

RECLAMATION PRIORITIES

Based on the results of the investigations conducted, priorities were established for each of the project areas investigated. The criteria for evaluating each project area included the relative acid load, cost of reclamation, relative benefit to the receiving stream, effectiveness of the proposed reclamation measures, and the possibility of future mining activity in the area.

The following tabulation gives the relative priority of each project area, discharge, total acid contribution and associated reclamation cost.

TABULATION OF RECLAMATION PRIORITIES

| Priority No. | Area        | Discharges                 | Flow (gpm) | Total Acid (lbs/day) | Total Cost | Cost (per lb/day) |
|--------------|-------------|----------------------------|------------|----------------------|------------|-------------------|
| 1            | XXIII & XXV | 301 & 302                  | 148        | 1712                 | \$ 55,100  | \$ 30             |
| 2            | XXVI        | 303                        | 261        | 658                  | 91,500     | 140               |
| 3            | XIX         | 220,221                    | 1067       | 1086                 | 160,000    | 150               |
| 4            | XLVI        | 329,350,351                | 132        | 1263                 | 100,640    | 80                |
| 5            | XXXIX       | 330,352                    | 33         | 295                  | 22,980     | 80                |
| 6            | XI          | 204                        | 12         | 130                  | 37,900     | 290               |
| 7            | XVI         | 211 - 214                  | 1025       | 904                  | 360,000    | 400               |
| 8            | XLIII       | 341,342,343                | 67         | 184                  | 13,000     | 70                |
| 9            | XVII        | 215,216<br>(Lower portion) | 46         | 91                   | 21,200     | 230               |
| 10           | XXVII       | 304,304A, 304B             | 18         | 127                  | 41,250     | 320               |
| 11           | XLI         | 334,335,336,337            | 95         | 139                  | 22,740     | 160               |

| Priority No. | Area   | Discharges                  | Flow (gpm) | Total Acid (lbs/day) | Total Cost | Cost (per lb/day) |
|--------------|--------|-----------------------------|------------|----------------------|------------|-------------------|
| 12           | XXIV   | 301A                        | 197        | 89                   | 22,000     | 250               |
| 13           | IV     | 103, 104, 105               | 50         | 34                   | 23,900     | 700               |
| 14           | XXXVII | 322, 323, 324               | 110        | 47                   | 31,710     | 670               |
| 15           | XIV    | 209                         | 45         | 18                   | 10,800     | 600               |
| 16           | XXXIV  | 313, 313A, 315              | 39         | 137                  | 115,500    | 840               |
| 17           | VII    | 113                         | 15         | 11                   | 10,000     | 910               |
| 18           | V      | 106                         | 5          | 5                    | 3,000      | 600               |
| 19           | XXXII  | 309                         | 71         | 85                   | 22,750     | 270               |
| 20           | XLIV   | 345                         | 176        | 38                   | 3,000      | 80                |
| 21           | XXII   | 241                         | 6          | 4                    | 4,000      | 1,000             |
| 22           | XVII   | 215, 216<br>(Upper & lower) | 46         | 91                   | 158,000    | 1,740             |
| 23           | XXXVI  | 317, 320                    | 35         | 21                   | \$ 44,400  | \$2,110           |
| 24           | XVIII  | 217, 218                    | 45         | 21                   | 60,000     | 2,860             |
| 25           | XL     | 332 (Partial)               | 7          | 17                   | 10,750     | 630               |
| 26           | IX     | 114                         | 10         | 5                    | 15,000     | 3,000             |
| 27           | XII    | 206, 207                    | 29         | 2                    | 11,700     | 5,850             |
| 28           | I      | 100                         | 2          | 3                    | 6,700      | 2,230             |
| 29           | XLII   | 340                         | 29         | 3                    | 21,600     | 7,200             |
| 30           | XIII   | 208                         | 12         | 1                    | 8,800      | 8,800             |
| 31           | XL     | 332 (Complete)              | 7          | 17                   | 197,600    | 11,620            |
| 32           | XV     | 210                         | 3          | 1                    | 16,000     | 16,000            |
| 33           | II     | 101                         | 30         | 5                    | 75,000     | 15,000            |
| 34           | VII    | 111                         | 19         | 3                    | 1,800      | 600               |

| Priority No.             | Area       | Discharges           | Flow (gpm) | Total Acid (lbs/day) | Total Cost  | Cost (per lb/day) |
|--------------------------|------------|----------------------|------------|----------------------|-------------|-------------------|
| 35                       | XXVIII     | 304C                 | 1          | 1                    | 3,100       | 38,750            |
| 36                       | XXI        | 237, 239             | 23         | 5                    | ---         | ---               |
| 37                       | XXIX       | 305                  | 88         | 397                  | ---         | ---               |
| 38                       | XXXI       | 308                  | 12         | 1                    | ---         | ---               |
| 39                       | VI         | 107                  | 14         | 20                   | ---         | ---               |
| 40                       | XLV        | 346, 346A, 348A, 349 | 48         | 39                   | ---         | ---               |
| 41                       | X          | 112,210,202,203      | 54         | 8                    | ---         | ---               |
| 42                       | XXX & XXXV | 306, 316             | 24         | 8                    | ---         | ---               |
| 43                       | XX         | 232                  | 4          | 1                    | ---         | ---               |
| 44                       | XXXVIII    | 325                  | 1          | ---                  | ---         | ---               |
| 45                       | III        | 102                  | 205        | <u>13</u>            | <u>---</u>  | <u>---</u>        |
| Anderson Creek Watershed |            | Total                |            | 7,632                | \$1,792,670 |                   |

The reclamation of all areas shown on the priority tabulation is not economically feasible or even practical. Assuming that the proposed reclamation measures would be 100% effective, reclamation of the top 10 projects on the priority tabulation would reduce the total acid load on Anderson Creek by 80%. The cost of reclaiming these areas represents 50% of the total reclamation cost for the Watershed. To achieve a 90% reduction in the acid load would require that the first 25 project areas be reclaimed at a cost equal to 80% of the total reclamation cost for the Watershed.

The reclamation plan for the Anderson Creek Watershed should proceed in accordance with the above established priorities. Completion of the first ten projects would have a significant impact on the water quality of Anderson Creek.

### IMMEDIATE ACTION PROGRAM

The purpose of an immediate action program is to identify a few reclamation projects which, if implemented, would have a significant impact in reducing acid mine drainage pollution. Projects considered for inclusion in an immediate action program should be of the type that can be easily implemented, and achieve a high reduction in acid load at a reasonable cost.

Since this basic criteria was used to establish the overall reclamation priorities for the Anderson Creek Watershed, the immediate action program must include the top projects in the Tabulation of Reclamation Priorities in the preceding section of this report.

The proposed Immediate Action Program for the Anderson Creek Watershed should include the first seven projects in the Tabulation of Reclamation Priorities. These seven projects contribute approximately 79% of the recorded acid load entering Anderson Creek and its tributaries from mining sources.

To facilitate implementation of these projects more detailed information on each of these areas was gathered and is presented on the following pages.

Project Areas XXIII & XXV

Area XXIII is the site of the Draucker #1 Mine once operated by the North American Refractories Company. This deep mine was a drift mine in the Mercer clay. The area of the entry and adjacent workings was later strip mined. The stripped area covers about 10.6 acres. Surface water collects in one strip cut and forms a small pond. Ground water emerges from the stripped deep mine entry and seeps through the strip mine spoil at one point where the stripping comes very close to the deep mine workings. Available mine maps, although sketchy, indicate that the hydraulic head for this area would be relatively small. The combined flow from this area averages 140 g.p.m. and has an acid load of 1650 lbs. per day.

The Pearce Mine of Harbison Walker Refractories Company (Area XXV) intersects the Draucker #1 Mine in several places. For this reason, any proposed reclamation of Area XXIII should include the sealing of this deep mine as well. Acid water discharges from the single entry to the Pearce Mine. This flow is generally about 8 g.p.m. and has an acid load of 61 lbs per day.

It appears that much of the recoverable clay has been removed by the deep and/or stripping operations at Area XXIII. Some pillars of recoverable clay were left in the deep mine workings of the Draucker #1 Mine. Much of this area is under permit to J. H. France Refractories Company, Permit No. 32698MS44.

Abatement of the acid mine drainage from this source would have a significant effect on Little Anderson Creek as this flow is a major polluter of that stream. This project has been selected as No. 1 priority.

Property Owners:

Affected Area: Wray A. & Beverly J. DeLarme

Adjacent Area: Wray A. & Beverly J. DeLarme

S. L. & Louise G. Johnson et al.

Project Area XXVI

This area has been extensively strip mined for the Mercer clay. The Wingert Mine, once operated by the North American Refractories Company, is also located here. Mine maps reveal that this deep mine is relatively small. The-strip mined area covers nearly 24 acres. There is a large pond occupying one strip cut which appears to be fed partially by surface water and partially by groundwater. A stream which originates in an older stripped area above this area, flows down over the highwall and forms another large pond before leaving through a drainage cut. The total combined flow of acid water from this area is about 261 g.p.m., contributing an average of 658 lbs. of acid per day to Little Anderson Creek. During periods of high flow this discharge may contain as much as 1700 lbs. of acid per day.

A spokesman for J. H. France Refractories Company, which was among the most recent mining companies active in this area, stated that future development of reserves from this location is unlikely due to the large amount of overburden.

This project has been assigned priority no. 2.

Property Owners:

|                |   |
|----------------|---|
| Affected Area: | S. L. & Louise G. Johnson et. Al.           |
| Adjacent Area: | Wesley Senkel                               |
|                | Wray A. & Beverly J. DeLarme                |
|                | Robert Hatten Heirs                         |
|                | S. L. & Louise G. Johnson and S.R. & Venice |
|                | Johnson Glenn Holly                         |



### Project Area XIX

This reclamation area is the site of the Widemire Mine once operated by Harbison Walker Refractories Company. This operation mined the Mercer clay. Maps of this operation show a total of eight entries, not all of which are immediately discernible. This mine was not completely worked out but a severe water problem and decreased quality of the clay in many areas of the mine led to its closing. It is unlikely that any further mining would be conducted in these workings as Harbison Walker Refractories Company owns far more valuable reserves of clay on adjacent properties.

Data taken from maps of the mine workings indicate a maximum hydraulic head of 30 feet would be developed if the entries were sealed. Sealing of the deep mine entries would result in partial flooding of the deep mine workings which would abate the acid mine drainage or improve the quality of the water should it break out at a higher elevation. The combined discharge of acid water from the mine workings averages 1067 g.p.m. contributing 1086 lbs. of acid per day to Kratzer Run. This source is responsible for about one-half of the recorded acid mine drainage entering Kratzer Run. Accordingly, this reclamation project has been given a priority of 3.

Property Owners:

Affected Area: Harbison Walker Refractories Company  
Grant I. & Dorothy M. Lupold Allen C.  
& Gertrude F. O'Dell

Adjacent Area: Elmer Michaels  
Ray O. & Lena M. Baron  
Frank E. & Nellie W. Shuster

### Project Area XLVI

This reclamation project is in the area of the abandoned Korb Mine. This deep mine was operated by the Harbison Walker Refractories Company and mined the Mercer clay. This mine has several entries and is quite extensive, connecting with the Spencer Mine to the west. About 4.7 acres have been strip mined around the entries.

Acid mine drainage flows from three of the southern entries and from the single entry adjacent to the Spencer Mine. The total flow from this mine averages 132 g.p.m. with an acid load of 1263 lbs. per day. During periods of high flow these figures may increase to as high as 265 g.p.m. and 3300 lbs. of acid per day. Data taken from mine maps indicate a maximum hydraulic head of 55 feet would be developed if the entries were sealed.

These mine workings are very extensive and most of the available good clay has been recovered. Adjacent areas still contain large reserves of very high quality clay and it appears that future mining activity will be concentrated in these adjacent areas rather than in the project area.

Sealing of the mine entries of the Korb Mine to abate the acid mine drainage would make another significant contribution to cleaning up Little Anderson Creek. The expenditure necessary to abate the large acid load is low, making this reclamation project a high priority.

A reclamation priority of 4 has been assigned to this area.

Property Owners:

Affected Area: Angelo & Maxine Centra  
Leased to Harbison Walker Refractories Co.  
Harbison Walker Refractories Co.

Adjacent Area: Lynn L. Bloom  
Angelo & Maxine Centra  
Harbison Walker Refractories Co.  
Ralph J . I Anna Mae Korb

### Project Area XXXIX

This area, the site of Harbison Walker Refractories Company Spencer Mine, has been extensively strip and deep mined for the Mercer clay. Much of the deep mine workings have been since stripped out. The stripped area totals about 20 acres with an additional 6 acres having been stripped around the deep mine entries. Some surface water collects in the depressions of the stripped area and flows through the strip cuts. The amount of this flow is small averaging only 5 g.p.m. and contributing only 25 lbs. of acid per day. The deep mine, however, has an average acid load of 270 lbs. per day although the average flow is only 28 g.p.m. During wet weather the flow from the deep mine has reached 76 g.p.m. with an acid load of 676 lbs per day. Another flow of acid water is present in this area but it is a discharge from the abandoned Korb Mine. The Korb Mine connects with the Spencer Mine but will be dealt with under the reclamation of the Korb Mine area, Project Area XLVI.

It is unlikely that any recoverable reserves of clay exist at this location due to the extensive previous operations. Water can not be contained in the workings by sealing. However, by placing an impervious barrier along the area of the deep mine entries the water level can be raised sufficiently to prevent atmospheric contact with the pyritic materials and therefore, improve the quality of the water considerably. The relatively low reclamation cost for this project makes it more attractive. The estimated cost is \$80 per lb. of acid per day.

This project is priority no. 5.

Property Owners:

Affected Area:

Harbison Walker Refractories Company

Jesse L. Korb Trustee

Ernest Charles & Anna Louise DuFour

Raymond A. Royer

Lester Hatten

Frank C. Hartzfeld

John R. & Alberta H. Morgan

Albert Olmstead

Adjacent Area:

Wray A. & Beverly J. DeLarme

Lewis H. .& Mary K. Bickle

Robert E. & Irene Spencer

### Project Area XI

This project area is a coal strip mine occupying a total area of 17.8 acres of which 12.5 acres is disturbed ground. The strata in this area shows a gentle dip to the south. The perimeter of the hill has been stripped leaving the wooded hilltop. This undisturbed area represents an estimated reserve of 5.3 acres of coal. Any future extraction of this coal would probably be uneconomical due to the relatively small amount of coal present.

A small elongated pond is located adjacent the highwall at the southeast corner of the stripped area. It collects surface water and groundwater which flows along the coal seam and emerges from the highwall. The water from this pond seeps through the spoil and emerges as acid mine drainage. The flow from this discharge is relatively small averaging 12 g.p.m. Although this flow is low the average acid load is quite high. Reclamation of this stripped area should eliminate the flow of acid water, thus preventing 130 lbs. of acid from entering Kratzer Run daily. During high flow periods this figure increases to as much as 400 lbs. per day. Abatement of the acid mine drainage at this location would require an expenditure of \$290 per lb. of acid/day. The relative ease of reclamation, reasonable cost and amount of acid to be eliminated resulted in this area being given a priority number of 6.

Property Owners:

Affected Area:  
Adjacent Area:

Charles E. & Blanche A. Dale  
William G. & Velma J. Hartzfeld

Gerald D. & Lemora A. McDonald E.

Louise & Myra. Jane Holden

Harbison Walker Refractories Co.



Project Area XVI

This area has been extensively strip mined for coal and fairly well backfilled. This strip mine covers an area of about 72 acres. Those coal seams which were economically accessible have been removed. Any reserves remaining in the lower lying seams are probably deep enough to discourage mining.

Acid water emerges from the toe of the spoil at numerous places along the southern periphery of the strip mined area. These flows eventually consolidate into a single flow and enter Bilger Run. The average combined flow from this area is 253 g.p.m. with an acid load of 904 pounds per day. There is no easy solution to the discharge of acid mine drainage from this area, but the large acid load dictates that this project be a high priority. Pressure treatment of the spoil by the injection of lime slurry has been suggested even though this technique has not been extensively proven. The severe nature of the acid problem from this area justifies the relatively large expenditure necessary to correct it. Abatement of acid mine drainage from this source would have a tremendous impact on the quality of Bilger Run and, in time, greatly improve the quality of Kratzer Run, a principal tributary to Anderson Creek. This reclamation project has been assigned a priority number of 7.

Property Owners:

|                |                                      |
|----------------|--------------------------------------|
| Affected Area: | Eugene W. White & Russell R. Butcher |
|                | Franklin Hudson Estate               |
| Adjacent Area: | Franklin Hudson Estate               |

Abatement of the acid mine drainage from these areas, therefore, would mean a significant improvement in the quality of water in Anderson Creek.. Such an improvement would hopefully return Anderson Creek to a condition conducive to the establishment of aquatic life and encourage future development for recreational and industrial purposes. The effects of such an improvement in water quality would be felt beyond the Watershed itself and would surely benefit Clearfield County as well as others downstream in the Susquehanna River drainage basin.