

BIG SCRUBGRASS CREEK MINE DRAINAGE
POLLUTION ABATEMENT PROJECT

SL-147

Errata Sheet

Page 30 Table 5 should read as follows:

<u>Name of Member</u>	<u>Average Interval to Top of Vanport Limestone - Feet</u>
Middle Kittanning Coal	80 to 90
Lower Kittanning Coal	40 to 50
Lower Kittanning Clay	35
Vanport Limestone	0
Scrubgrass (Upper Clarion) Coal	15 to 30
Lower Clarion Coal	30 to 45
Brookville Coal	55 to 65

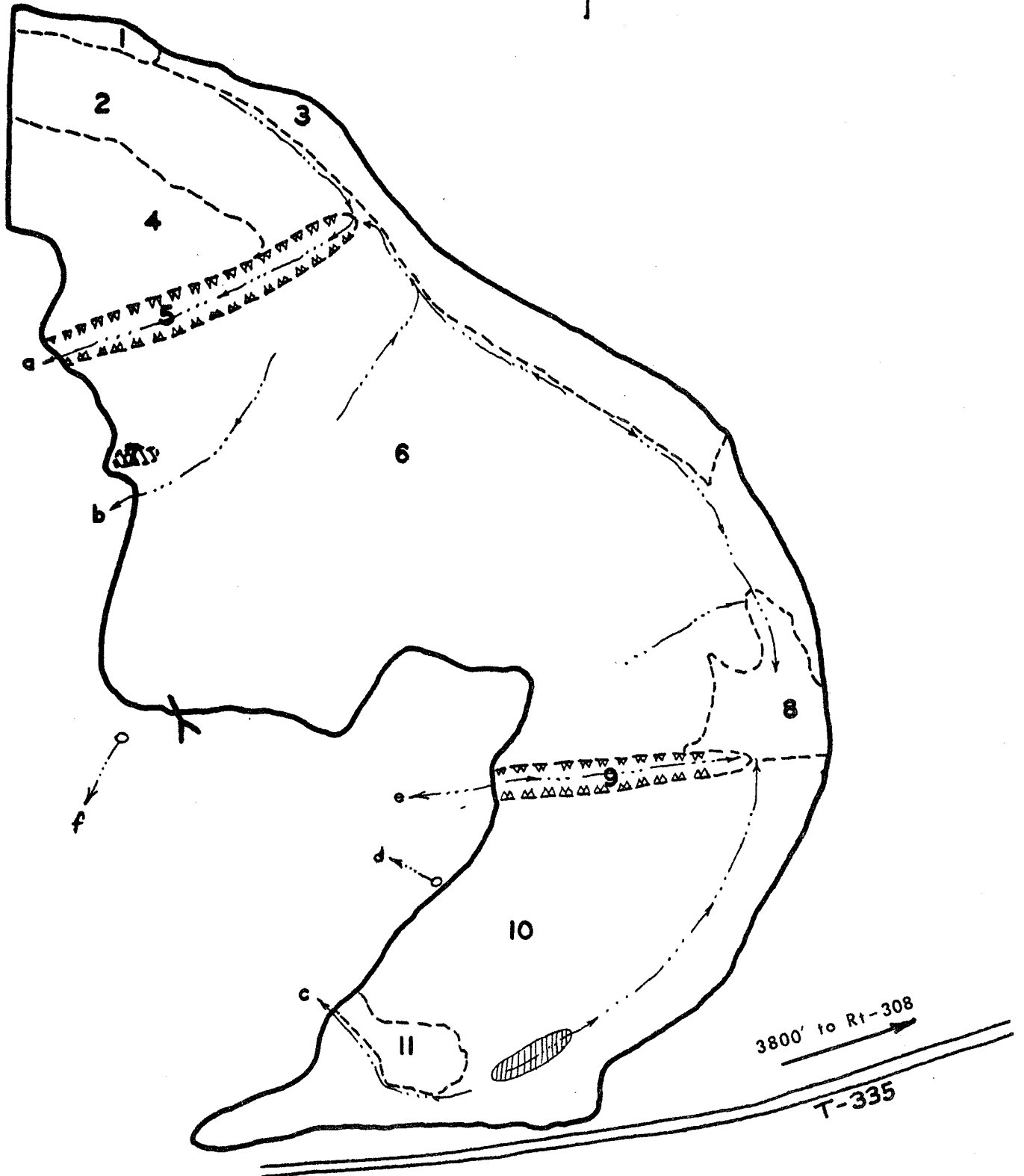
Page 113. In both sets of data the heading for maximum and minimum values should be interchanged.

Page 190. Under estimated cost of reclamation, the last unit should be changed from Area #1 to Area #11.

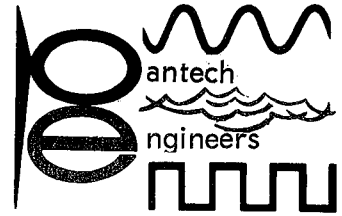
Page 224. Under estimated cost of reclamation, Areas #16, #18 and #25 - the 22 acres should read 20.2 acres in both cases.

Page 233. Map opposite this page for Mine Site 21 shows a seepage point "d" outside the mine area. The quantity of water flowing from this point was not large enough to justify any reclamation work.

SITE 15



PANTECH ENGINEERS, Inc.
CONSULTING ENGINEERS



TELEPHONE: 814 / 437-3021
340 LIBERTY STREET
FRANKLIN, PENNSYLVANIA 16323

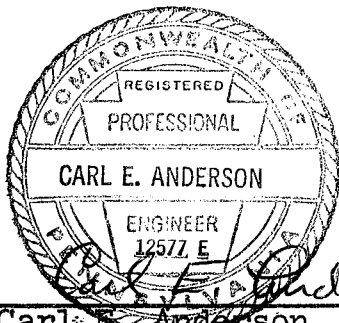
May 29, 1973

The Honorable Maurice K. Goddard, Secretary
Department of Environmental Resources
Commonwealth of Pennsylvania
Harrisburg, Pennsylvania

Dear Dr. Goddard:

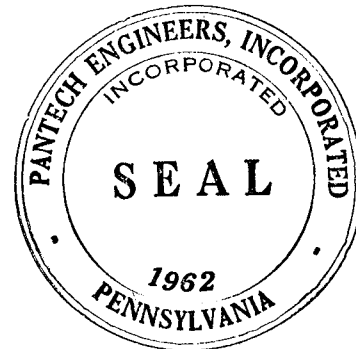
We submit herewith the Final Report on the Mine Drainage Pollution Abatement Project on Big Scrubgrass Creek Watershed in Venango and Butler Counties, Operation Scarlift Project SL-147. This is in compliance with your Service Contract dated October 8, 1970 as amended. We appreciate the opportunity to perform these services.

Very truly yours,
PANTECH ENGINEERS, INC.



Carl E. Anderson
Carl E. Anderson, P.E.
Project Engineer
Environmental Systems
Division

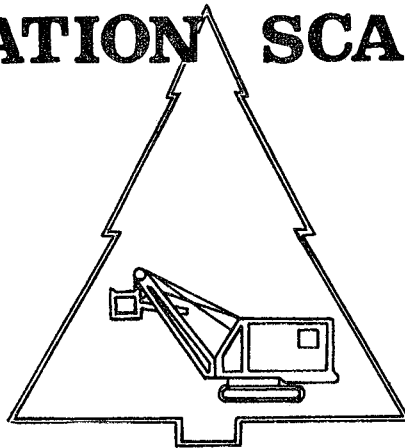
Charles E. Goss
Charles E. Goss,
President



**BIG SCRUBGRASS
CREEK
MINE DRAINAGE
POLLUTION
ABATEMENT PROJECT**

Part of

OPERATION SCARLIFT



COMMONWEALTH OF PENNSYLVANIA
Milton J. Shapp, Governor
Department of Environmental
Resources
Maurice K. Goddard, Secretary

FEBRUARY

1973

Pantech Engineers, Inc.

CONSULTING  ENGINEERS

FRANKLIN, PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES
REVIEW NOTICE

This report, prepared by outside consultants, has been reviewed by the Department of Environmental Resources and approved for publication. The contents indicate the conditions that are existing as determined by the consultant, and the consultant's recommendations for correction of the problems. The foregoing does not signify that the contents necessarily reflect the policies, views, or approval of the Department.



Figure 1. Aerial View of Mine Site 33 in the Gilmore Run Subwatershed of Big Scrubgrass Creek Watershed. Most of this mine has been adequately reclaimed to prevent acid mine drainage pollution. The recommendations in this report are aimed at achieving acid source abatement for all sources within the watershed.

TABLE OF CONTENTS

TABLE OF CONTENTS

	<u>Page</u>
<u>Summary</u>	1
Acknowledgements.....	6
Definitions of Terms.....	8
<u>Watershed Description</u>	
General Location and Description	13
Population and Economic Background.....	16
Geology.....	21
Regional Structure	22
Subsurface Stratigraphy.....	26
Mining History.....	30
Hydrology	
General Climate	37
Precipitation	37
Soils.....	37
Runoff	40
Formation of Acid Mine Drainage.....	41
<u>Description of Present Study</u>	
General Background	43
Water Quality Analytical Methods.....	46
Investigation of Acid Sources.....	47
<u>Analysis of Stream Quality</u>	
Introduction.....	51
Major Findings.....	55
Main Stream Water Quality	62
<u>General Recommendations</u>	
Introduction.....	73
General Solutions to the Problem of AMD.....	73
Economic Comparison of Strip Mine Reclamation and Runoff Treatment	79
Strip Mine Reclamation	81
Source Abatement for Deep Mines.....	88
Other Pollution Problems on the Watershed.....	90
Follow-up.....	91
Specific Reclamation Plans.....	93
Basis for Cost Estimates	93
Alternative Soil Revegetation Methods.....	96
Recommended Priorities.....	99
<u>Bullion Run Subwatershed</u>	
Stream Water Quality	107
Specific Reclamation Plans for Bullion Run	119
<u>Trout Run Subwatershed</u>	
Stream Water Quality	146
Specific Reclamation Plans for the Trout Run Subwatershed.....	155

Table of Contents

Page

Gilmore Run Subwatershed

Stream Water Quality169
Specific Reclamation Plans for the
Gilmore Run Subwatershed182

Upper Main Stream Subwatershed

Stream Water Quality211
Specific Reclamation Plans for the
Upper Main Stream Subwatershed221

Southwest Tributaries Subwatershed

Stream Water Quality246
Specific Reclamation Plans for the
Southwest Tributaries252

South Branch Subwatershed

Stream Water Quality274
Specific Reclamation Plans for the
South Branch Subwatershed286

East Tributaries Subwatershed

Stream Water Quality307
Specific Reclamation Plans for the
East Tributaries Subwatershed.....316

Appendix A

References

Appendix B

Sampling Station Water Quality Data
Water Quality Data from Critical Seeps and Pools

Appendix C

Hydrology
Precipitation Data

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
1	Aerial View of Mine Site 33	Frontpiece
2	Stream Map of Venango County Showing the Location of the Big Scrubgrass Creek Watershed	14
3	Topographic Map of Bid Scrubgrass Creek Watershed Showing the coverage on Published 7½ Minute Quadrangle Maps from the USGS.....	15
4	Aerial View Looking West along Interstate 80 at the Clintonville Interchange in the Big Scrubgrass Creek Watershed.....	17
5	Aerial View Looking Upstream along the Allegheny River at Kennerdell	17
6	Aerial View of Mine Site No. 17 in the Gilmore Run Subwatershed	20
7	Map of Northwest Pennsylvania Showing Physiographic Provinces.....	23
8	Distribution of Glacial Drift in Northwestern Pennsylvania	25
9	Bedrock Geologic Map of the Big Scrubgrass Creek Watershed.....	28
10	Generalized Stratigraphic Column in Big Scrubgrass Creek Watershed	29
11	Remains of a deep mine operation in the Southwest Tributaries Subwatershed south of the Village of Nectarine	34
12	View of Mine Site No. 13 in the Gilmore Run Subwatershed.....	34
13	View of Mine Site No. 4 in the Bullion Run Subwatershed.....	35
14	View of New Strip Mining on Site No. 3 in the Bullion Run Subwatershed	36
15	Map showing U. S. Weather Bureau Rainfall Recording Stations near the Big Scrubgrass Creek Watershed	38
16	Histogram of Monthly Precipitation Records for the Project.....	39

List of Figures

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
17	Watershed Map Showing Location of Stream Sampling Stations and Project Rain Gages.....	50
18	Watershed Map Showing Stream Water Quality During a Period of High Flow.....	56
19	Watershed Map Showing Average Stream Water Quality During the Project Period.....	57
20	Watershed Map Showing Stream Water Quality During a Period of Low Flow	58
21	Graph of pH Versus Time at Sampling Station No. 15	64
22	Graph of PPM Acid Versus Time at Sampling Station No. 15	65
23	Graph of pH Versus Time at Sampling Station No. 33	66
24	Graph of PPM Acid Versus Time at Sampling Station No. 33	67
25	View of Good Soil Cover on Mine Site No. 33	78
26	View of Poor Soil Cover on Mine Site No. 9	78
27	Typical Design Drawings and Standards for Diversions and Waterways	85
28	Typical Profiles for Terrace and Contour Regrading	87
29	Key Map Showing Subwatershed Divisions Used to Develop Specific Abatement Plans.....	105
30	Key to Symbols Used on Mine Site Maps	106
31	Graph of pH Versus Time at Sampling Station No. 7	108
32	Graph of PPM Acid Versus Time at Sampling Station No. 7	110
33	Map of Bullion Run Subwatershed.....	117
34	Aerial Photo Showing Mine Sites Nos. 4, 5, 6, 7 and 8.....	118
35	Photo Showing Seepage on Mine Site No. 5	133
36	Graph of pH Versus Time at Sampling Station No. 30	148

List of Figures

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
37	Graph of PPM Acid Versus Time at Sampling Station No. 30	149
38	Map of the Trout Run Subwatershed.....	154
39	Photo Showing Seepage from Area #8 on Mine Site No. 18.....	161
40	Graph of pH Versus Time at Sampling Station No. 10	170
41	Graph of PPM Acid Versus Time at Sampling Station No. 10	171
42	Graph of pH Versus Time at Sampling Station No. 45	173
43	Graph of PPM Acid Versus Time at Sampling Station No. 45	174
44	Map of Gilmore Run Subwatershed	179
45	Aerial Photo Showing Mine Sites Nos. 13, 15, 16 and 26	180
46	Aerial Photo Showing Mine Site No. 17	181
47	Photo Showing Acid Seepage from Mine Site No. 17.....	197
48	Graph of pH Versus Time at Sampling Station No. 14	212
49	Graph of PPM Acid Versus Time at Sampling Station No. 14	213
50	Map of the Upper Main Stream Subwatershed.....	219-A
51	Aerial Photo Showing Mine Site No. 10	220
52	Aerial View of Mine Site No. 10	225
53	Map of Southwest Tributaries Subwatershed	251
54	Graph of pH Versus Time at Sampling Station No. 18	275
55	Graph of PPM Acid Versus Time at Sampline Station No. 18.....	276

List of Figures

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
56	Map of the South Branch Subwatershed.....	285
57	Map of the East Tributaries Subwatershed	315
Plate I	Watershed map showing coal mine locations	
Plate II	Watershed map showing goal contours and area underlain by the Brookville and Middle Kittanning coal beds.	

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
1	Summary Table of Tributary Pollution Loads	2
2	Summary of Abatement Plans and Costs.....	5
3	Venango County Employment Statistics	18
4	Venango County Coal Production	19
5	Principal Members of the Allegheny Group.....	30
6	Water Quality Data - 1958 - Pennsylvania Fish Commission	52
7	Water Quality Data for Big Scrubgrass Creek - Appalachia Regional Commission.....	53
8	Summary of Specific Abatement Plans	101
9	Comparison of Estimated Acid Reduction and Abatement Costs by Priority Grouping	104
10	Summary of Abatement Plans and Costs for the Bullion Run Subwatershed.....	145
11	Summary of Abatement Plans and Costs for the Trout Run Subwatershed.....	168
12	Summary of Abatement Plans and Costs for the Gilmore Run Subwatershed	210
13	Summary of Abatement Plans and Costs for the Upper Main Stream Subwatershed	245
14	Summary of Abatement Plans and Costs for the Southwest Tributaries Subwatershed	273
15	Summary of Abatement Plans and Costs for the South Branch Subwatershed	306
16	Summary of Abatement Plans and Costs for the East Tributaries Subwatershed	331