Pollution Source 124 - Description - Quick Start Six

This pollution source is a 29 acre bony dump which was created by the operation of a coal processing plant near Beccaria. This bony dump is situated on the axis of a topographic as well as a structural basin, affecting all ground water seeps and surface drainage in that area.

The Eureka Mines No. 12 and No. 13 on the Lower Freeport (D) seam are situated on the western limb of the basin and contribute a large amount of alkaline water to the contaminated area. The Leland Mine No. 1, also located on the Lower Freeport seam, occupies the eastern limb of the basin and contributes alkaline ground water in the form of numerous seeps. In addition, this eastern portion of the basin has been extensively strip mined on the Lower Freeport and Upper Freeport seams, creating an inordinate amount of surface drainage due to the lack of vegetation.

The water from the Eureka Mines No. 12 and No, 13 passes through a large pond in the bony dump. 'This water enters the pond near the pond's discharge point causing a segregation of acid and alkaline water. The lower end of the pond is alkaline where the alkaline "D" seam water enters. The upper 2/3 of the pond is acid ranging from pH 2.5 to pH 4.0. The pond is almost entirely within the bony pile from which it derives its

AMD constituents. The AMD constituents are leached from the coal refuse by percolating rainfall which joins the standing water in the coal refuse material. This standing water then migrates from the refuse material to either the acid pond or directly to Muddy Run. Muddy Run flows through the refuse material for a distance of approximately 600 feet. Many small erosion channels indicate that many small, intermittent, non-measurable, acid seeps occur directly to Muddy Run along this 600 feet of contact.

The pollution source sampling station (124) was located on the discharge channel from the pond before its confluence with Muddy Run. All but one of the samples taken here were alkaline. The alkalinity is due to the alkaline "D" seam water passing through the discharge channel before mixing with the acid water in the upper end of the pond could occur. Some mixing does occur as seen from the degradation of the "D" seam water passing through the pond. The "D" seam water has an average pH of 7.5 prior to entering the pond, but the average pH at the discharge is 6.3. The single acid reading occurred during a period of heavy rainfall which flushed both the standing water in the refuse and the water in the pond, producing 14.6 pounds of acid per day. A large amount of the discharge is not monitored since it does not exit by way of the acid pond. It seeps directly into Muddy Run during periods of rainfall. This refuse material uses up some of the much needed alkalinity of the "D" seam discharge,

and most importantly is a very serious slugger. It has shown its capability of producing a minimum of 1,416 pounds of acid in a day and it is felt that a total acid slug of as much as 3,000 pounds per day could emanate from this refuse pile under such hydrologic conditions as a heavy rain following a dry period.

This bony dump is also causing siltation problems in the lower reach of Muddy Run and the southeastern portion of the refuse dump is burning. This area is scheduled for reclamation as Quick Start Six.

Pollution Source 1 24 - Abatement - Quick Start Six

The goal of reclamation at this site is two-fold: (1) to abate the acid pollution; and (2) to eliminate the stream siltation originating from the mine refuse dump.

The first step will be to haul the burning refuse to the existing pond for quenching. After all quenching has been satisfactorily completed, grading and compaction of the entire area will be performed.

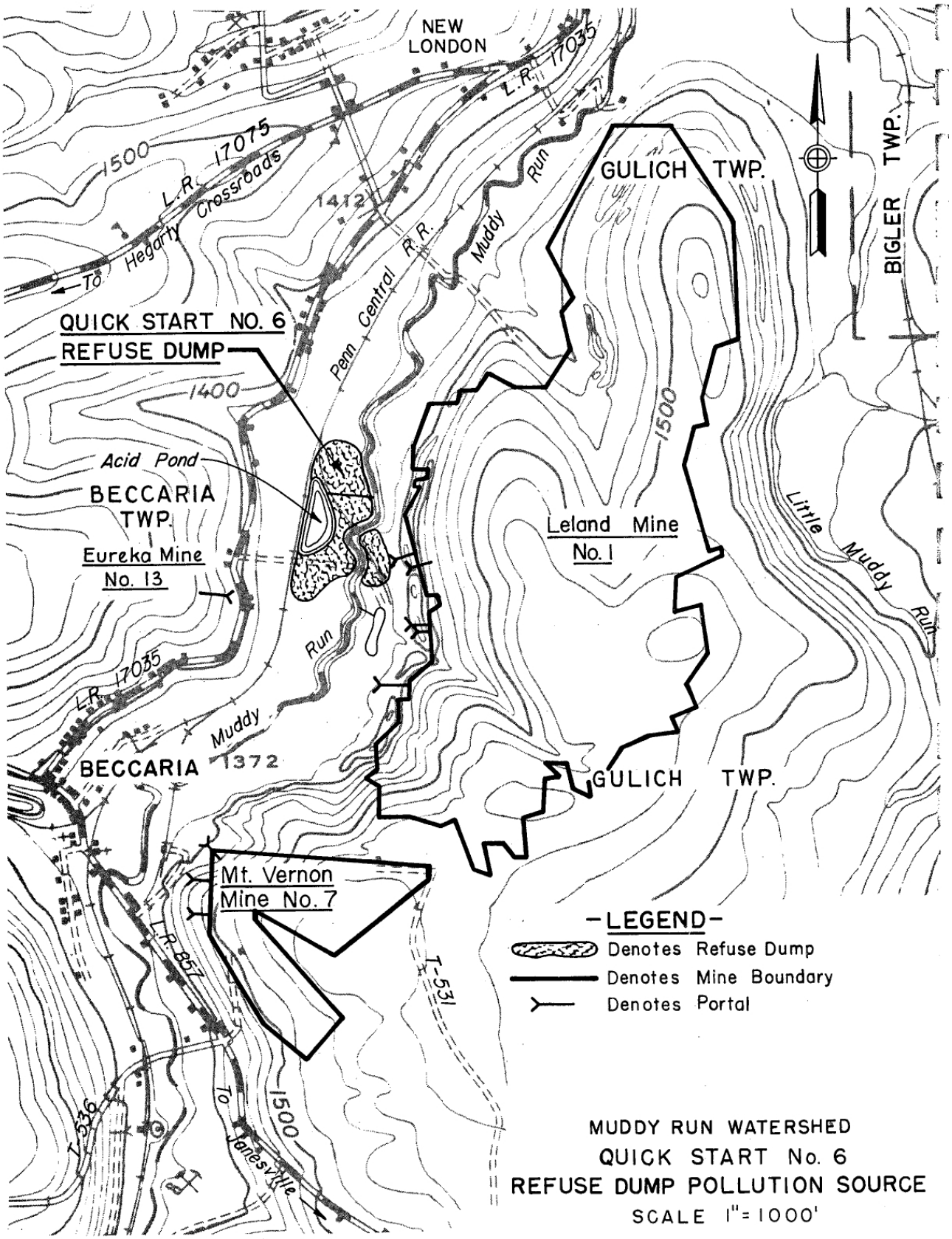
The finished grading will be designed to encourage water runoff, and eliminate ponding. The intent is to minimize the infiltration of rain water into the refuse.

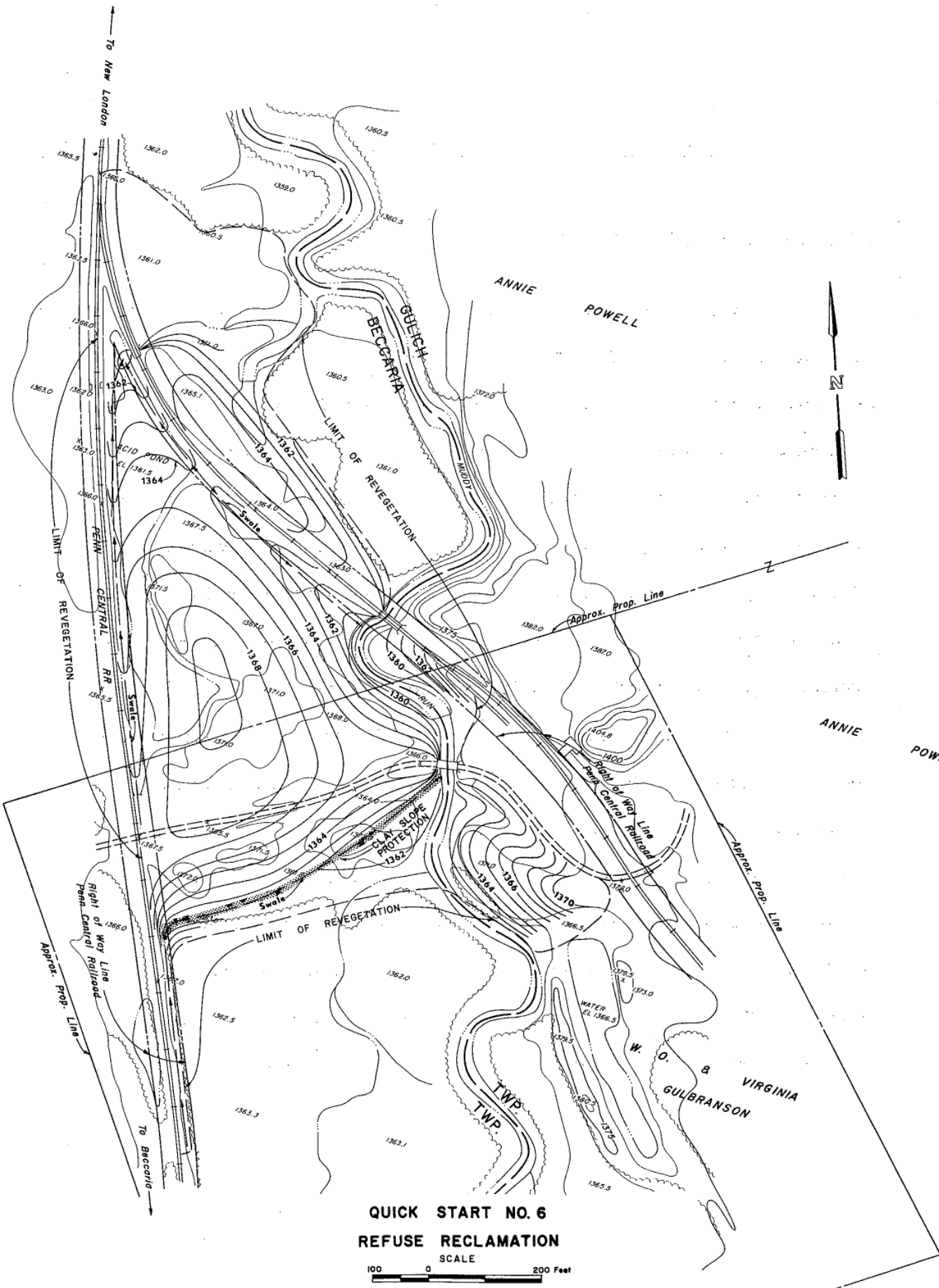
Vegetation will be established over the graded area by placing

topsoil, soil supplements, and grass seed. The soil and the grass will minimize infiltration of rainfall into the refuse and eliminate, or at least considerably reduce, siltation.

Directly to the south of the dump, a swamp has formed which is supplied by an alkaline discharge from the same "D" seam portal that discharges through this acid pond. The "D" seam discharge is split near its source. Approximately half of the water enters the swamp and a manmade dike carried the remaining half through a private pond. The water discharging from this private pond passes through. the acid pond. Diversion ditches and impermeable clay barriers will be placed near the southern edge of the refuse dump to shunt the swamp water directly to Muddy Run, preventing it from entering the refuse material. This ditch will be directed toward the source of the alkaline water in order to intercept some of the alkaline water before it enters the swamp. It was found, using field pH's, that the alkalinity in this water is being consumed by natural acidity within this swamp.

Estimated cost is $79,000.


NEW LONDON
L.R. 17035
1500
L.R. 17075
Crossroads
To Hegarty
1412
Penn Central R.R.
Muddy Run
GULICH TWP.
BIGLER TWP.
QUICK START NO. 6
REFUSE DUMP
1400
Acid Pond
BECCARIA TWP.
Eureka Mine No. 13
Leland Mine No. 1
1500
Little Muddy Run
L.R. 17035
Muddy Run
BECCARIA
1372
GULICH TWP.
Mt. Vernon Mine No. 7
L.R. 857
T-531
T-536
To Jamesville
1500
-LEGEND-
Denotes Refuse Dump
Denotes Mine Boundary
Denotes Portal
MUDDY RUN WATERSHED
QUICK START No. 6
REFUSE DUMP POLLUTION SOURCE
SCALE 1"=1000'



QUICK START NO. 6

REFUSE RECLAMATION

SCALE

100 0 200 Feet

Other Pollution Sources Requiring Abatement

Pollution Source 127, 128 and 129 - Description

These three pollution sources from two strip mines located two miles northeast of Blandburg have been combined because: (1) their discharges intermingle in part; (2) they lie relatively close together; (3) they have been regraded; (4) they are on the same seam; and (5) they require similar abatement measures. Their combined area is 109 acres and their combined average acid and iron loads is 2,686 pounds per day and 67 pounds per day, respectively. Both strip mines are on. the Clarion (A) seam. Although the flow is relatively low, this coal seam contributes extremely high concentrations of acid, iron and sulfate.

The strip mines have been completely regraded and some vegetation has occurred. The area within the State Game Lands has been seeded with grasses with only partial success. A small area in the vicinity of pollution source 127 has been reseeded with pines and has shown acceptable growth rates. Most of the discharge is coming from the toe of the spoil on the down dip edges of the strip mine. Most of the acid is caused by infiltration of rainfall through the highly acid spoil, with some small contribution from ground water entering the up dip side and flowing through

the base of the spoil. Lack of vegetation has allowed deep erosion channels to form in some areas of both of these strips. There is a large tree kill associated with pollution source 129.

Pollution Source 127, 128 and 129 - Abatement

The primary goal of abatement in this area is to enhance surface vegetation, thereby reducing the influx of precipitation and minimizing erosion. There are small scattered areas within both of these strip mines where regrading will be necessary to reduce the effects of past erosion. The surface of both of these mines is so highly acid and stony that a normal revegetation program will not be successful. It is, therefore, recommended that a surface application of quarry waste limestone be spread over the entire surface of both of these strips to an average depth of 1 inch and then disked into the surface. With the exception of a few areas, the surface should then be mulched, fertilized and planted with grasses. This limestone treatment will add some much needed alkalinity to the headwaters of Muddy Run. It will provide an alkaline medium for grass growth on the surface of the strip mine. Its fine particulate nature will reduce the average particle size on the surface of the mine, providing a better medium for growth. There are small steep areas on the down dip toe of the spoil

where trees will be planted together with grasses in order to reduce the effects of erosion that is likely to occur in these areas. Estimated cost is $125,000.

Pollution Source 116, 126 - Description

This pollution source complex is composed of three adjacent Clarion (A) seam strip mines located just southeast of Allemans. The pollution load was measured in part by two sampling stations (116, 126) where discrete flows could be measured. However, the major pollution load from this area occurs through many small seeps at the down dip edge of the strip mines. The total pollution load was gauged at sampling station 30 by subtracting the pollution loads contributed by pollution sources 127 and 128. This means of measurement indicated that an average of 2,205 pounds of acid per day, 11 .7 pounds of iron per day, and 4,537 pounds of sulfate per day are being discharged from this complex. In order to substantiate this indirect method of measurement, flows and samples were taken on the single surface tributary exiting from this complex. These measurements averaged 1,246 pounds per day acid, 7.3 pounds per day iron, and 2, 250 pounds per day sulfate, verifying that this strip mine complex is a major polluter.

The two small strip mines to the northwest are not regraded and have some vegetation. The large strip mine area is regraded and has little vegetation. Pollution source 126 monitors water leaving an impoundment formed by a roadbed. An average of 94 pounds of acid per day is discharging

from this pond. The AMD constituents present in this pond are derived entirely from the northernmost of the three strips. The average of 2 pounds per day acid measured at pollution source sampling station 116, before it was phased out, is the result of a low point in the spoil pile allowing water to exit from the pit formed by the last cut in the strip mine. This does not account for all the AMD from this strip, because some intermittent discharges occur (especially during periods of high rainfall) directly from the spoil material forming the northern bank of the receiving stream. The large, regraded strip mine is the major pollution source. Many small acid seeps occur along the down dip edge of this mine and there are several deep erosion channels where surface water exits during periods of high rainfall.

Pollution Source 116, 126 -Abatement

The two small strip mines should be regraded and the entire stripped area should receive surface treatment to enhance vegetation. The three strip mines within this area require similar abatement techniques and were combined to reduce the total abatement cost.

Estimated cost is $98,500.

Pollution Source 115 and 122 - Description

These are two continuous gravity discharges from a deep mine complex on the Lower Kittanning (B) seam located near Glasgow, producing combined acid and iron loads of 2,678 pounds per day and 326 pounds per day, respectively. The mines involved in this complex are: Miller Mine No. 1, Cambria Mills Mine No. 4, Miller Mine No. 4 and Scott Brothers Coal Company Mine No. 2, and a possibility exists of further connection with the Bucket Mine and Cambria Mills Smokeless Mine No. 2. Scott Brothers Coal Company Mine No. 2 is presently active. These drifts have been found to be associated with the Miller Mine No. 1. This was the first mine of the complex to be developed because the coal crops, in this vicinity. These drifts were reportedly sealed upon completion of mining. Then the Cambria. Mills Mine No. 4 was developed. The drifts associated with this mine were also sealed upon completion of mining. The entire north and northeast outcrop of the Miller Mine No. 1 and the Cambria Mills Mine No. 4 was stripped, breaking the seals of the four drifts associated with these two mines, shortly before or during the development of the Miller Mine No. 4 during the late 1950's. Stripping along the eastern outcrop has been backfilled and planted, but the stripping on the northern outcrop is only partially backfilled and is now planted. The Miller

Mine No. 4 and the Scott Brothers Mine No. 2 were not affected by the stripping. The Scott Brothers Mine No. 2 was entered by a slope opening and is draining down dip toward station 115. This company is neither pumping nor treating water at this time. Mine maps do not show a connection between the Scott Brothers Mine No. 2 and the BucketMine-Cambria Mills Smokeless Mine No, 2 complex. However, local residents report that such a connection does exist, thereby adding these two mines to this large mine complex and contributing more acid water to discharge points 115 and 122.

Pollution Source 115 and 122 Abatement

The large acid loads from this mine complex places this high on the abatement priority list. Complete mine inundation is the only practical abatement technique for this large area. The sealing of this mine will cause a head of approximately 240 feet to be exerted against the present discharge point at 115, and lesser amounts of head at other possible discharge points. The sealing of this mine will require the placement of 8 drift seals, 3 shaft seals and the placement of approximately 3,000 linear feet of clay liner against a highwall where strip mines have breached the outcrop barrier. Two of these drift seals will have to withstand 240

feet of head; one will have to withstand 140 feet of head; two 110 feet of head; two 70 feet of head; and the remaining one 10 feet of head. If the Scott Brothers Mine No. 2 is connected to either the Bucket Mine or the Cambria Mills Smokeless Mine No. 2, then the previously mentioned heads will be increased by approximately 250 additional feet. The first step in the abatement design for this complex will be to determine if this connection does indeed exist

Estimated cost is $265,000.

Pollution Source 133 - Description

This is a 7 acre non-backfilled strip mine on the Clarion (A) seam located approximately 1/2 mile north of Mountaindale. The open pit of this mine contains both coal and bony and is serving as a catchment pond for both rainfall and ground water. The discharge is intermittent, slugging Muddy Run during periods of high rainfall. The discharge has an average load of 166 pounds per day acid and 14 pounds per day iron.

Pollution Source 133 - Abatement

The mine will have to be backfilled and regraded and will need a surface treatment program in order to accommodate vegetation. Surface treatment will again entail the use of limestone because the regraded surface of this mine will be unsuitable for good vegetation growth.

Estimated cost is $18,000.

Pollution Source 131 and 132 - Description

This is a 93 acre non-backfilled strip mine complex on both the Clarion (A) and Lower Kittanning (B) seams, located just east of Blandburg. The combined average discharge from these sources is 1, 643 pounds per day acid and 56 pounds per day iron. The discharges are occurring from the down dip area of the strip mine . Precipitation is the major source of water for these discharges, with minor amounts of ground water entering through the highwall. This source is placed high on the priority list because it is located in the headwaters of Muddy Run and is a serious slugger.

Pollution Source 131 and 132 - Abatement

Most of the area within this strip mine will require some degree of regrading. The entire surface of the strip mine should receive surface treatment. Surface treatment will be similar to that specified for pollution sources 127 and 130.

Estimated cost is $232,500.

Pollution Source 101 -Description

The rock dump and bony pile remaining after completion of mining in Yorkshire Mine No. 1 on the Clarion (A) seam (located one mile south of Madera) is adding quantities of acid, iron and sulfate to Banian Run. This rock dump and bony pile contains remnants of the high sulphur Clarion coal. It averages 10 feet in height and comprises approximately 260, 000 square feet . The acid load discharged from this area is not large enough to overcome the alkalinity in Banian Run, but an average of 81 pounds per day of alkalinity is being consumed by discharges from this refuse pile. The sulfate and iron concentrations of Banian Run are also being increased through this area by 21 % and 733% respectively. The magnitude of the pollution load emanating from this source is measured by the difference between two sampling stations. This pollution source consists of many small intermittent flows thatwere not directly measurable. Sampling station 5 monitored the quality of the water entering the area and pollution source sampling station 101 monitored the quality of the water exiting the area. The pollution load at pollution source sampling station 101 minus the pollution load at sampling station 5 and also minus the load from pollution source 120 (which enters Banian Run between station 5 and 101) provided the measure of the pollution from source 101 .

Pollution Source 101 -Abatement

The steeply piled bony dump should be regraded in order to: (1) insure slope stability; and (2) isolate the refuse from through-flowing drainage channels. Percolating rainfall is the only water source that produces acid from this dump. Therefore, a layer of soil should be placed over the regraded refuse, then limed, fertilized, mulched and seeded with grasses to provide a medium for plant growth. A good vegetation cover will greatly decrease the amount of precipitation entering the spoil by (1) increasing surface retention of water which will be evaporated back to the atmosphere; and (2) increasing the biotic transpiration of water (which is nil at present) through the interception of precipitation by vegetation for use in their life processes.

Estimated cost is $24,000.

Pollution Source 107 (includes stations 104, 105 and 106) Description

The pollution is emanating from bony material resulting from the Glenmar Mine No. 1 tipple located just west of Beccaria. This tipple area was used for loading and clearing the Lower and Upper Freeport coal extracted from both the adjacent deep mine and later strip mine operations. The area is drained by a dendritic intermittently flowing system which confluences above station 107. This condition renders the water highly acid (97 pounds per day, 491 ppm) with proportionately high concentrations of iron (21 ppm) and sulfate (703 ppm). This bony dump averages 3 feet in thickness and has an area of approximately 400,000 square feet. The old tipple and railroad structures are still in place. The acid produced by mining on both the Upper and Lower Freeport coal seams is usually neutralized by limestone occurring in the underclay of these seams. However, the .resulting bony dumps are generally limestone-free and are often acid producing. Therefore, though little abatement work is required on the Upper and Lower Freeport Mines within this watershed, the resultant bony piles are often pollution sources and must be abated. Most of these coal refuse piles are "sluggers" because they are dependent almost entirely upon rainfall for acid production.

Pollution sources 104, 105 and 106 come from this same ref-

use dump. Pollution sources 105 and 106 are alkaline springs issuing from pipes at the base of the refuse dump. They have slightly high sulfate levels (average 397 ppm). These sources have been used at various times as a potable water supply by local residents.

Pollution source 104 measures the small tributary that flows by the refuse dump. This water is alkaline with low levels of sulfate and iron. The refuse dump is steep at this point and forms the western bank of the stream. Slumping of the refuse material occurs during periods of high rainfall, causing a siltation problem.

Pollution Source 107 (104, 105, 106) - Abatement

The coal refuse material should be graded to: (1) achieve slope stability; (2) improve runoff; and (3) to isolate the bony from through-flowing drainage channels. The grading plan requires that some of the bony be buried in the nearby Lower Freeport strip mine. The bony buried in the nearby strip mine will be covered by immediately available spoil. The graded bony (in place) will be covered with soil, limed, fertilized, mulched and planted. This procedure will increase surface water runoff, thereby greatly reducing the amount of precipitation that is allowed to percolate through the acid refuse. The alkaline discharges from pollution

sources 105 and 106 will probably be affected by the regrading. Their courses may be altered but their quality should not be drastically affected. The siltation problem occurring at pollution source 104 will be eliminated by the grading which will remove the steep refuse pile next to the stream.

Estimated cost is $37,,000.

Pollution Source 120 - Description

This is a small continuous discharge from the. down dip corner of a terrace regraded strip mine on the Lower Kittanning (B) seam (located, one mile south of Madera). There is a possibility that an old, small deep mine is associated with this discharge. The exact source of discharge cannot be determined until the abatement work is started but in either case the abatement method will remain the same. This discharge is high in acid (74 pounds per day, 74 ppm) and sulfate (363 pounds per day, 410 ppm). Vegetation is well established on this strip mine and should not be disturbed.

Pollution Source 1 20 - Abatement

Abatement of pollution source 120 will require the placement of approximately 100 lineal yards of clay barrier trench. This trench will be located in the area of the discharge and will serve as a ground water dam. The narrow, vertical trench will be excavated to the base of the coal, then filled with clay so a watertight bond is formed between the underclay below the coal and the clay in the trench.

Estimated cost is $30,000.

Pollution Source 103 - Description

The Eureka Mine No. 16 is a large, deep mine on the Lower Freeport (D) seam located southwest of Ramey. This deep mine, plus some adjacent strip mines on the same seam have numerous alkaline discharges to a small tributary of Muddy Run. Most of these discharges are measured at station 15. However, some of the discharges are not directly measured, and are included with the data for station 13. These are all high alkaline discharges, but there is an average of 227 pounds per day of iron being discharged from this mining complex into Little Muddy Run. The discharge is heavily discolored by precipitating yellowboy. The flows are too turbulent to allow the yellowboy to settle out until the discharge has reached the main branch of Little Muddy Run. The pH of these discharges, which averages 6.9, is sufficiently high to precipitate most of the iron in the form of ferric hydroxide under non-turbulent conditions. The discharges pass through a large beaver dam formed across the culvert of a railroad bed at station 13. This beaverdam is not serving a very useful function as a settling pond, because there is a very large acid discharge entering the dam along with this alkaline water. This reduces the pH to the point where the iron will not readily precipitate. This large acid discharge, pollution source 125, will be eliminated with the sealing

of the Brookwood Shaft Mine, after which only alkaline water will enter the beaver dam at station 13. Once this acid discharge is eliminated, the alkalinity will be high enough to precipitate almost all of the iron within the beaver dam. The problem here is that the beaver dam is not permanent. Once the food supply is gone, or the beavers are trapped out, the dam will be washed away. The beavers have raised their dam to the point where water is exiting across the railroad grade and causing it to erode.

Pollution Source 103 - Abatement

The abatement measure recommended here will prevent a large build-up of precipitated ferric-hydroxide from occurring in the main branch of Little Muddy Run. It is recommended the beaver dam be replaced by a clay and concrete plug within the railroad culvert, thereby utilizing the elevated railroad bed as a dam. A layer of riprap should be placed along the back of the railroad bed to insure future stability. The beavers should be relocated from this watershed to prevent them from building a dam along the spillway, since this would cause water to wash over the top of the railroad grade, eroding the dam. This is the most feasible method of settling out the iron. There is an estimated average flow of about 3 cfs. If this method were not used, two large settling ponds would have to be con-

-structed, and a maintenance schedule set up whereby precipitated ferric-hydroxide would have to be removed every few years.

If the abatement plan for this pollution source is to be implemented, then steps should be taken immediately to protect the railroad bed from more erosion until construction can begin. This project should not be constructed until the Brookwood Shaft Mine is sealed. Sealing of the Breechoed Mine may be delayed somewhat because flooding of this mine will introduce water into the underlying active deep mine (Rosemary Mine No. 1) on the Clarion (A) seam.

The beavers are shunting water over the railroad bed and erosion is occurring at an alarming rate. The dam has also flooded the construction site for Quick Start Two with approximately five feet of water. The beavers should be live-trapped and relocated, and the beaverdam removed. This will prevent further erosion of the railroad grade and dewater the construction site for abatement of Quick Start Two.

Estimated cost is $8,,000.

Pollution Source 134 - Description

This is an intermittent discharge from two partially backfilled strip mines on the Lower Kittanning (B) seam located just north of Mountaindale . The average discharge is 158 pounds per day acid and .7 pounds per day iron.

Pollution Source 134 - Abatement

The remaining backfilling and grading will have to be accomplished on this strip mine and a vegetation cover established to prevent further pollution from this area. The surface of the regraded Lower Kittanning seam in this area is both highly acid and very stony. For this reason, the limestone treatment will have to be applied to the regraded surface of this strip. The surface should then be fertilized, mulched and planted with grasses.

Estimated cost is $114,200.

Pollution Source 102 - Description

The refuse dump remaining after completion of mining in the Goodyear Mine on the Clarion (A) seam (located two miles south of Madera)
is causing a small stream which flows through the area to be rendered acid. This dump is responsible for the average acid and iron loads of 40 pounds per day and 2.3 pounds per day, respectively. The actual acid load from this bony dump is higher than this figure. Some of the acid was consumed in overcoming the natural alkalinity in the stream. The refuse pile averages 5 feet in height and comprises approximately 320,000 square feet. The hazardous airshaft and the slope entryway adjacent to this refuse pile are listed under high priority pollution source 135. If abatement measures are performed for this refuse pile, then pollution source 135 will be included with this project. This will lower the overall abatement cost.

Pollution Source 102 - Abatement

The steeply piled bony dump should be regraded in order to: (1) insure slope stability; and (2) isolate the refuse from through-flowing drainage channels. Percolating rainfall is the only water source that produces acid from this dump. Therefore, a layer of soil should be placed over the regraded refuse, then limed, fertilized, mulched and seeded with

grasses to provide a medium for plant growth. A good vegetation cover will greatly decrease the amount of precipitation entering the spoil by (1) increasing surface retention of water which will be evaporated back to the atmosphere, and (2) increasing the biotic transpiration of water (which is nil at present) through the interception of precipitation by vegetation for use in their life processes.

Estimated cost is $29,500.

Pollution Source 112 - Description

This is a double-drift entryway on the down dip side of an old deep mine on the Clarion (A) seam located 11/2 miles southeast of Janesville. The outcrop barrier in the southern and eastern edges of the mine has been breached by a later strip mine operation. The mouth of the drift is sealed with earth and clay. Approximately 100 feet of the heading is caved, resulting in a 10 to 15 feet deep trough with exposed steel support beams creating a potential hazard. The small discharge from this drift (0.02 cfs) produces an average of 31 pounds per day (267 ppm) acid and 2.5 pounds per day (22 ppm) iron.

Pollution Source 112 Abatement

The two drifts should be opened with a backhoe at the end of the caving and sealed directly in the heading. Approximately 100 feet of caved heading should be filled with shale that is obtainable from a pit 100 yards from the drift.

Estimated cost is $30,000.

Pollution Source 130 - Description

This is an irregularly shaped exploratory strip mine on the Clarion (A) seam located one mile east of Blandburg. It is discharging an average of 12 pounds per day (19 ppm) acid and 0.5 pounds per day (2 ppm) iron. It was discovered late in the study that the weir location for pollution source 130 did not measure the entire discharge from this strip mine. Other discharges occur in the form of small surface flows and acid seeps. The acid load for this strip mine is on the same order as the acid loads in the other "A" strip mines in this area. The long northern arm of the strip mine is regraded and accounts for approximately 45% of the area, the remainder of the mine is unreclaimed. This strip mine, and the other "A" seam strip mines in this region are of particular concern because they introduce acid into the very headwaters of Muddy Run.

Pollution Source 130 - Abatement

Only 55% of the strip mine requires regarding, but the entire mine requires surface treatment to induce vegetation, which is sparse at present. Surface restoration will require limestone surface treatment in order to induce vegetation growth, and to add alkalinity to the headwaters of Muddy Run. The surface should then be fertilized, mulched and seeded

with grasses in order to reduce infiltration of rainfall. Estimated cost is

$33,_2000.

Pollution Source 138 - Description

This is a small continuous discharge of variable quality that emanates from a strip and deep mine area on the Lower Freeport (D) seam located % mile northeast of Beccaria. This flow enters a small impoundment prior to discharging to the main branch of Muddy Run. It was determined during a double check procedure late in the study that the original interpretation of the origin of the pollution was in error, therefore, there was no sampling data for this source. Several field pH's (averaging 4.5) were taken over a two month period. The pollution is being leached from acid coal refuse prior to its exit from the strip mine. The impoundment is acting as an iron settling basin.

Pollution Source 138 - Abatement

The refuse material must be isolated from contact with this flow. This will be accomplished in two ways: (1) some of the material will be graded in place and the flow will be channeled through it; (2) some of the material will be removed to other portions of the Freeport seam strip mines and covered with spoil. The remaining exposed refuse material will be covered with soil, fertilized, limed, mulched and planted with grasses. The regrading will permit the water to follow its former

channel to the impoundment. The impoundment will continue to act as an iron settling basin.

Estimated cost is $25,500.

Pollution Source 140 - Description

This is a large 15 acre refuse dump resulting from mining operations in the Eureka Mine No. 28 on the Lower Kittanning (B) seam located 3 mile east of Janesville. A tributary of the East Branch of Little Muddy Run is rendered acid as it passes through this area, but it; is eventually re-neutralized by other alkalinity sources prior to its confluence ..with Little Muddy Run. This .pollution source is a slugger and produces acid only during periods of heavy rainfall. The refuse is presently in-very high piles with steep sides.

Pollution Source 140 - Abatement

Regrading will be necessary in order to ensure slope stability and to isolate the refuse material from the through-flowing drainage system. Since there is no groundwater entering the refuse-piles and the only water source is precipitation,, surface treatment must be applied to reduce infiltration, thereby reducing the acid discharge. Surface treatment in this case will require that a layer of soil be placed over the regraded refuse pile and subsequently limed, fertilized, mulched and seeded with grasses.

Estimated cost is $58, 800.

Pollution Source 141 - Description

This large 13 acre refuse pile is the result of a large coal processing plant, serving strip mines mainly on the Clarion (A) and Lower Kittanning (B) seams in this area. The acid contribution from this source has not been monitored because drainage occurs only during periods of high precipitation. It contributes pollution to both Muddy Run and Powell Run headwaters. There is no ground water interaction here; all the acid is produced by percolating rainfall.

Pollution Source 141 - Abatement

The refuse pile is relatively flat and only a minor amount of regrading will be necessary. The major cost for this pollution source will be surface. treatment necessary to encourage vegetation growth which will reduce the influx of precipitation. The Powell Coal Company may be responsible for this refuse pile. However, at present this is in doubt because of the time span over which the coal processing plant operated. It is recommended that the State look into this to determine the extent of the Powell Coal Company's responsibility for this refuse dump. Surface reclamation can be achieved by covering the regraded dump with soil, liming, fertilizing, mulching and seeding with grasses.

Estimated cost is $45,000.

Pollution Source 109 and 1 10 - Description

These are two adjacent drifts entering the Black Oak Mine No. 5 on the Lower Freeport (D) seam located one mile south of Beccaria. They exhibit a combined average discharge of 9 cfs. These discharges, although discolored, have a combined average of only 0.4. ppm of iron and 190 ppm of sulfate. They are a valuable alkalinity source, producing an average of 3,266 pounds per day. The greatest danger of this source is the drift opening associated with station 1 10. It is easily entered and the double-drift heading is free from obstructions for a considerable distance. This presents a hazardous situation because the drift is accessible for entry. It has an, easily collapsible shale roof and large amounts of water are moving through the drift.

Pollution Source 109 and 1 10 - Abatement

This drift should be closed to keep out people. The large flow of water exiting from the drift prevents the placement of nearby spoil material over the mouth. It is recommended that the drift opening be caved by demolition methods.

Estimated cost is $1.9000.

Pollution Source 135 - Description

This is not an actual pollution source, but it is a hazard. There is an open airshaft and open entryway to the Goodyear Mine located approximately two miles south of Madera. The shaft is filled with water to a depth of 25 to 35 feet below the surface and is a hazard to anyone in the vicinity. The abandoned concrete reinforced slope entrance located 100 feet north of the shaft is partially collapsed, but is still considered a danger to life.

Pollution .Source 135 -Abatement

The air shaft should be filled with on-site coal refuse material and the slope entry should be collapsed by demolition. Estimated cost is $2.,000.

NOTE: If pollution source 102 receives abatement measures, then this pollution source (135) will be included with that project, since pollution source 135 is located within the area of pollution source 102. This will reduce the cost of abatement for pollution source 135.

Pollution Source 136 - Description

This is not an actual pollution source, but is a hazard. It is a cylindrical 6 foot diameter stone lined airshaft into the Eureka Mine No 16 on the Lower Freeport (D) seam located just southwest of Ramey. It is presently inadequately circled by a snow fence, but should still be considered a hazard. It is open to a depth of approximately 40 feet to the base of the "D" coal.

Pollution Source 136 - Abatement

This airshaft should be filled with spoil material obtainable from the nearby strip mine on the Lower Freeport seam. Estimated cost is $900.

Pollution Source 137 - Description

This again is not an actual pollution source, but it is a dangerous airshaft. It is an abandoned 6 foot diameter stone lined airs haft for the King Mine on the Lower Freeport (D) seam that is filled with water to a depth of 27 feet below land surface and is located % mile south of Janesville. The King Mine workings are not delineated on the mine development drawings. It is an old mine on a non-acid coal seam for which no mine maps were available. This shaft is presently unmarked and is hidden in a grove of pine trees. It should be considered extremely hazardous, especially in winter.

Pollution Source 137 - Abatement

This shaft should be filled with spoil material obtainable from a nearby strip mine on the Upper Freeport coal seam. Estimated cost is $900.

Pollution Sources not Recommended for Abatement

Pollution Source 113, 114 - Description

Pollution source 113 is a continuous discharge from a Lower Freeport strip mine located about two miles north-northeast of Glasgow. Due to good concentrations of alkalinity and low concentrations of iron and sulfate, this station was phased out in the fifth month of the study. The alkaline water from pollution source 113 and the water from two naturally alkaline surface streams enters an impoundment created by the pit in an unregraded Middle Kittanning strip mine. The level of water in this impoundment is further raised by a beaver dam placed at the point of discharge. The impoundment comprises an area of approximately 800,000 square feet and averages about 10 feet in depth. The good quality throughflowing water is slightly degraded by: (1) passage through the Middle Kittanning spoil; and (2) small discharges occurring at the base of the Middle Kittanning Coal. The water exiting from this pond is alkaline with tolerable levels of iron (1 .5 ppm) and sulfate (208.6 ppm). The pond serves as an iron settling basin and requires no abatement work.

Pollution Source 111 - Description

This small, persistent discharge from a collapsed slope to the King Mine on the Lower Freeport seam located % mile south of Janesville is alkaline, averaging 23 pounds per day (31 ppm), with tolerable levels of iron (0.3 ppm) and sulfate (141 ppm). Only during extremely low flow periods does the sulfate concentration begin to approach 250 mg/L, the maximum for potable water.

Pollution Source 123 - Description

This is a small, intermittent, gravity discharge from a large strip mine area (30 acres), on the Lower Kittanning (B) seam, located two miles northeast of Glasgow. Surface water, stored in partially backfilled pits, is percolating along the clay-coal interface of the Lower Kittanning seam and eventually emerging at the outcrop along Route 253.

This discharge is only slightly acid (1 pound per day), carrying minimal quantities of iron (.02 pounds per day) and sulfate (3 pounds per day).

Pollution Source 123 - Abatement

Regrading and revegetation would be necessary to abate the pollution from this source. This area has a very low cost-benefit ratio and abatement cannot be justified by the magnitude of the pollution load. Additional benefits such as aesthetic improvement would have to be included to justify abatement for this pollution source.

Pollution Source 139 - Description

A small, intermittent discharge emanates from a collapsed drift of a house coal mine on the Clarion (A) seam located one mile north .of Mountaindale. Although this discharge contains high concentrations of acid, iron and sulfate, its small flow does not require abatement. Additional mines were discovered in this area after the mine development drawings were printed. These drifts are located along the side of the hill between pollution source 139 and Blandburg. There are a series of drifts to small Clarion coal mines. There is another series of drifts to Harbison Walker mines on the Mount Savage Clay that occurs approximately 18 feet vertically below the Clarion seam. None of these drifts are discharging.

Pollution Source 139 - Abatement

The drift associated with pollution source 139 could be sealed to stop this discharge, but the pollution load is not of sufficient magnitude to warrant the expense involved (about $15, 000).

Pollution Source 119 - Description

This pollution source sampling station located two miles north of Blandburg was originally selected to measure the pollution loads to Curtis Run from the State Game Lands. Four monthly samples were collected from July to October 1970. This station was then replaced by pollution source stations 127 and 128.

Property Owners:

The owners of property affected by the preceding reclamation measures follow:

Source	Property Owners
100	Pennsylvania Electric Company; Harry V. and Margaret Willey; Mid-Pen Coal Co.; Mathias and Helen Erhart; Earl R. and Katharine J. Walter; Clarence E. Krom; J. Orvis Carson; Paul Carson; John Kent; Willard Nearhoff; Charles and Margaret Pierce; Andrew Surovy; Ramsford J. and Marie L. Marshall; Elton and Bernith McGarry; John Munjack
101	Yorkshire Coal Company; Margaret McGlynn; W. G. Moore and Son
102	John Beyer, Heirs
103	Annie Powell; Pete Chankaneck; W. O. Gulbranson; Sarah Jane Kuhn; Howard J. Smith; Samuel Hegarty Heirs; Walter P. and Elizabeth Velma Kitko; Mid-Pen Coal Company
107	Christine Poshedley; Moshannon Smithing Coal Company
108	Buterbaugh Bros. Land and Timber Corp.; Kittanning Coal Company; Mike Kopylchack, Sr., Heirs; Viola N. Rickenbaugh
109	Buterbaugh Bros. Land and Timber Corp.; Margaret McGlynn

110	Buterbaugh Bros. Land and Timber Corp.; Margaret McGlynn
112	John and Mary Jane Henshaw; Sarah Jane Kuhn; Park H. Loose, Et al
113 - 114	Annie Powell; Arthur L. Wagner, Et al; John H. Hommer
115 & 122	Annie Powell; John H. Hommer; Willard Mulhollen; Cambria Mills Coal Company; H. W. Miller; George W. Troxell; Howard B. Hexcox
116	Viola M. Rickenbaugh
117 - 118	Clyde Hescox; Annie Powell; Kenneth N. Miller; T. V. McCartney; E. C. McCartney
120	Yorkshire Coal Company; Margaret McGlynn; W. G. Moore and Son
121	John H. Hommer, Jr.
123	Viola M. Rickenbaugh; Robert A. Williams; John H. Hommer, Jr.
124	Annie Powell; W. O. and Virginia Gulbranson; Penn Central Railroad
125	W. O. Gulbranson; Sarah Jane Kuhn; Howard J. Smith; Kittanning Coal Company; Mary Raynack, Heirs
126	Viola M. Rickenbaugh; Luther Caber; Rickenbaugh Camp Development Corporation
127 & 129	Board of Game Commission of Pennsylvania
128	Board of Game Commission of Pennsylvania; Viola M. Rickenbaugh

130	Jack Lewis, Et al
131 - 132	Jack Lewis, Et al; Annie Powell; Blair Gap Water Supply Company; Max Frick; Parcel No. 301 (Tax Map No. 49-07); Parcel No. 113 (Tax Map No. 49-12)
133	Annie Powell; L. C. Hepler; Cambria County; Parcel No. 155 (Tax Map No. 49-07)
134	Simon C. Shissler, Jr.; L. C. Hepler; John J. Hommer, Jr.; Annie Powell; Howard B. Hescox; Reade Township; Parcel No. 179 (Tax Map No. 49-07)
135	John Beyer, Heirs
136	W. O. Gulbranson; Sarah Jane Kuhn; Howard J. Smith
137	Andrew and Susan Duke; Clearfield Coal Company
138	W. O. and Virginia Gulbranson
140	Kittanning Coal Company; Valdimere and Loretta Temchack; John Witosky; John Finch, Jr.; Mike Kopylchack, Sr., Heirs; Alex Betza; J. B. Harrington, Jr.
141	Parcel No. 113 (Tax Map No. 49-12)

RECOMMENDED PRIORITIES

Immediate Pollution Abatement (Quick Starts)

Priority Number	Pollution Source Number(s)	Pollution Load Pounds Per Day Acid	Iron	Estimated Abatement Cost	Cost Per Pound/Acid
1	121	15+(Slugs)	2	$ 30,200 =	$ 2,013
2	125	17,263	1,730	212,400 =	12
3	108	3,669	373	452,000 =	123
4	100	2,446	991	166,500 =	68
5	117, 118	972	118	100,000 =	103
6	124	1,416	210	79,000 =	56

(These priorities are now under design)

Total Cost = $1,040,100

Other Pollution Sources Requiring Abatement

Priority Number	Pollution Source Number(s)	Pollution Load Pounds Per Day Acid	Iron	Estimated Abatement Cost	Cost Per Pound/Acid
7	127, 128, 129	2,686	67	$ 125,000 =	$ 47
8	116, 126	1,246	7	98,500 =	79
9	115, 122	2,678	326	265,000 =	99
10	133	166	14	18,000 =	108
11	131, 132	1,643	56	232,500 =	142
12	101	81	17	24,000 =	296
13	107	97	7	37,000 =	381
14	120	74	0	30,000 =	405
15	103	Alk.	75	8,000 =	N/A
16	134	158	7	114,200 =	723
17	102	40	2	29,500 =	738
18	112	31	2	30,000 =	968
19	130	12	1	63,000 =	5,250
20	138	Not Measurable		25,500 =	N/A
21	140	Not Measurable (Slugger)		58,800 =	N/A
22	141	Not Measurable (Slugger)		45,000 =	N/A

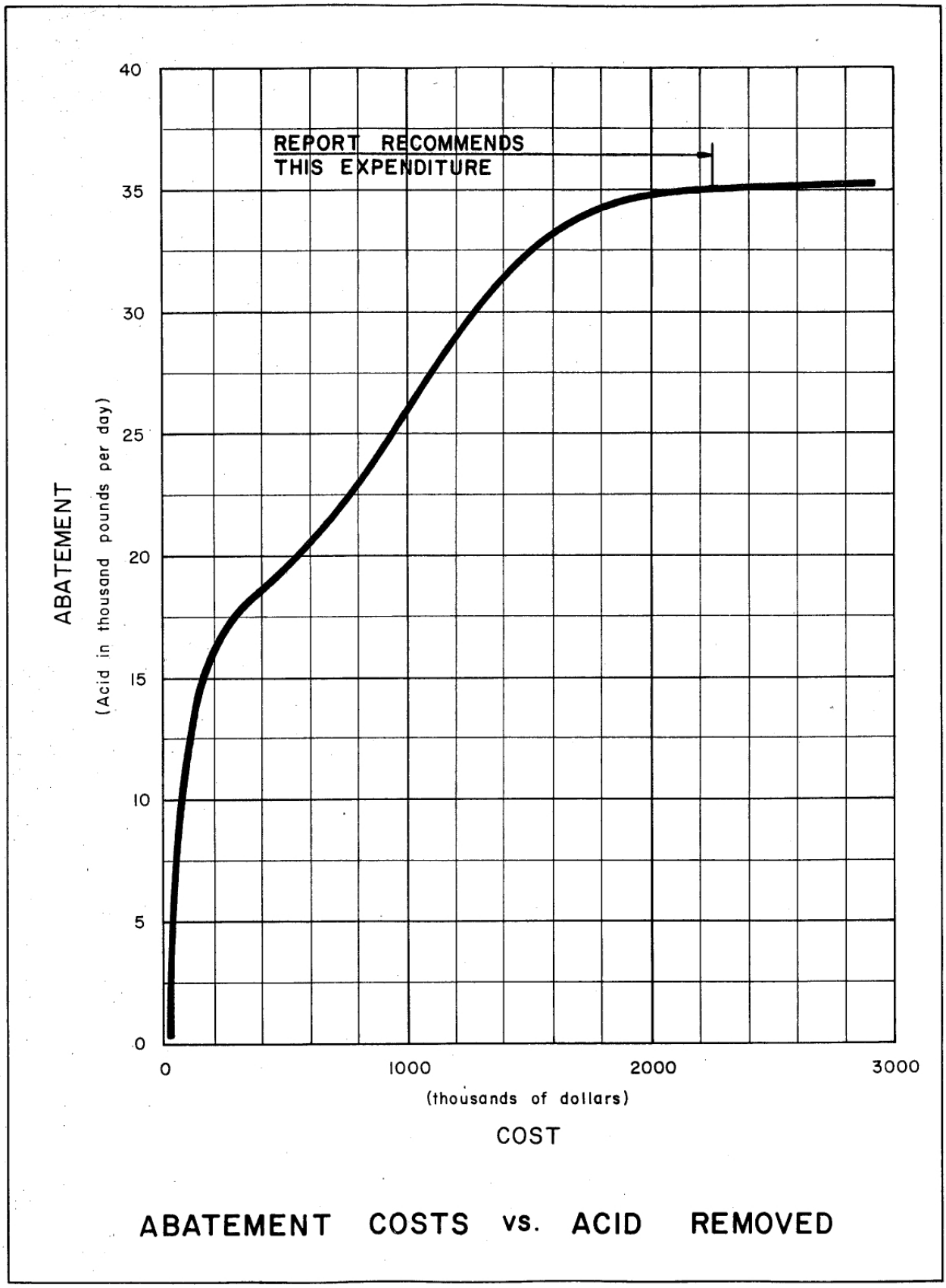
Other Pollution Sources Requiring Abatement
(Continued)

Priority Number	Pollution Source Number(s)	Pollution Load Pounds Per Day Acid	Iron	Estimated Abatement Cost	Cost Per Pound/Acid
23	109, 110	Hazardous Opening		$ 1,000 =	N/A
24	135	Hazardous Opening		2,000 =	N/A
25	136	Hazardous Opening		900 =	N/A
26	137	Hazardous Opening		900 =	N/A
		Total Cost		= $1,178,800	

Pollution Sources Not Recommended for Abatement

Priority Number	Pollution Source Number(s)	Pollution Load Pounds Per Day Acid	Iron	Estimated Abatement Cost	Cost Per Pound/Acid
27	113, 114	Marginal Quality			
28	111	Marginal Quality			
29	123	Marginal Quality			
30	139	Very Small Flow			
None	119	Replaced by Pollution Sources 127, 128			

NOTE: A condensed, summary tabulation of each pollution source is given in the Abstract in front of this report.



ABATEMENT COSTS vs. ACID REMOVED