | 8 min. | 16 min. | To 3 p.s.i. |
| 30.0 | 35.0 | | | 1 min. 30 sec. | 3 min. 40 sec. | 10 min. | 20 min. | 30 min. | To 3 p.s.i. |

Description of operations and general information:

1.75 hr.

Sheet No. 1 of 1
Date 9-1-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek; River Yellow Creek; Hole No. 21; Rig No. 3

Location of Hole 0+16 343' RT Baseline "D"

Contractor Geo. Mechanic, Inc.; Driller B. Battich; Elev. top of Hole

Type & No. of Pump Myno; No. of Meter 20792925; Elev. top of rock

PART I — DATA ON FLOW TEST

| Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Press. Gauge lbs./sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 59.0 | 64.0 | | | 50 | 10:18 am | 10:23 am | 5 | 1860.0 | 1957.0 | 97.0 | |

PART II — HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Time on Each 10 lb. Drop: Gauge pressure at test intervals from 50-40 lb. (or higher pressures if necessary) | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 59.0 | 64.0 | | | NO HOLD | | | | | |
| 54.0 | 59.0 | | | 1 min. 20 sec. | 2 min. | 4 min. | 11min.10sec. | 15 min. | To 3 p.s.i. |
| 49.0 | 54.0 | | | 6 min. 30 sec. | 14 min. | 30 min. | -- | -- | -- |

Description of operations and general information:

1.50 hr.

Sheet No. 1 of 1
Date 9-7-72

# REPORT OF WATER PRESSURE TESTING IN CORE DRILL HOLES

Dam Site Yellow Creek River Yellow Creek ; Hole No. 22 ; Rig No. 3

Location of Hole 6+04 185' LT Baseline "C"

Contractor Geo. Mechanic ; Driller B. Battich ; Elev. top of Hole

Type & No. of Pump Myno ; No. of Meter Rockwell 20792925 ; Elev. top of rock

PART I DATA ON FLOW TEST

| Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Press. Gauge lbs./sq.in. | Time Started | Time Stopped | Time Min. | Water Meter Readings At start of test | At end of test | Total gals. of water used | Gal. or cu.ft. per min. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 70.0 | 75.0 | | | 50 | 9:37 | 9:42 | 5 | 1990.0 | 2116.0 | 126.0 | |
| 65.0 | 70.0 | | | 50 | 11:25 | 11:30 | 5 | 2252.0 | 2358.5 | 106.5 | |

PART II HOLDING TEST - MAXIMUM PRESSURE 50 p.s.i.

| Data on Pressure Section of hole tested Depth From | Depth To | Elevation From | Elevation To | Time on Each 10 lb. Drop Gauge pressure at test intervals from 50-40 lb. | 40-30 lb. | 30-20 lb. | 20-10 lb. | 10-0 lb. (or higher pressures if necessary) | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 70.0 | 75.0 | | | NO HOLD | | | | | |
| 65.0 | 70.0 | | | NO HOLD | | | | | |
| 60.0 | 65.0 | | | 1 min. 25 sec. | 3min. 55sec. | 5min. 3 | s. 18min. | 18 mi-. | @ 4 p.s.i. |
| 55.0 | 60.0 | | | 7 min. | 22 min. | 30 min. | -- | -- | @ 24 p.s.i. |

Description of operations and general information:

2 hr.

APPENDIX "C"

SAMPLING STATION LOCATIONS

FIELD pH AND FLOW QUANTITIES

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 1 X | 1/28/71 | 7.7 | 1.6 | 2,304 | Little Connoquenessing Creek - 300 feet east (upstream) of Yellow Creek |
| 2 X | 1/28/71 | 7.5 | 2.1 | 3,024 | Little Connoquenessing Creek - 600 feet west (downstream) of Yellow Creek |
| 3 X | 1/28/71 | 7.2 | 2.8 | 4,032 | Yellow Creek - 500 feet north of confluence with Connoquenessing Creek |
| 4 | 1/28/71 | 7.6 | 0.8 | 1,152 | Spring House - 150 feet north of Station #3, @ toe of slope on west side of road. |
| 5 X | 1/28/71 | 7.2 | 2.3 | 3,312 | Yellow Creek - north of Station #4 |
| 6 | 1/28/71 | 7.8 | - | - | Drift Mine - 36 feet south of Pole $\frac{262}{16}$ |
| 7 | 1/28/71 | 3.9 | 2.1 | 3,024 | Drift Mine - east side of road |
| 8 | 1/28/71 | 6.7 | 0.9 | 1,296 | Pipe Discharge - west side of road and 20 feet south of Pole $\frac{262}{25}$ |
| 9 | 1/28/71 | 4.5 | - | - | Pipe Discharge - west side of road |
| 10 | 1/28/71 | 3.1 | - | - | Drift Mine - east side of road opposite Pole $\frac{262}{29}$ |
| 10A | 1/28/71 | 5.2 | - | - | Drift Mine - across from Station #10 on west side of road |
| 11 | 1/28/71 | 7.7 | - | - | Discharge - 300 feet north of Station #10 on south side of private road that runs east of Yellow Creek Rd. |
| 12 | 1/28/71 | 7.5 | - | - | Discharge - 120 feet south of Pole $\frac{262}{32}$ on west side of road, south of White house |
| 13 | 1/29/71 | 7.3 | - | - | Pipe Discharge - 90 feet north of Pole $\frac{262}{10}$ on west side of road. |
| 14 | 1/29/71 | 7.6 | - | - | Discharge - north of Station #13 on east side of road |
| 15 | 1/29/71 | 7.0 | - | - | Pipe Discharge - 36 feet south of Pole $\frac{262}{19}$ on west side of road |
| 16 | 1/29/71 | 7.7 | - | - | Discharge - north of Station #10 |
| 17 | 1/29/71 | 3.2 | - | - | Drift Mine - at Station #10 |
| 18 | 1/29/71 | 6.6 | - | - | Discharge - east side of road near Pole 918-165 |
| 19 | 1/29/71 | 6.9 | - | - | Pipe Discharge - east side of road and north of old farm |
| 20 | 1/29/71 | 7.1 | - | - | Ditch - east side of road by driveway |
| 21 | 1/29/71 | 7.5 | - | - | Ditch - 25 feet north of Station #20 on east side of road |
| 22 | 1/29/71 | 7.5 | - | - | Discharge - 60 feet south of Pole 691/32 and south of Station #20 on east side of road |

W.H.G.
3/19/74

"X" after number denotes stream sampling station
No "X" denotes discharge sampling station

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 23 | 1/29/71 | 6.8 | - | - | Ditch - West side of road that crosses Yellow Creek |
| 24 | 1/29/71 | 7.3 | - | - | Discharge - west side of road opposite Station #23 |
| 25X | 1/29/71 | 7.4 | - | - | Stream - east side of road |
| 26X | 1/29/71 | 7.3 | - | - | Stream - 25 feet north of Station #25 |
| 27X | 1/29/71 | 7.4 | - | - | Stream - west of road, combined flow of Station # 25 and 26. |
| 28 | 1/29/71 | 6.5 | - | - | Discharge - east side of road in rocks |
| 29 | 1/29/71 | 6.9 | - | - | Ditch - east side of road near Station #18 |
| 30 | 1/29/71 | 7.0 | - | - | Ditch - east side of road by culvert near farm |
| 31X | 1/29/71 | 7.0 | - | - | Stream - west side of road across from Station #30 |
| 32X | 1/29/71 | 7.2 | - | - | Stream - east side of road north of culvert |
| 33X | 1/29/71 | 7.7 | - | - | Stream - east side of road, small stream flowing from house into Station #32 |
| 34X | 1/29/71 | 7.5 | - | - | Stream - east side of road and east of Station #33 |
| 35X | 2/8/71 | 7.6 | 7.5 | 10,800 | Stream - east side of road |
| 36 | 2/8/71 | 7.6 | 0.5 | 677 | Ditch - south of Station #35 |
| 37 | 2/8/71 | 7.2 | - | - | Ditch - north of Station #35 |
| 38X | 2/8/71 | 7.4 | 7.5 | 10,800 | Stream - west side of road near Station #35 |
| 39X | 2/8/71 | 6.0 | 2.5 | 3,600 | Stream - east side of road near house |
| 40X | 2/8/71 | 7.2 | 10.0 | 14,400 | Stream - east side of road |
| 41 | 2/8/71 | 7.4 | 15.0 | 21,600 | Ditch - north of Station #40 |
| 42X | 2/8/71 | 7.4 | 1.0 | 1,440 | Stream - west side of road across from Station #40 |
| 43X | 2/8/71 | 7.2 | 7.5 | 10,800 | Stream - east side of road, north of Hwy. Marker 3/10 and south of farm |
| 44 | 2/8/71 | 7.2 | Ponded | - | Pond - northeast of Station #43 behind farm |
| 45 | 2/8/71 | 7.4 | 1.3 | 1,800 | Discharge - 10 feet south of Hwy. Marker 3/10 |

W.H.G.
3/19/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| | SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|---|
| | | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| | 46 | 2/8/71 | 7.4 | 7.5 | 10,800 | Ditch - On east side of road |
| | 47 | 2/8/71 | 7.6 | 15 | 21,600 | Pipe Discharge - West of road |
| | 48X | 2/8/71 | 7.2 | .78 | 1,123 | Stream - East of road at farm |
| | 49 | 2/8/71 | 7.4 | 7.5 | 10,800 | Ditch - North of Station #48 on east of road |
| | 50 | 2/8/71 | 4.2 | 1.0 | 1,440 | Discharge - North of culvert; east side of road |
| | 51 | 2/8/71 | 3.5 | 1.0 | 1,440 | Discharge - South of culvert; east side of road |
| | 52 | 2/8/71 | 3.7 | 15.0 | 21,600 | Culvert - west of road; Confluence of Stations 50 and 51. |
| | 53 | 2/8/71 | 6.0 | 2.5 | 3,600 | Ditch - South of Station 51; north of mine. |
| | 54 | 2/8/71 | 3.0 | 1.1 | 1,584 | Ditch - South of Station 53 at mine on east side of road. |
| | 55 | 2/8/71 | 3.0 | 1.0 | 1,440 | Ditch - South of mine on east side of road |
| | 56 | 2/8/71 | 5.8 | 1.5 | 2,160 | Discharge - South of culvert; below road crossing on east side of road |
| | 57 | 2/8/71 | 6.5 | 3.0 | 4,320 | Culvert - East side of road. |
| | 58 | 2/8/71 | 6.2 | 0.9 | 1,296 | Culvert - East side of road. |
| | 59X | 2/8/71 | 6.1 | 30.0 | 43,200 | Stream - At old mining area. |
| FC | 60 | 2/8/71 | 3.1 | Seepage | - | Drift Mine - Southeast of Station 59 |
| FC | 61 | 2/8/71 | 3.0 | Seepage | - | Drift Mine - East of Station 59 |
| | 62 | 2/8/71 | 3.2 | 3.0 | 4,320 | Culvert - East side of road; North of Station 59. |
| | 63 | 2/8/71 | 3.1 | 1.1 | 1,584 | Discharge - 50 feet east of culvert of Station 62 |
| | 64X | 2/8/71 | 7.3 | 2.5 | 3,600 | Stream - 75 feet west of Station 62. |
| | Stanford #1 65 | 2/8/71 | 6.5 | 3.0 | 4,320 | Discharge - 150 feet South of Station 64; West side of road |
| | Stanford #1 66X | 2/8/71 | 6.1 | 30.0 | 43,200 | Yellow Creek - between Stations 64 and 65. |
| | Stanford #1 67X | 2/8/71 | 6.1 | 30.0 | 43,200 | Yellow Creek - Southwest of Station 65 |
| | 68 | 2/8/71 | 7.1 | 30.0 | 43,200 | Culvert - East side of road; 100 feet south of W.P. Pole #112353. |

J.R.C.
3/19/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 69 | 2/ 8/71 | 6.8 | Seepage | - | Culvert - 50 feet east of W.P. Pole #112333 |
| 70 | 2/ 8/71 | 6.9 | 1.0 | 1,440 | Ditch - North of Station 69 |
| 71X | 2/12/71 | 6.8 | - | - | Yellow Creek - North of Kelly Road at Bridge |
| 72 | 2/12/71 | 5.7 | 1.39 | 2,000 | Pipe Discharge - South of Kelly Road, west of house Driveway (12" C&P) |
| 73 | 2/12/71 | 5.5 | .78 | 1,125 | Ditch - 100 feet west of Station 72; North of Kelly Road |
| 74 | 2/12/71 | 3.6 | 1.04 | 1,500 | Pipe Discharge - 0.1 Mile west of Station 72; West of Kelly Road (12" C.M.P.) |
| 75 | 2/12/71 | 3.7 | 1.04 | 1,500 | Ditch - 0.1 mile west of Station 72; East of Kelly Road. |
| 76 | 2/12/71 | 6.3 | 1.56 | 2,250 | Discharge - 0.3 mile west of Station 72; East of Kelly Road; 25 ft. right of road. |
| 77 | 2/12/71 | 6.5 | 3.57 | 5,143 | Discharge - 0.4 mile west of Station 72; East of Kelly Road; 10 ft. from edge of road. |
| 78 | 2/12/71 | 6.5 | 1.25 | 1,800 | Discharge - 50 ft. west of Station 77; 15 ft. east of road on slope. |
| 79 | 2/12/71 | 6.8 | 3.13 | 4,500 | Ditch -50 ft west of Station 77. |
| 80 | 2/12/71 | 6.7 | 8.33 | 12,000 | Pipe Discharge - 50 ft. west of Station 77; East of Kelly Road of Pole # P.E. 32. (12" C.M.P.) |
| 81 | 2/12/71 | 6.0 | 12.5 | 18,000 | Ditch - 0.5 mile west of Station 72; East of Kelly Road; Entrance to strip mine. |
| 82 | 2/12/71 | 5.9 | 8.33 | 12,000 | Ditch - 50 ft. west of Station 81; East of Kelly Road. |
| 83 | 2/12/71 | 6.2 | 12.5 | 18,000 | Pipe Discharge - 50 ft. west of Station 81; West of Kelly Road (12" C.M.P.) |
| 84 | 2/12/71 | 6.8 | 1.34 | 2,000 | Pipe Discharge - 0.6 mile west of Station 72; West of Kelly Road at mine entrance road (12" C.M.P.) |
| 85 | 2/12/71 | 6.5 | 4.17 | 6,000 | Discharge - 1.1 mile from Station 71; East of Kelly Road 10 ft. from roadway. |
| 86 | 2/12/71 | 6.8 | 25 | 36,000 | Ditch-250 ft. West of Station 85; East of Kelly Road. |
| 87 | 2/12/71 | 4.9 | 1.25 | 1,800 | Discharge - 250 ft. west of Station 85; 5 ft. from roadway. |
| 88 | 2/12/71 | 5.5 | 12.5 | 18,000 | Discharge - 250 ft. west of Station 85; East of Kelly Road; 30 ft. off roadway. |
| 89 | 2/12/71 | 6.3 | 12.5 | 18,000 | Ditch - 250 ft. west of Station 85; East of Kelly Road. |
| 90 | 2/12/71 | 6.5 | 25 | 36,000 | Pipe Discharge - 250 ft. west of Station 85; West of Kelly Road (24" R.C.P.) |
| 91 | 2/12/71 | 6.2 | 1.47 | 2,118 | Discharge - 1.2 mile west of Station 71; East of Kelly Road; 5 ft. East of roadway. |

J.E.S.
3/13/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 92 | 2/12/71 | 7.0 | 2.08 | 3,000 | Pipe Discharge - 1.3 mile west of Station 71; west of Kelly Road. (12" C.M.P.) |
| 93 | 2/12/71 | 7.1 | 8.33 | 12,000 | Pipe Discharge - 1.7 mile west of Station 71; West of Kelly Road (24" C.M.P.) |
| 94 | 2/12/71 | 7.0 | 8.33 | 12,000 | Pipe Discharge Under road to east side of road (12" CMP) |
| 95 | 2/12/71 | 7.2 | 12.5 | 18,000 | Ditch - East side of Kelly Road. |
| 96 | 2/12/71 | 7.1 | 25 | 36,000 | Pipe Discharge - West of Kelly Road (24" RCP) |
| 97 | 2/16/71 | 7.7 | 5.0 | 7,200 | Pipe Discharge - East of I-79; 100 ft. South of Highway Marker 5/85 (48" RCP & 4" underdrain) |
| 98 | 2/16/71 | 7.7 | 25 | 36,000 | Pipe Discharge - East of I-79; 0.5 mile from Yellow Creek Road and I-79 Ramp at Highway Marker 5/80 (24" RCP |
| 99X | 2/16/71 | 7.6 | 25 | 36,000 | Little Connoquenessing Creek - 20 ft. South of flow entering from Station 97. |
| 100 | 2/16/71 | 7.5 | 25 | 36,000 | Pipe Discharge - East of I-79 at Highway Marker 6/00 (48" R.C.P.) |
| 101 | 2/16/71 | 7.3 | .25 | 360 | Discharge - East of I-79; at Highway Marker 6/25 |
| 102 | 2/16/71 | 7.5 | 2.08 | 3,000 | Pipe Discharge - East of I-79; 200 ft. South of Highway Marker 6/30 |
| 103 | 2/16/71 | 6.7 | .63 | 900 | Pipe Discharge - East of I-79; at Highway Marker 91/2 (6" V.C.P.) |
| 104 | 2/16/71 | 7.1 | 25 | 36,000 | Pipe Discharge - East of I-79; 100 ft. South of Highway Marker 6/45 (24" R.C.P.) |
| 105 | 2/16/71 | 7.0 | 8.33 | 12,000 | Pipe Discharge - East of I-79; 25 ft. South of Highway Marker 6/50 (18" R.C.P.) |
| 106X | 2/16/71 | 6.9 | 25 | 36,000 | Yellow Creek - 10 ft. above Station 105 outlet. |
| 107 | 2/16/71 | 7.1 | 25 | 36,000 | Culvert - East of I-79; 250 ft. North of Highway Marker 6/50. |
| 108 | 2/16/71 | 8.4 | 12.5 | 18,000 | Pipe Discharge - East of I-79; 200 ft. North of Highway Marker 6/55 (24" R.C.P.) |
| 109 | 2/16/71 | 8.0 | .5 | 720 | Pipe Discharge - East of I-79; Highway Marker 6/65 (12" CMP) |
| 110 | 2/16/71 | 7.7 | 1.66 | 2,400 | Pipe Discharge - East of I-79; 300 ft. North of Highway Marker 6/65 (12" R.C.P.) |
| 111 | 2/18/71 | 8.1 | 12.5 | 18,000 | Pipe Discharge - East of I-79; 250 ft. South of Highway Marker 6/75 (24" R.C.P.) |
| 112 | 2/18/71 | 7.2 | 1.25 | 1,800 | Pipe Discharge - East of I-79; 75 ft. South of Highway Marker 6/90 (72" S.P.P.) |
| 113 | 2/18/71 | 7.3 | .83 | 1,200 | Pipe Discharge - East of I-79; 200 ft. South of Highway Marker 6/95 (18" C.M.P.) |
| 114 | 2/18/71 | 4.9 | 5 | 7,200 | Strip Mine - East of I-79; between Highway Markers 7/00 and 7/05; North End of Mine. |

J.R.C.
3/19/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 115 | 2/18/71 | 6.7 | 25 | 36,000 | Ditch - East of I-79; 100 ft. North of 2 Oak Trees. 200 ft. off roadway. |
| 116 | 2/18/71 | 7.0 | Ponded | - | Drift Mine - East of I-79; 200 ft. Right of 2 Oak Trees. Entrance is covered. |
| 117 | 2/18/71 | 5.6 | Ponded | - | Drift Mine - 100 ft. South of Station 116. |
| 118 | 2/18/71 | 6.3 | 25 | 36,000 | Pipe Discharge - From Station 117 (8" C.M.P.) |
| 119 | 2/18/71 | 7.0 | 25 | 36,000 | Ditch - West of Barnyard. |
| 120 | 2/18/71 | 7.1 | 25 | 36,000 | Culvert - 200 ft. South of Bridge at Spring House. |
| 121X | 2/18/71 | 7.1 | 25 | 36,000 | Stream - Under Bridge Adjacent to Little Yellow Creek. |
| 122 | 2/18/71 | 7.4 | 25 | 36,000 | Pipe Discharge - Under Road; Metal Post on Left side of Roadway is Painted Red. (12" C.M.P.) |
| 123 | 2/18/71 | 7.4 | 25 | 36,000 | Pipe Discharge - Underroad (12" C.M.P. |
| 124 | 2/18/71 | 7.5 | 25 | 36,000 | Culvert - Wood Bridge near end of road; Stream runs under I-79 thru 72" S.P.P.A. |
| 125X | 2/18/71 | 7.4 | 25 | 36,000 | Little Yellow Creek - At Roads end on right, under entrance to house. |
| 126X | 2/18/71 | 7.5 | 25 | 36,000 | Little Yellow Creek - Second Bridge to Left on Yellow Creek Road. |
| 127X | 2/18/71 | 7.2 | 25 | 36,000 | Yellow Creek - First Bridge to Left of Yellow Creek Road. |
| 128 | 2/19/71 | 6.2 | 1 | 1,440 | Strip Mine - Seepage; Left of Yellow Creek; 300 ft. North of Road. |
| 129X | 2/19/71 | 6.3 | - | - | Stream - 100 ft. from Station 128. |
| 130 | 2/19/71 | 6.7 | - | - | Strip Mine - Stream at North end of mine. |
| 131X | 2/19/71 | 6.7 | 25 | 36,000 | Stream - Running from hillside to left of Yellow Creek thru field. |
| 132X | 2/19/71 | 6.7 | 25 | 36,000 | Stream - Entering farm pond to left of Yellow Creek Road. |
| 133 | 2/23/71 | 5.4 | 12.5 | 18,000 | Discharge - North of Station 132. |
| 134X | 2/23/71 | 6.7 | 12.5 | 18,000 | Yellow Creek - 273 ft. from Station 133. |
| 135X | 2/23/71 | 6.9 | 12.5 | 18,000 | Yellow Creek - 111 ft. from Station 134. |
| 136X | 2/23/71 | 7.0 | 25 | 36,000 | Yellow Creek - 300 ft. from Station 135. |
| 137X | 2/23/71 | 6.9 | 25 | 36,000 | Yellow Creek - 150 ft. from Station 136. |

J.R.C.
3/19/71

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 138X | 2/23/71 | 6.9 | - | - | Yellow Creek - |
| 139X | 2/23/71 | 7.0 | - | - | Yellow Creek - |
| 140X | 2/23/71 | 6.5 | - | - | Yellow Creek - |
| 141X | 2/23/71 | 6.0 | - | - | Yellow Creek |
| 142X | 2/23/71 | 6.2 | - | - | Yellow Creek - North of Stream |
| 143X | 2/23/71 | 6.2 | - | - | Yellow Creek - South of Stream |
| 144X | 2/23/71 | 5.3 | - | - | Yellow Creek - End of Stream |
| 145X | 2/23/71 | 5.3 | - | - | Yellow Creek - |
| 146X | 2/24/71 | 7.0 | 12.5 | 18,000 | Stream - |
| 147 | 2/24/71 | 6.25 | 6.25 | 9,000 | Strip Mine - Stream flowing from. |
| 148 | 2/24/71 | 7.7 | 25 | 36,000 | Drift Mine - Seepage enters stream from mine area. |
| 149 | 2/24/71 | 8.0 | 6.25 | 9,000 | Drift Mine - Seepage from mine. |
| 150 | 2/24/71 | 8.5 | 5 | 7,200 | Drift Mine - Seepage from mine. |
| 151 | 2/24/71 | 8.3 | 12.5 | 18,000 | Drift Mine - Seepage from mine. |
| 152 | 2/24/71 | 7.4 | 25 | 36,000 | Drift Mine - Seepage from mine. |
| 153 | 2/24/71 | 9.4 | - | - | Strip Mine - Ponded area; 20 ft. diameter |
| 154 | 2/24/71 | 7.4 | 5 | 7,200 | Strip Mine - Stream from mine. |
| 155 | 2/24/71 | 8.2 | - | - | End of 6" pipe; Water pumped from active mine. |
| 156 | 2/24/71 | 8.2 | - | - | Pumped water enters pond. |
| 157X | 2/24/71 | 8.2 | - | - | Yellow Creek - Pumped water enters stream. |
| 158 | 2/24/71 | 8.1 | 25 | 36,000 | Strip Mine - Seepage from mine. |
| 159X | 2/24/71 | 7.1 | 25 | 36,000 | Yellow Creek - Along Strip Mine. |
| 160X | 2/25/71 | 7.2 | 25 | 36,000 | Yellow Creek - Along Roadway. |

J.R.C.
3/19/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 161 X | 2/25/71 | 7.3 | 25 | 36,000 | Yellow Creek - Off Roadway |
| 162 X | 2/25/71 | 7.0 | 5 | 7,200 | Yellow Creek - 70 ft. from Roadway. |
| 163 X | 2/25/71 | 7.2 | 25 | 36,000 | Yellow Creek - 500 ft. from Roadway |
| Stanford #2 164X | 2/25/71 | 6.2 | 25 | 36,000 | Yellow Creek - Bauder Rd. Branch - 100 ft. beyond Rwy. |
| Stanford #2 165X | 2/25/71 | 6.0 | - | - | Yellow Creek - Bauder Road Branch - Upstream from Station 164. |
| Stanford #2 166X | 2/25/71 | 6.2 | - | - | Yellow Creek - Bauder Rd. Branch - Downstream from Station 164. |
| Stanford #2 167 | 2/25/71 | 5.2 | - | - | Strip Mine - Seepage from mine. |
| Stanford #2 168 X | 2/25/71 | 5.4 | 25 | 36,000 | Stream - Upstream from Station 167. |
| Stanford #2 169 X | 2/25/71 | 5.9 | - | - | Yellow Creek Bauder Road Branch - Upstream from Station 168. |
| Stanford #2 170 X | 2/25/71 | 5.9 | - | - | Yellow Creek Bauder Road Branch - Downstream from Station 168. |
| Stanford #2 171 | 2/25/71 | 3.7 | 25 | 36,000 | Strip Mine - Stream from mine. |
| Stanford #2 172X | 2/25/71 | 6.3 | - | - | Yellow Creek Bauder Road Branch - Upstream from Station 171. |
| Stanford #2 173 X | 2/25/71 | 6.2 | - | - | Yellow Creek Bauder Road Branch - Downstream from Station 171. |
| Stanford #2 174 X | 2/25/71 | 5.8 | 6.25 | 9,000 | Stream - Next to House Trailer. |
| Stanford #2 175 X | 2/26/71 | 3.5 | 6.25 | 9,000 | Yellow Creek Bauder Rd. Branch-Parallel to Mine Road |
| Will be sealed-Stanford No. 2 176 | 2/26/71 | 3.7 | 8.33 | 12,000 | Drift Mine - Flow out of Mine. |
| Stanford #2 177 | 2/26/71 | 4.3 | 5 | 7,200 | Drift Mine - Flow out of mine; 100 ft. above Station 176. |
| Stanford #2 178 | 2/26/71 | 4.3 | - | - | Drift Mine - Seepage in swampy area. |
| 179 X | 2/26/71 | 6.0 | - | - | Yellow Creek Bauder Road Branch - At Bridge for Driveway. |
| 180 X | 2/26/71 | 6.7 | 25 | 36,000 | Yellow Creek-Bauder Road Branch |
| 181 X | 2/26/71 | 7.7 | 25 | 36,000 | Stream - |
| 182 X | 2/26/71 | 8.0 | 12.5 | 18,000 | Stream - 40 ft. above Station 181. |
| 183 | 2/26/71 | 6.1 | 6.25 | 9,000 | Ditch - |

J.E.T.
3/1? 71

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 184 | 2/26/71 | 5.0 | 25 | 36,000 | Strip Mine - Across Road from Stream. |
| 185 X | 2/26/71 | 7.0 | 25 | 36,000 | Stream - from field. |
| 186 X | 2/26/71 | 7.5 | - | - | Yellow Creek - Bauder Road Branch - Intersection above stream that follows road. |
| 187 X | 2/26/71 | 7.7 | - | - | Yellow Creek-Bauder Road Branch - Intersection above stream that goes to strip mine. |
| 188 X | 2/26/71 | 8.0 | - | - | Yellow Creek-Bauder Road Branch - Below stream intersection. |
| 189 | - | - | - | - | No Station Listed. |
| 190 X | 2/26/71 | 6.7 | - | - | Yellow Creek - Bauder Road Branch |
| 191 X | 2/26/71 | 6.1 | - | - | Yellow Creek-Bauder Road Branch-Stream intersection Right Branch |
| 192 X | 2/26/71 | 5.4 | - | - | Yellow Creek-Bauder Road Branch-Stream intersection Left Branch |
| 193 X | 2/26/71 | 5.5 | - | - | Yellow Creek-Bauder Road Branch |
| 194 X | 2/26/71 | 5.9 | 25 | 36,000 | Yellow Creek-Bauder Road Branch |
| 195 X | 2/26/71 | 6.1 | 12.5 | 18,000 | Yellow Creek-Bauder Road Branch |
| 196 X | 2/26/71 | 5.9 | - | - | Yellow Creek-Bauder Road Branch-Pinkerton Farm Area. |
| Stanford #1- 197 X | 3/1/71 | 3.5 | 25 | 36,000 | Stream-Along road as it enters Main Stream. |
| Stanford #1 198 X | 3/1/71 | 5.9 | - | - | Main stream above stream along road. |
| Stanford #1 199 X | 3/1/71 | 6.5 | - | - | Main stream below stream along road. |
| Stanford #1 200 X | 3/1/71 | 3.5 | 8.33 | 12,000 | Stream - from swamp area. |
| Stanford #1 201 | 3/1/71 | 4.1 | 6.25 | 9,000 | Strip Mine - 200 ft. off road. |
| Stanford #1 202 | 3/1/71 | 3.7 | - | - | Strip Mine - 100 ft. off road. |
| Stanford #1 203 | 3/1/71 | 3.5 | - | - | Strip Mine. |
| Stanford #1 204 X | 3/1/71 | 3.5 | 3.13 | 4,500 | Stream-from hillside. |
| Stanford #1 205 | 3/1/71 | 4.4 | 2.77 | 4,000 | Strip Mine-Seepage. |
| Stanford #1 206 | 3/1/71 | 4.2 | 12.5 | 18,000 | Strip Mine-Seepage. |

J.R.C.
3/19/74

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| Stanford #1 207 | 3/1/71 | 4.1 | - | - | Pipe Discharge - (15" concrete pipe) |
| 208 | 3/1/71 | 3.3 | 25 | 36,000 | Pipe Discharge - (18" concrete pipe) |
| 209 | 3/1/71 | 4.6 | 12.5 | 18,000 | Drift Mine - Seepage from mine. |
| 210 X | 3/1/71 | 5.7 | 12.5 | 18,000 | Stream-along road. |
| 211 | 3/1/71 | 4.3 | 8.33 | 12,000 | Drift Mine - Seepage from mine. |
| 212 | 3/1/71 | 4.2 | 12.5 | 18,000 | Strip Mine - Stream from mine. |
| 213 | 3/1/71 | 4.6 | - | - | Discharge - South of 15" concrete pipe taking water across road. |
| 214 | 3/1/71 | 5.2 | - | - | Discharge - North of 15" concrete pipe taking water across road. |
| 215 | 3/1/71 | 5.7 | 8.33 | 12,000 | Pipe Discharge - Under roadway (15" C.M.P. |
| 216 X | 3/1/71 | 6.7 | - | - | Stream - 300 ft. from road intersection. |
| 217 | 3/1/71 | 6.7 | 12.5 | 18,000 | Pipe Discharge - Stream from hillside. (15" C.M.P. |
| 218 | 3/1/71 | 6.8 | 5 | 7,200 | Pipe Discharge (15" R.C.P.) |
| 219 | 3/1/71 | 5.8 | 3.57 | 5,142 | Strip Mine - Stream from mine. |
| 220 | 3/1/71 | 5.2 | 25 | 36,000 | Pipe Discharge - (15" C.M.P.) |
| 221 | 3/1/71 | 6.4 | 25 | 36,000 | Pipe Discharge - North side of pipe (15" C.M.P.) |
| 222 | 3/1/71 | 5.7 | 12.5 | 18,000 | Pipe Discharge - South side of pipe (15" C.M.P.) |
| 223 X | 3/1/71 | 6.0 | 12.5 | 18,000 | Stream-Perpendicular to Bauder Rd. and 2[illegible]' from St. |
| Stanford #1 224 X | 3/2/71 | 6.6 | - | - | Stream - |
| Stanford #1 225 X | 3/2/71 | 6.5 | - | - | Yellow Creek - |
| Stanford #1 226 X | 3/2/71 | 6.6 | - | - | Yellow Creek - |
| Stanford #1 227 X | 3/2/71 | 6.5 | 8.33 | 12,000 | Yellow Creek - |
| Stanford #1 228 X | 3/2/71 | 6.7 | - | - | Yellow Creek - |
| Stanford #1 229 X | 3/2/71 | 6.5 | - | - | Yellow Creek - |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| Stanford 230 | #1 3/2/71 | 6.5 | - | - | Discharge - South of Station 228. |
| Stanford 231 | #1 3/2/71 | 6.5 | - | - | Strip Mine - At south end of strip mine. |
| Stanford 232 | #1 3/2/71 | 3.5 | - | - | Drift Mine-Stream flowing from mine east into Yellow Ck. |
| Stanford 233 X | #1 3/2/71 | 6.5 | - | - | Yellow Creek - North of Station 232. |
| Stanford 234 X | #1 3/2/71 | 5.9 | - | - | Yellow Creek - South of Station 232. |
| 235 X | 3/2/71 | 4.2 | - | - | Stream - Water ponding Northwest of Station 232. |
| 236 | 3/2/71 | 4.2 | 1 | 1,440 | Strip Mine - Seepage from South end of strip mine at top of slope. |
| 237 | 3/2/71 | 5.0 | 3.13 | 4,500 | Strip Mine - Seepage from toe of slope. |
| 238 | 3/2/71 | 5.9 | - | - | Strip Mine - At access road to mine. |
| 239 | 3/2/71 | 4.7 | 25 | 3,600 | Strip Mine - At toe of slope; North of Station 238. |
| 240 | 3/2/71 | 6.8 | - | - | Discharge - Below Station 239. |
| 241 | 3/2/71 | 3.6 | 6.25 | 9,000 | Strip Mine - Seepage at toe of slope. |
| 242 | 3/2/71 | 5.3 | - | - | Pipe Discharge - (48" R.C.P.) |
| 243 X | 3/3/71 | 4.2 | 25 | 36,000 | Yellow Creek-Kelly Road Branch |
| 244 | 3/3/71 | 4.2 | Ponded | - | Strip Mine. |
| 245 | 3/9/71 | 5.7 | 5 | 7,200 | Strip Mine - Seepage |
| 246 | 3/9/71 | 6.9 | 25 | 36,000 | Strip Mine - Seepage from bottom of slope. |
| 247 | 3/9/71 | 6.9 | 25 | 36,000 | Drift Mine - Off Kelly Road |
| 248 | 3/10/71 | 7.5 | - | - | Strip Mine - In stream flowing from mine. |
| 249X | 3/10/71 | 7.5 | - | - | Yellow Creek- |
| 250X | 3/10/71 | 7.5 | - | - | Yellow Creek - At confluence of Stations 248 & 249. |
| 251 | 3/10/71 | 7.5 | - | - | Strip Mine - At end of stream in mine to the Northwest. |
| 252 | 3/10/71 | 6.8 | .2 | 288 | Strip Mine - at toe of slope. |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LOCATION, FIELD pH and FLOW QUANTITIES

| SAMPLING STATION NUMBER | DATE | pH | FLOW | | LOCATION |
|---|---|---|---|---|---|
| | | | GALLONS PER MINUTE | GALLONS PER DAY | |
| 253 | 3/10/71 | 7.0 | 1 | 1,440 | Discharge - North of Station 252. |
| 254 | 3/10/71 | 7.2 | - | - | Culvert - North end of 3' x 5' R.C. Culvert. |
| 255 | 3/10/71 | 6.8 | 1.38 | 1,987 | Strip Mine - Seepage from West side of stream. |
| Hastings FC 256 | 3/10/71 | 5.2 | 25 | 36,000 | Drift Mine - Shaft behind junic pile. |
| 257 | 3/10/71 | 6.8 | 1 | 1,440 | Strip Mine - At toe of slope. |
| 258X | 3/10/71 | 7.2 | 25 | 36,000 | Stream - Flow from North. |
| 259X | 3/10/71 | 7.2 | 25 | 36,000 | Stream - Flow from East. |
| 260X | 3/10/71 | 7.2 | 25 | 36,000 | Stream - Flow from South. |
| 261X | 3/10/71 | 7.2 | 25 | 36,000 | Stream - At confluence of Stations 258, 259 and 260. |
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# APPENDIX "D"
# LABORATORY CHEMICAL ANALYSIS

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 28, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow | Field | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate | Flow | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate | Flow | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate |
| | g.p.m | pH | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. | g.p.m | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. | g.p.m | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. |
| 244 | - | - | - | - | - | - | - | - | - | 3.1 | 180 | - | 10. | 0 | 800 | - | 4.4 | 36 | - | 39 | 0 | 500 |
| 245 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.4 | - | 32 | 0.7 | 0 | 95 |
| 252 | 0.8 | - | 6.4 | - | 50 | 60 | 0 | 700 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 253 | 364 | 6.3 | 6.5 | - | 66 | 2.7 | 0 | 185 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 256 | 25 | 3.1 | 2.8 | 450 | - | 80 | 0 | 900 | - | 2.8 | 280 | - | 22.5 | 0 | 600 | - | - | - | - | - | - | - |
| 257 | 12.5 | 6.2 | 6.8 | - | 192 | 17.7 | 0 | 140 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
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YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 26, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow g.p.m | Field pH | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. |
| 221 | 8.3 | 5.7 | 6.3 | 2 | - | 0.7 | - | 200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 222 | 8.3 | 5.0 | 5.6 | 0 | 0 | 0.3 | - | 185 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 223 X | 1.3 | 5.3 | 5.8 | 10 | - | 0.1 | - | 170 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 223A X | 1.0 | 5.2 | 5.3 | 10 | - | 0.6 | - | 150 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 224 X | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.8 | - | 26 | 4.3 | 0 | 80 |
| 232 | 637 | 3.3 | 2.7 | 600 | - | 120 | 3.0 | 1200 | 130 | 2.7 | 650 | - | 140 | 1.8 | 1600 | 87 | 3.0 | 500 | - | 160 | 0 | 1500 |
| 233 X | 930 | 5.8 | 6.3 | - | 10 | 5.0 | 0 | 390 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 234 X | 950 | 5.6 | 3.5 | 48 | - | 27.5 | 0 | 475 | - | 5.1 | 44 | - | 22.4 | 14 | 500 | - | - | - | - | - | - | - |
| 235 X | - | - | - | - | - | - | - | - | 941 | 6.3 | - | 18 | 0.5 | 0 | 340 | 370 | 7.1 | - | 38 | 5.5 | 0 | 390 |
| 237 | 192 | 4.5 | 4.1 | 26 | - | 4.0 | 0 | 520 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 237A | 3.1 | 3.0 | 2.6 | 750 | - | 350 | 110 | 2700 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 237B | - | - | - | - | - | - | - | - | 1094 | 5.7 | 8 | - | 4 | 2.3 | 400 | 545 | 5.9 | - | 18 | 1.7 | 0 | 320 |
| 238 | 1,628 | 5.7 | 5.3 | 16 | - | 1.6 | 0 | 390 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 240 | 6.3 | 3.6 | 3.6 | 50 | - | 1.1 | 0 | 600 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 241 | 3.6 | 5.9 | 6.7 | - | 30 | 10 | 0 | 520 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 242 | 153 | 6.2 | 6.3 | 0 | 0 | 2.8 | 0 | 400 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 243 X | 65 | 3.3 | 3.1 | 1.10 | - | 12 | 0 | 1100 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 28, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow | Field | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate | Flow | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate | Flow | Lab | Acidity | Alk. | Total Iron | Ferrous Iron | Sulfate |
| | g.p.m | pH | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. | g.p.m | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. | g.p.m | pH | mg./l. | mg./l | mg./l | mg./l. | mg./l. |
| 201 | 58 | 3.1 | 2.6 | 1400 | - | 275 | 2.3 | 3100 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 202 | 12.5 | 3.2 | 2.5 | 1000 | - | 275 | 0.9 | 2000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 203 | 0.8 | 3.0 | 2.5 | 2100 | - | 350 | 1.1 | 5200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 204 X | 3.6 | 3.0 | 2.5 | 1600 | - | 250 | 18 | 3200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 206 | 4.2 | 3.1 | 3.1 | 160 | - | 25 | 0 | 475 | - | - | - | - | - | - | - | - | 5.8 | - | 20 | 3.2 | 0 | 185 |
| 207 | 66 | 3.0 | 3.0 | 150 | - | 4.3 | 0 | 600 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 208 | 238 | 3.4 | 3.4 | 104 | - | 1.5 | 0 | 1300 | - | 3.3 | 120 | - | 8.5 | 0.6 | 920 | - | - | - | - | - | - | - |
| 209 | 12.5 | 3.8 | 3.9 | 40 | - | 1.4 | 0 | 900 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 210 X | 12.5 | 5.0 | 5.0 | 13 | - | 0.5 | 0 | 120 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 211 | 2.8 | 3.8 | 3.8 | 42 | - | 4.3 | 0 | 1000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 213 | 43 | 3.7 | 3.5 | 84 | - | 3.3 | - | 540 | - | 3.3 | 146 | - | 6.5 | 0 | 1500 | - | - | - | - | - | - | - |
| 214 | 5.0 | 4.6 | 4.1 | 58 | - | 3.0 | 0 | 1050 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 215 | 8.3 | 4.7 | 4.8 | 50 | - | 0.7 | - | 390 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 217 | 6.3 | 5.6 | 6.2 | - | 10 | 0.1 | - | 640 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 218 | 8.3 | 6.1 | 6.6 | - | 2.0 | 0.6 | - | 460 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 219 | 3.1 | 5.1 | 5.2 | 20 | - | 0.5 | - | 360 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 220 | 8.3 | 5.0 | 4.8 | 36 | - | 0.3 | - | 560 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 28, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow g.p.m | Field pH | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. |
| 156 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4.3 | 30 | - | 10 | 0.3 | 300 |
| 163 X | - | - | - | - | - | - | - | - | 2659 | 4.0 | 4.6 | - | 22.5 | 0 | 480 | 1590 | 4.6 | 40 | - | 10 | 0.3 | 380 |
| 164 X | - | 7.3 | 6.8 | 0 | 0 | 1.4 | - | 105 | 1147 | 5.7 | 16 | - | 4.4 | 460 | - | 640 | 6.2 | - | 8.0 | 0.6 | 0 | 400 |
| 165 X | 740 | 6.7 | 5.7 | 20 | - | 6 | 0 | 340 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 168 X | 43 | 4.3 | 3.5 | 60 | - | 9 | 0.8 | 190 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 171 | 85 | 3.4 | 2.7 | 500 | - | 300 | 0.1 | 1500 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 176 | 16 | 4.1 | 3.9 | 18 | - | 6 | 0 | 38 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 179 X | 3600 | 4.0 | 4.4 | 36 | - | 5 | 0 | 370 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 182 X | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.3 | - | 10 | 7.0 | 0 | 400 |
| 183 | 1.3 | 5.7 | 6.2 | - | 4 | 0.1 | 0 | 480 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 191 X | 1900 | 5.0 | 5.3 | 18 | - | 1.4 | 360 | - | - | - | - | - | - | - | - | - | 3.9 | 42 | - | 10 | 0.7 | 420 |
| 192 X | 1.0 | 4.1 | 6.3 | 8 | - | 9 | 0 | 130 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 195 X | 5.0 | 6.1 | 6.8 | - | 20 | 9 | 0 | 500 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 196 X | 789 | 5.7 | 4.7 | 52 | - | 8 | 0 | 370 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 197 X | 12.5 | 3.1 | 2.7 | 1250 | - | 280 | 1.5 | 2200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 199A | - | - | - | - | - | - | - | - | 1929 | 5.1 | 46 | - | 20 | 20 | 400 | 980 | 4.1 | 30 | - | 1.4 | 0 | 440 |
| 200 X | 5.0 | 3.0 | 2.6 | 1100 | - | 110 | 0.9 | 2000 | 6.8 | 2.6 | 1400 | - | 200 | 1.3 | 2600 | 20 | 2.9 | 1100 | - | 200 | 0.3 | 3100 |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 26, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow g.p.m | Field pH | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. |
| 53 | 1.7 | 3.9 | 3.1 | 200 | - | 135 | - | 475 | - | 2.8 | 280 | - | 80 | 0 | 475 | - | - | - | - | - | - | - |
| 54 | 1.0 | 3.8 | 3.1 | 120 | - | 32.5 | - | 350 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 56 | 2.8 | 6.6 | 6.3 | - | 8 | 0.6 | - | 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 57 | 6.3 | 6.9 | 7.2 | - | 34 | 0.6 | - | 42 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 58 | 0 | - | 7.3 | - | 46 | 0.4 | - | 28 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 59X | 330 | 7.3 | 7.0 | - | 4 | 0.5 | - | 32 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 60 | | | | | | | | | - | 2.8 | 180 | - | 1200 | 0 | 400 | - | - | - | - | - | - | - |
| 61 | Ponded | 3.5 | 3.1 | 180 | - | 105 | - | 475 | 2.8 | 120 | - | 1400 | 3.3 | 260 | - | - | - | - | - | - | - | - |
| 61A | - | - | - | - | - | - | - | - | - | 5.9 | - | 8 | 1.6 | 0 | 38 | - | - | - | - | - | - | - |
| 62 | 6.3 | 3.3 | 3.2 | 64 | - | 8.5 | - | 160 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 63 | 3.1 | 3.3 | 3.2 | 90 | - | 4.5 | - | 200 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 64X | 12.5 | 6.1 | 6.5 | - | 60 | 3.3 | - | 110 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 65 | 8.3 | 4.8 | 6.6 | - | 40 | 2.2 | - | 110 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 66X | 5500 | 5.1 | 5.8 | 20 | - | 2.8 | - | 310 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 67X | 5900 | 5.0 | 5.7 | 20 | - | 3.1 | - | 320 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 69 | 12.5 | 5.9 | 6.0 | 0 | 0 | 1.0 | - | 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 71 | 3200 | 6.4 | 6.8 | - | 40 | 0.5 | - | 220 | 792 | 6.9 | - | 52 | 3 | 0 | 370 | 325 | 7.0 | - | 48 | 3.5 | 0 | 310 |
| 72 | 4.2 | 3.8 | 4.6 | 36 | - | 0.7 | - | 270 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 73 | 5.0 | 4.3 | 4.4 | 52 | - | 0.9 | - | 340 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

YELLOW CREEK
DRAINAGE BASIN STUDY
POLLUTION ABATEMENT PROJECT
LABORATORY CHEMICAL ANALYSIS

| SAMPLING STATION NUMBER | MARCH 29, 1971 to April 6, 1971 | | | | | | | | MAY 28, 1971 | | | | | | | JUNE 14, 1971 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow g.p.m | Field pH | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. | Flow g.p.m | Lab pH | Acidity mg./l. | Alk. mg./l | Total Iron mg./l | Ferrous Iron mg./l. | Sulfate mg./l. |
| 3X | - | - | - | - | - | - | - | - | 5584 | 6.7 | - | 20 | 0.7 | 0 | 210 | 6840 | 7.0 | - | 30 | 1.5 | 0 | 160 |
| 7 | 2.1 | 2.6 | 3.6 | 40 | - | 15.4 | - | 105 | - | 3.6 | 52 | - | 260 | 0 | 320 | | | | | | | |
| 8 | 12.5 | 6.4 | 6.5 | - | 6 | 0.5 | - | 48 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 9 | 3.6 | 6.3 | 5.7 | 2 | - | 3.6 | - | 56 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10 & 17 | 2.5 | 3.1 | 2.9 | 260 | - | | - | 600 | - | 3.2 | 180 | - | 6.5 | 0 | 240 | - | - | - | - | - | - | - |
| 10A | 239 | 4.2 | 4.2 | 16 | - | 3.9 | - | 90 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 15 | 5.0 | 4.3 | 6.7 | - | 20 | 2.3 | - | 60 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 18 | 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 19 | 6.3 | 6.5 | 6.5 | - | 38 | 3.9 | - | 38 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 21 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.4 | - | 24 | 1.8 | 0 | 280 |
| 23 | 2.1 | 6.6 | 6.2 | - | 0 | 0.9 | - | 28 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6.0 | - | 6 | 3.2 | 0 | 320 |
| 28 | 2.1 | 7.0 | 6.5 | - | 12 | 2.2 | - | 28 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 29 | 2.1 | 7.2 | 6.7 | - | 10 | 3.1 | - | 28 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 30 | 875 | 7.2 | 6.7 | - | 14 | 0.1 | - | 22 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 31 X | - | 7.3 | 6.7 | - | 18 | 0.2 | - | 16 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 39 X | 213 | 7.0 | 7.0 | - | 78 | 0.3 | - | 150 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 50 | 2.5 | 4.0 | 3.8 | 36 | - | 2.6 | - | 95 | - | 3.7 | 32 | - | 1.6 | 0 | 100 | - | - | - | - | - | - | - |
| 51 | 4.2 | 4.1 | 3.5 | 44 | - | 22.5 | - | 160 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 52 | 3.1 | 4.0 | 3.3 | 100 | - | 57.5 | - | 350 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

"X" after number denotes stream sampling station
No "X" denotes discharge sampling station