PA-111

PROJECT DESCRIPTIONS AND STATUS
APRIL 1, 1997 THROUGH JUNE 30, 1997

SLIPPERY ROCK CREEK - SR 109 DISCHARGE

Project Description/Participants:

- This CMRS watershed project will involve the construction of passive treatment systems at Operation Scarlift Discharge SR 109, located on State Game Lands No. 95. A previously considered discharge, SR 110A, has been put on hold due to budget constraints.
- Based on the water quality data, the discharge can be treated successfully with a passive system consisting of a Successive Alkalinity-Producing System (SAPS) followed by a retention basin. Remediation of the SR 109 discharge, along with two other nearby AMD remediation projects, will significantly improve over two miles of the main branch of Slippery Rock Creek.
- Project will be completed via "Pass Through" Grant to Penn's Corner Charitable Trust.
- Other groups participating in this project are as follows:

  PA D.E.P. - Knox District Mining Office
  PA D.E.P. - Bureau of Mining and Reclamation
  Penn's Corner Charitable Trust
  PA Game Commission
  Natural Resources Conservation Service
  Butler County Conservation District
  DEP - Northwest Regional Office
  Western PA Coalition for Abandoned Mine Reclamation
  Slippery Rock Watershed Coalition
  PA Fish and Boat Commission
  Slippery Rock University
  Allegheny College

Project Status Report - April 1997 - June 1997

- Preparation of project proposal coordinated with Penn's Corner.
- Project design/construction schedule developed.
- Project area maps updated to reflect scope of work.
- Discharge and stream sampling and stream flow monitoring continued.
- Installation of convergent weir piping performed to facilitate flow measurement.
- Preliminary design plan of access road and facility developed.
- Facilitated agreement execution with Penn's Corner RC & D.
- Developed construction plans for passive treatment system for installation at the SR 109 site on State Game Lands No. 95.
- Reviewed site access with County Conservation District.

Proposed Activities for July 1997 - September 1997

- Begin preparation of field layout drawings.
- Prepare preliminary documents for final Scope of Work statement.
- Complete contract execution with Penn's Corner.

Project Work Plan Schedule - SR 109 Implementation

Milestone	Start Date	Target End Date	Actual End Date
Finalize Scope of Work	12/31/97		
Complete facility design	12/31/97	1/31/98	
Prepare/execute contract agreement	1/31/98	3/31/98	
Penn's Corner secure bids	4/30/98	6/30/98	
Award construction contract	5/31/98	7/31/98	
Construction finalized	6/30/98	9/30/98	
Monitor stream quality	11/98	11/99	

PA-111

Slippery Rock Creek Watershed

Comprehensive Mine Reclamation Strategy

Department of Environmental Protection

Knox Office, District Mining Operations

COMMONWEALTH OF PENNSYLVANIA

AMD TECHNOLOGY DEMONSTRATION: SR 109

EPA 104(b)(3) Grant Proposal for FY 96

Butler County
Pennsylvania
JAN. '98

AMD TECHNOLOGY DEMONSTRATION
EPA 104(b)(3) FY '96
OPERATION SCARLIFT DISCHARGE SR 109
PA COMPREHENSIVE MINE RECLAMATION STRATEGY
SLIPPERY ROCK WATERSHED PROJECT
PA STATE GAME LANDS NO. 95
WASHINGTON TOWNSHIP, BUTLER COUNTY

♦ EXECUTIVE SUMMARY

The Slippery Rock Team from the Knox District Mining Office plans to implement a Successive Alkaline Producing System (i.e. SAPS) and a retention basin/wetland to remediate Operation Scarlift Discharge SR 109. The SR 109 discharge originates from a Clarion/Brookville deep mine drift entry from the abandoned Keystone Mines near Argentine. The project site is located in Washington Township, Butler County, approximately 0.50 mile north of the State Game Lands No. 95 gate off of T-637 (Leonard Road). Implementation of this project along with the six passive treatment systems currently functioning and two additional systems that have funding for construction will help improve water quality on a three mile stretch of the main branch of Slippery Rock Creek that flows through PA State Game Lands No. 95. The design concept of this system will further the technology of dealing with elevated acidity and to a lesser extent marginal metal concentrations of acid mine drainage.

♦ INTRODUCTION

The Slippery Rock study area is one of eight watershed projects currently being studied under the PA Comprehensive Mine Reclamation Strategy funded through an initial EPA 104(b)(3) grant for approximately $230,000. The watershed encompasses 27 square miles and has approximately 31 miles of streams. The watershed is located in northern Butler County between the communities of Boyers and Eau Claire. It includes Venango, Washington, Marion, and Cherry townships. Acid Mine Drainage has developed from the abandoned deep and strip mining activity on the Clarion/Brookville coal that has degredated the waterways. Approximately 60 % of the area flows to the main branch of Slippery Rock Creek with the remaining 40 % making up the Seaton Creek Subwatershed. Approximately 15 % of the property is owned by the PA Game Commission which has been designated the target zone for AMD remediation.

Currently on the watershed, there are 6 passive treatment systems functioning with 2 additional systems proposed and 3 reclamation projects. The following is a list of initiatives to date in the watershed:

1. Anoxic Limeston Drain (ALD) constructed at the "Big Bertha" discharge (SR 94) by the Butler County Conservation District through Conoco fines.
2. Anoxic Limestone Drains (ALD - 2) constructed at the SR 114 discharges by Hedin Environmental/CDS Associates through Black Fox Mining bond forfeitures.
3. Retention Facility constructed at the SR 115 borehole discharge by the NRCS and Butler County Conservation Disctrict through Cononco fines.

4. The Ferris Treatment Complex implements vertical flow wetland technology to remediate Operation Scarlift Discharges SR 85 - SR 88. Construction was completed by Kerry Coal Company and Puryear Excavating. Funding for this site through the Sunbeam Tipple Reclamation Project and an EPA 104(b)(3) grant for FY 95 through the Penn's Corner Charitable Trust.
5. Anoxic Limestone Drain (ALD) for the SR 101A discharge by Hedin Environmental/CDS Associates through an EPA 319 grant with Slippery Rock University.
6. Successive Alkaline Producing System (S.A.P.S.) for the SR 109 discharge by Penn's Corner Charitable Trust through EPA 104(b)(3) funding for FY 96/97.
7. ALD-SAP combination by Hedin Environmental/CDS Associates for the SR 89 discharge through additional EPA 319 funding.
8. Sunbeam Tipple Reclamation Project by Kerry Coal Company: Reclamation of 21.2 acres of layering, mixing and blending 175,000 tons of coal ash with 100,000 tons of the abandoned coal refuse.
9. Reclamation of 5.2 acres of abandoned gob piles (six) on SGL 95 by H.R. Steward through the Butler County Conservation District. Mixing and blending REC-LIME with refuse.
10. Reclamation of the Able-Dreshman Property in the Seaton Creek Subwatershed by Amerikohl Mining Inc. Layering, mixing and blending 250,000 tons of coal ash to approximately 30 acres of unreclaimed strip mine and two abandoned pits

♦ PROJECT DESCRIPTION

This project is needed to retain metals and boost alkalinity to an unnamed tributary to the main branch of Slippery Rock Creek. The project will consist of constructing an access road and a Successive Alkaline Producing System (S.A.P.S.) followed by a retention basin/wetland for Operation Scarlift SR 109. The project area has a geographic position of 041-05-59 north latitude by 079-49-43 west longitude and can be located by measuring 18.1" north by 10.8" west from the southeast corner (041-00-00 latitude by 079-45-00 longitude) of the Hilliards USGS 7.5' topographic map. As mentioned earlier, this site falls within the Slippery Rock Watershed Project under the Pennsylvania Mine Reclamation Strategy (PA CMRS). The following table represents the water quality for **SR 109** sampled by the Knox DMO from 12/21/94 through 6/26/96:

		gpm	----------mg/l----------						lbs/day
Sample	Date	Flow	pH	iron	mang.	Al	SO_4	nt.acid	acid ld.
SR 109	12/21/94	16	4.20	3.99	1.94	3.05	135	32.20	6.19
SR 109	2/23/95	11	4.70	2.43	1.61	0.50	145	11.20	1.48
SR 109	3/30/95	14	4.70	1.78	1.55	0.50	130	24.80	4.17
SR 109	5/25/95	18	4.70	1.52	1.38	0.50	113	9.00	1.95
SR 109	7/27/95	10	4.70	2.27	1.63	0.50	133	11.00	1.32
SR 109	9/21/95	9	5.00	4.56	2.29	0.50	133	14.40	1.56
SR 109	10/18/95	6	4.90	4.60	2.17	0.50	169	19.80	1.43
SR 109	11/02/95	9	4.80	3.93	2.01	0.50	127	15.40	1.67
SR 109	12/13/95	9	4.70	2.37	1.91	0.50	156	18.60	2.01
SR 109	2/21/96	12	4.50	1.78	1.37	0.50	118	9.20	1.33
SR 109	3/13/96	15	4.50	0.98	1.32	0.50	120	33.60	6.06
SR 109	4/16/96	12	4.60	0.96	1.33	0.50	125	17.40	2.51
SR109	5/16/96	24	4.50	0.79	1.15	0.50	109	29.20	8.42
SR 109	6/26/96	18	4.40	1.29	1.52	0.50	91	10.20	2.21

PLEASE REFER TO PROJECT PLAN THAT FOLLOWS

In addition, this project is encouraged by the Slippery Rock Watershed Coalition and will be used by interns from Slippery Rock University and Allegheny College to analyze the improvements in water quality and stream biology to the main branch of Slippery Rock Creek.

COST TABLE

1.	Contracting/Accounting: (7.75% of grant projection)	$ 4262.50
2.	Mobilization: (5.00% of grant projection)	$ 2750.00
3.	Clearing/Grubbing: (2.5 ac. @ $3000/ac.)	$ 7500.00
4.	Access Road Construction:	$ 5000.00
5.	Excavation/Earthfill: (6450 yd^3 @ $1.50/$yd^3$)	$ 9675.00
6.	6 " Schedule 40 PVC: (perforated: 200 ft. @ $3.50/ft.)	$ 700.00
	Installation:	$ 500.00
7.	6 " Schedule 40 PVC (smooth: 175 ft. @ $2.50/ft.)	$ 437.50
	Installation :	$ 500.00
8.	AASHTO No. 1 Graded Rip-Rap: (450 ton @ $18.00/ton)	$ 8100.00
9.	Spent Mushroom Compost: (140 tons @ $20.00/ton)	$ 2800.00
10.	R-4 Graded Rip-Rap: (100 tons @ $12.00/ton)	$ 1200.00
11.	4 " Gate Valve: (1)	$ 300.00
12.	Miscellaneous Fittings:	$ 250.00
13.	Diversion Ditch: (300 ft. @ $5.00/ft.)	$ 1500.00
14.	E&S Filter Fabric Fence: (400 ft. @ $6.50/ft.)	$ 2650.00
15.	Revegetation Plan: (2.50 ac. @ $2750/ac.)	$ 6875.00
	TOTAL PROJECT COST:	$ 55,000.00

(revised: 1/28/98)

PROJECT DESCRIPTIONS AND STATUS
JANUARY 1, 1998 THROUGH MARCH 31, 1998

SLIPPERY ROCK CREEK - SR 109 DISCHARGE

Project Description/Participants:

- This CMRS watershed project will involve the construction of passive treatment systems at Operation Scarlift Discharge SR 109, located on State Game Lands No. 95. A previously considered discharge, SR 110A, has been put on hold due to budget constraints.

- Based on the water quality data, the discharge can be treated successfully with a passive system consisting of a Successive Alkalinity-Producing System (SAPS) followed by a retention basin. Remediation of the SR 109 discharge, along with two other nearby AMD remediation projects, will significantly improve over two miles of the main branch of Slippery Rock Creek.

- Project will be completed via "Pass Through" Grant to Penn's Corner Charitable Trust.

- Other groups participating in this project are as follows:

  PA D.E.P. - Knox District Mining Office
  PA D.E.P. - Bureau of Mining and Reclamation
  Penn's Corner Charitable Trust
  PA Game Commission
  Natural Resources Conservation Service
  Butler County Conservation District
  DEP - Northwest Regional Office
  Western PA Coalition for Abandoned Mine Reclamation
  Slippery Rock Watershed Coalition
  PA Fish and Boat Commission
  Slippery Rock University
  Allegheny College

Project Status Report: January 1998 - March 1998

- Knox DMO completed the design plan for the SR 109 Project on SGL 95. A 450 ton Successive Alkaline Producing System (SAPS) followed by a retention pond/wetland will be constructed.

- Knox DMO staff met with the Penn's Corner Conservancy Charitable Trust on 2/5/98 to review the design plan for the SR 109 Project. Plan was finalized as proposed.

- The construction area for the SR 109 project has been flagged in the field.

- The finalized "Scope of Work" proposal for the SR 109 Project was submitted to the Harrisburg BMR by the Knox DMO on February 6, 1998.

- The contract agreement between the Commonwealth of PA and the Penn's Corner Conservancy Charitable Trust was prepared by the Harrisburg BMR. Contract agreement was submitted to Penn's Corner for official signatures on 3/10/98.

(cont.)

Proposed Activities for April 1998 - June 1998

- Knox DMO to complete SR 109 Construction Contract for the contractors to develop a job price.
- Penn's Corner Conservancy Charitable Trust will develop public notice for the job annoucement that will be advertised in newspapers of general circulation.
- Site showing of the SR 109 Project Area will be held for contractors in mid May '98.
- Penn's Corner will award the contract in mid June '98.

Project Work Plan Schedule - SR 109 Implementation

Milestone	Start Date	Target End Date	Actual End Date
Finalize Scope of Work	12/31/97		2/6/98
Complete facility design	12/31/97	1/31/98	2/5/98
Prepare/execute contract agreement	1/31/98	3/31/98	
Penn's Corner secure bids	4/30/98	6/30/98	
Award construction contract	5/31/98	7/31/98	
Construction finalized	6/30/98	9/30/98	
Monitor stream quality	11/98	11/99	

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Slippery Rock Creek Watershed

Comprehensive Mine Reclamation Strategy

Department of Environmental Protection

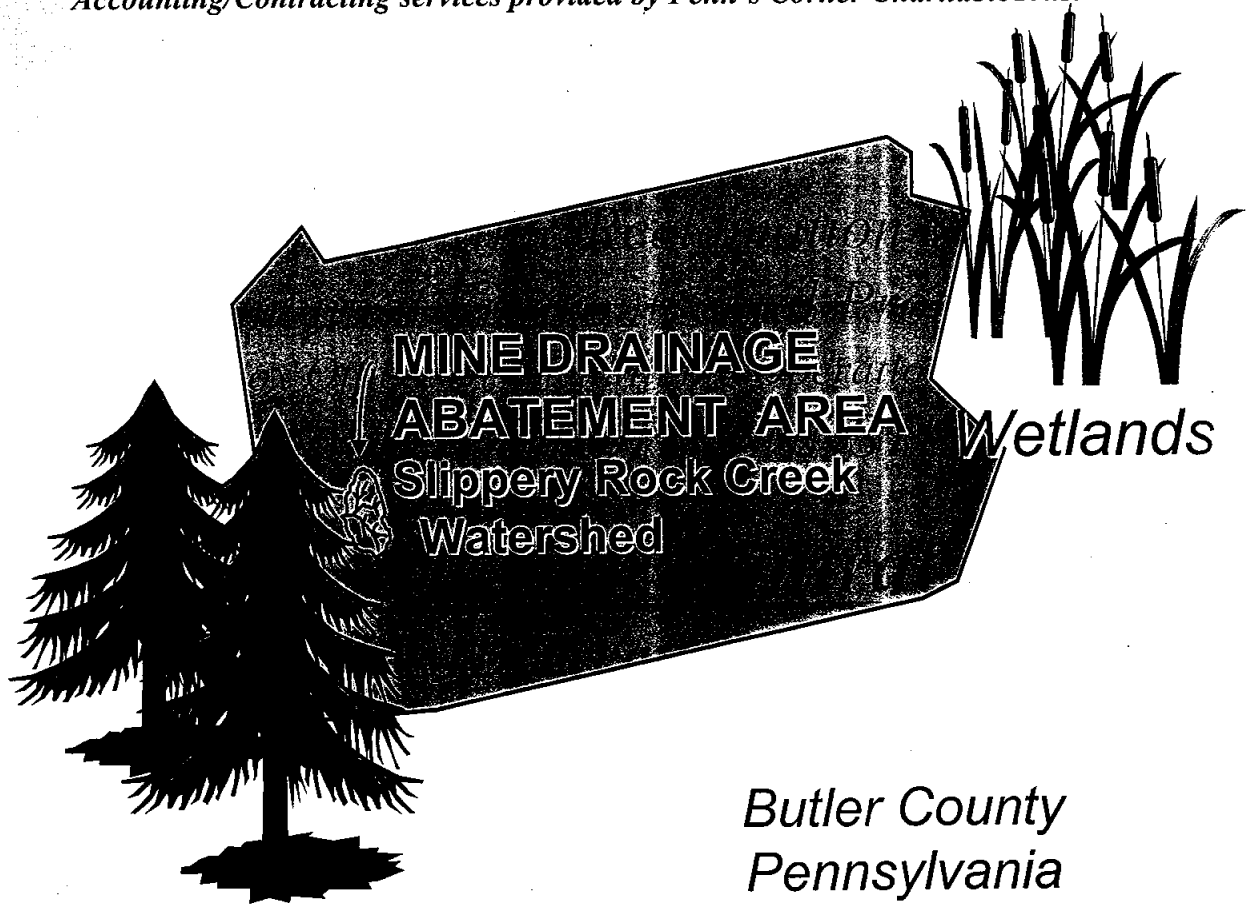
Knox Office, District Mining Operations

COMMONWEALTH OF PENNSYLVANIA

Construction Contract

SR 109 AMD Treatment System

Accounting/Contracting services provided by Penn's Corner CharitableTrust



Butler County
Pennsylvania
MAY 1998

PA DEPARTMENT OF ENVIRONMENTAL RESOURCES, KNOX DMO
SR 109 VERTICAL FLOW SYSTEM & RETENTION POND/WETLAND FACT SHEET

PA Game Lands No. 95, Washington Township, Butler County, PA

FUNDING SOURCE: EPA 104(b)(3) Grant.

PROJECT PARTICIPANTS:
Puryear Excavating & Trucking, PA DEP – Knox DMO, Northwest Regional Office, & B.M.R., PA Game Commission, Butler County Conservation District, NRCS, WPCAMR, PA Fish & Boat Commission, Slippery Rock Watershed Coalition, Slippery Rock University Staff & Students

COMPLETION DATE:
Construction completed August 1998
Water quality monitoring ongoing: PA DEP – Knox DMO

MATERIALS USED FOR TREATMENT:
166 yd^3 of compost *(1 foot layer)*
450 tons of AASHTO No. 1 limestone *(3 foot layer)*

WATER COLLECTION AND DISTRIBUTION:
Collection: By check dam and rock lined channel

Inlet: From the collection system, flow is distributed vertically down through the 1 foot layer of compost and then continuing down through the 3 foot layer of AASHTO No. 1 limestone to the underdrain system consisting of 3 rows of 6" perforated Schedule 40 PVC connected to a 6" Schedule 40 PVC manifold of the vertical flow system.

Outlet: Flow from the underdrain system rises vertically through 6" Schedule 40 PVC slope pipes and is discharged to the retention pond/wetland. The current elevation of the outlet of the slope pipes creates a 4 foot depth of water above the top of the compost. Discharge from the retention pond/wetland is via rock lined channel to the stream.

SYSTEM DIMENSIONS (FEET):

	Length:	Width:	Depth
VERTICAL FLOW SYSTEM	144	91	12
RETENTION POND	70	40	5
WETLAND	70	40	3

(cont.)

SOIL AMENDMENTS AND SEED MIXTURE:
Birdsfoot trefoil @ 10 lbs/ac; White Dutch clover @ 4 lbs/ac; Reed Canary Grass @ 15lbs/ac; Winter Wheat cover @ 120 lbs/ac; Aglime @ 10 tons/ac; 10-20-20 fertilizer; straw @ 3 tons/ac

WATER QUALITY (representative):

	Flow (gpm)	pH	alk(mg/l)	acd(mg/l)	Al(mg/l)	Fe (mg/l)
Pre-constr.: SR 109 Raw	14.2 *(avg.)*	4.9	9.0	14.0	<0.5	3.1
Post-constr.: VFS	12.2 *(avg.)*	7.5	134.9	0	<0.5	<0.3

VFS – Vertical Flow System

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REVISED SR 109 PROJECT COST TABLE

1.	Contracting/Accounting: (7.75% of grant projection)	$ 4262.50
2.	Mobilization/Demobilization:	$ 2300.00
3.	Clearing/Grubbing:	$ 7000.00
4.	Access Road Construction/Excavation	$ 14000.00
5.	Earthfill:	$ 5000.00
6.	6" PVC Pipe *(smooth/perforated)*/Valve/Fittings:	$ 2687.50
7.	AASHTO No. 1 Graded Riprap:	$ 6300.00
8.	Spent Mushroom Compost:	$ 4400.00
9.	R-4 Graded Rip-Rap:	$ 3000.00
10.	Diversion Ditch:	$ 2000.00
11.	E&S Filter Fabric Fence:	$ 1050.00
12.	Revegetation Plan:	$ 3000.00

TOTAL PROJECT COST: $ 55,000.00

υ August 12, 1998 Reimbursement Request: *(Partial)*

Mobilization:	$ 1000.00
Clearing/Grubbing:	$ 7000.00
Diversion Ditch:	$ 2000.00
Pollution Control *(Filter Fence)*	$ 1000.00
Access Road/Excavation:	$ 14000.00
Accounting: *(Overhead)*	$ 2750.00
TOTAL PARTIAL:	**$ 27750.00**

υ September 1, 1998 Reimbursement Request: *(Final)*

Demobilization:	$ 900.00
Earthfill:	$ 5000.00
6" PVC Pipe/Valve/Fittings:	$ 2400.00
AASHTO No. 1 Riprap: *(Rockfill)*	$ 6140.00
Spent Mushroom Compost:	$ 4400.00
R-4 Graded Riprap: *(Rock Channels)*	$ 3000.00
Revegetation Plan: *(Perm. Seeding)*	$ 3000.00
Accounting: *(Overhead)*	$ 1512.50
TOTAL FINAL:	**$ 26352.50**

TOTAL CONSTRUCTION/OVERHEAD COST: $ 54,102.50

BALANCE: $ 897.50

(revised: 8/25/98)

PA COMPREHENSIVE MINE RECLAMATION STRATEGY

-SLIPPERY ROCK CREEK WATERSHED PROJECT-

DESIGN PLAN

SR 109 Project

-This design plan is based on the topographic maps used in the Operation Scarlift deep mine seal areas developed by GWIN, DOBSON, & FOREMAN, Consulting Engineers 1973.

-A grid layout and topographic survey site specific to the construction area will be completed during Spring '98.

-Funding provided by FY '96 EPA 104(b)(3) grant money for the PA Comprehensive Mine Reclamation Strategy.

-Contracting and Accounting services provided by the Penn's Corner Conservancy Charitable Trust.

Roger D. Bowman, Mining Engineer
Department of Environmental Protection
Knox District Mining Office
January 1998

Revised: 2/27/98

Project Description:

The proposed plan to remediate Operation Scarlift discharge **SR 109** is located in Washington Township - Butler County, within PA State Game Lands No. 95. From the SGL No. 95 gate at T-637 (Leonard Road) near Argentine, the project area is located 0.50 mile north along the Operation Scarlift access road, approximately 300 feet west of the access road. The project area also can be located by measuring 18.10 in. North by 10.80 in. West from the southeast corner (i.e. 41-00-00 lat./79-45-00 long.) of the Hilliards USGS 7.5 minute topographic map. Geographic position of the construction site appears to be approximately 41-05-59 north latitude by 79-43-43 west longitude.

The SR 109 discharge originates from a Clarion/Brookville deep mine drift entry from the abandoned Keystone Mines. The SR 109 Project will consist of constructing an access link to the existing Operation Scarlift road and a Successive Alkaline Producing System (SAPS) followed by a retention basin/wetland. The following table represents the water quality of the **SR 109** discharge sampled by the Knox DMO from 12/21/94 through 6/26/96:

		gpm	----------mg/l----------						lbs/day
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SR 109	3/30/95	14	4.70	1.78	1.55	0.50	130	24.80	4.17
SR 109	5/25/95	18	4.70	1.52	1.38	0.50	113	9.00	1.95
SR 109	7/27/95	10	4.70	2.27	1.63	0.50	133	11.00	1.32
SR 109	9/21/95	9	5.00	4.56	2.29	0.50	133	14.40	1.56
SR 109	10/18/95	6	4.90	4.60	2.17	0.50	169	19.80	1.43
SR 109	11/02/95	9	4.80	3.93	2.01	0.50	127	15.40	1.67
SR 109	12/13/95	9	4.70	2.37	1.91	0.50	156	18.60	2.01
SR 109	2/21/96	12	4.50	1.78	1.37	0.50	118	9.20	1.33
SR 109	3/13/96	15	4.50	0.98	1.32	0.50	120	33.60	6.06
SR 109	4/16/96	12	4.60	0.96	1.33	0.50	125	17.40	2.51
SR 109	5/16/96	24	4.50	0.79	1.15	0.50	109	29.20	8.42
SR 109	6/26/96	18	4.40	1.29	1.52	0.50	91	10.20	2.21

The strategy behind passively treating Operation Scarlift discharge **SR 109**

has been divided into three phases of construction on State Game Lands No. 95 as follows:

I. Construct an access road link for the SR 109 Project area to the exisiting Operation Scarlift access road.

II. Construct the **Successive Alkaline Producing System** (i.e. SAPS) and the Retention Basin/Wetland as a passive treatment system for the SR 109 discharge.

III. Install the **collection system**. (consisting of:)

- Excavate the **collection ditch** to direct the SR 109 discharge to the SAPS.

- Construct the **check dam** to the direct **SR 109** discharge to the SAPS.

-DESIGN SPECIFICATIONS-

Phase I: Access Road Link

♦ construct access road link to project area.

A. approximately **300 linear feet** of road to project area.
1. Clear/Grub/Level **4500 ft^2** of road: **15 feet width**
2. Crushed stone surface (durable, non-toxic): **220 tons** (167 yd^3)
3. Thickness of crushed stone: **1 foot**

Phase II: Passive Treatment System - Successive Alkalinity Producing System - SAPS

♦ construct **Successive Alkalinity Producing system - SAPS**

A. Excavation: Cut/Fill to design specifications.
1. Cut: (approximately) **2355 cubic yards**
2. Fill: (approximately) **2050 cubic yards**

B. SAPS Dimensions:

1. Pond Bottom: **72 feet** by **30 feet**
2. Bottom Elevation: **1243 feet**
3. Top of embankment: **144 feet** by **91 feet**
4. Top Elevation: **1255 feet**
5. Depth: **12 feet**
6. Inside Slopes: **3 : 1** (length, emb. width); **2 : 1** (upslope cut width)

♦ Install dewatering and discharge pipes in SAPS 1.

A. Place approximately (43 yd^3) **56 tons** of the AASHTO No. 1, (80% $CaCO_3$ equivalent) limestone in the pond bottom as drainfill. (Depth: 0.5 feet)

B. Lateral Pipes
1. **6" perforated Schedule 40 PVC**
2. Approximate Length: **200 feet**
   - (3) rows on 5 foot centers, 65 feet each

C. Dewatering Device (smooth pipe)
1. **6" Schedule 40 PVC** Approximate Length: **100 feet**
2. **4" Steel Valve w/reducer** Quantity: **(1)**
3. Dewatering Elevation: **1243.5 feet**

D. Discharge Pipes (smooth pipe)
1. **6" Schedule 40 PVC** Approximate Length: **125 feet**
2. Discharge Elevations: (2) **1249 & 1251 feet**

♦ Embed lateral pipes with remaining AASHTO No. 1 Limestone at bottom of SAPS to a total depth of **3 feet** above the pond bottom.

A. AASHTO No.1, 80% $CaCo_3$ (300 yd^3) **394 tons**
B. Depth: (from pond bottom) **3.00 feet**

♦ Spread **Spent Mushroom Compost** to a **1 foot** depth above the AASHTO No. 1, 80 % $CaCO_3$ limestone.

A. Spent Mushroom Compost amount: (approx. 112 tons) **166 yd^3**

(revised: 2/4/97)

♦ construct **Retention Pond/Wetland**

A. Excavation: Cut/Fill to design specifications.
   1. Cut: (approximately) **800 cubic yards**
   2. Fill: (approximately) **50 cubic yards**

B. Retention Pond dimensions:
   1. Pond Bottom: **45 feet** by **15 feet**
   2. Bottom Elevation: **1245 feet**
   3. Top of embankment: **70 feet** by **40 feet**
   4. Top Elevation: **1250 feet**
   5. Depth: **5 feet**
   6. Inside Slopes: **3 : 1** (length, emb. width); **2 : 1** (upslope cut width)
   7. Pool dimensions: **60 feet** by **30 feet**
   8. Pool Elevation: **1248 feet**
   9. Depth of water: **3 feet**

C. Wetland dimensions:
   1. Wetland Bottom: **57 feet** by **25 feet**
   2. Bottom Elevation: **1247 feet**
   3. Top of Embankment: **70 feet** by **40 feet**
   4. Top Elevation: **1250 feet**
   5. Depth: **3 feet**
   6. Inside Slopes: **3 : 1** (length, emb. width); **2 : 1** (upslope cut width)
   7. Pool dimensions: **60 feet** by **30 feet**
   9. Depth of water: **1 foot**

♦ Spread **Spent Mushroom Compost** to a **0.5 foot** depth above the bottom of the wetland. (approx. 28 tons) **42 yd^3**

♦ Construct **wetland outflow channel** to natural drainage.

A. Channel Depth: **2 feet**
B. Bottom Width: **3 feet**
C. Slopes: **2 : 1**
D. Length: **25 feet**
E. Channel Lining: **R-4 Riprap** (5.09 yd^3) **7 tons**

♦ **Phase III: SR 109 Collection System**

A. Excavate collection ditch to direct **SR 109** discharge to SAPS.

1. Trapezoidal channel, 3 feet in depth, 3 foot bottom width, slopes: 2 : 1, excavation: 70 yd^3 (approx.)
2. 40 feet in length at a 2% slope, Inlet elevation: **1252 feet**
3. Channel lining: R-4 (6" avg.) Rip-Rap, Volume: **10 tons** (approx.)

B. Construct **SR 109 CHECK DAM**

1. Fill volume: **400 cubic yards**
2. Top elevation: **1255 feet**
3. Inside slope: **2 : 1** Outside slope: **3 : 1**
4. Emergency Spillway
   - Top width: **10 feet**
   - Depth: **2 feet**
   - Bottom width: **6 feet**
   - Channel lining: R-4 (6"avg.) Rip-Rap, Volume: **20 tons** (approx.)

CUT/FILL SUMMARY TABLE

Cut		**Fill**	
SAPS:	2355 yd^3	SAPS:	2050 yd^3
Pond/Wetland:	800 yd^3	Pond/Wetland:	50 yd^3
Rock Channels:	70 yd^3	Check Dam:	400 yd^3
TOTAL:	3225 yd^3	TOTAL:	2500 yd^3 (3225 yd^3)

Excess Cut: 725 yd^3

- Excess **725 cubic yards** of Cut can be placed on outslopes of SAPS and Check Dam. **(TOTAL FILL: 2500 yd^3 + 725 yd^3 = 3225 yd^3)**

- **Erosion and Sedimentation Control Plan**

1. E&S plan will be prepared by Knox DMO and available on site.

2. 25 PA Code Chapter 105.12.(a)(16) waiver for restoration activities for the SR 109 Project *will not* be needed because of "zero" wetland impacts.

3. E&S plan constists of:
   a. **Diversion Ditch DD1**: 300 linear feet of vegetated channel at a 2 % slope.
   b. installing **filter fence**:

- 400 ft. of 24" wide fabric
- 3 ft. wooden stakes, quantity 100

♦ **Revegetation Plan**

1. Seed and mulch affected area (i.e. approximately 2.5 acres) with **Mixture II** plan. This seed plan was approved by the Pa Game Commission for the SR 114 ALD's constructed by Hedin Environmental near Argentine and the SR 87/SR 88 VFW constructed by Puryear Excavating and Trucking at the Ferris Project.

MIXTURE II

a. bird's foot trefoil ↓↑(double strength/innocculated)	10 lbs/ac	d. winter wheat cover	120 lbs/ac
		e. ag lime	10 tons/ac
b. white dutch clover	4 lbs/ac	f. 10-20-20 fertilizer	1000lbs/ac
c. reed canarygrass	15 lbs/ac	g. mulch (straw)	3 tons/ac

SR 109 PROJECT
COST TABLE

1. Contracting/Accounting: (7.75% of grant projection) $ 4262.50

2.	Mobilization: (5.00% of grant projection)	$ 2750.00
3.	Clearing/Grubbing: (2.50 ac. @$3000/ac.)	$ 7500.00
4.	Access Road Construction:	$ 5000.00
5.	Excavation/Earthfill: (6450 yd^3 @ $1.50/$yd^3$)	$ 9675.00
6.	6" Schedule 40 PVC (perforated: 200 ft @ $3.50/ft.)	$ 700.00
	a. Installation:	$ 500.00
7.	6" Schedule 40 PVC (smooth: 175 ft @ $2.50/ft.)	$ 437.50
	a. Installation:	$ 500.00
8.	AASHTO No. 1 Graded Rip-Rap: (450 tons @ $18.00/ton)	$ 8100.00
9.	Spent Mushroom Compost: (140 tons @ $20.00/ton)	$ 2800.00
10.	R-4 Graded Rip-Rap: (100 tons @ $12.00/ton)	$ 1200.00
11.	4 " Steel Valve: (1)	$ 300.00
12.	Miscellaneous Fittings:	$ 250.00
13.	Diversion Ditch: (300 ft. @ $5.00/ft.)	$ 1500.00
14.	E&S Filter Fabric Fence: (400 ft. @ $6.625/ft.)	$ 2650.00
15.	Revegetation Plan: (2.50 ac. @ $2750/ac.)	$ 6875.00
	TOTAL PROJECT COST:	$ 55,000.00

ENGINEER'S ESTIMATE

AMD COLLECTION/TREATMENT SYSTEM - EPA 104(b)(3) GRANT
OPERATION SCARLIFT DISCHARGE SR 109
PA D.E.P. - SLIPPERY ROCK WATERSHED PROJECT
STATE GAMELANDS NO. 95
BUTLER COUNTY, PENNSYLVANIA

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
1	Mobilization/Demobilization	8	1	JOB	XXXXX	$ 7,750.00
2	Clearing and Grubbing	2	1	JOB	XXXXX	$ 7,500.00
3.	Diversion	27	1	JOB	XXXXX	$ 1,500.00
4	Pollution Control	5	1	JOB	XXXXX	$ 2,525.00
5.	Excavation	21	1	JOB	XXXXX	$ 4,837.50
6.	Earthfill	23	1	JOB	XXXXX	$ 4,837.50
7.	6" PVC Pipe (Perforated)	45	1	JOB	XXXXX	$ 1,325.00
8.	6" PVC Pipe (Solid)	45	1	JOB	XXXXX	$ 1,487.50
9.	Rockfill – SAPS	25	1	JOB	XXXXX	$ 8,100.00
10.	Compost – SAPS	401	1	JOB	XXXXX	$ 2,240.00
11.	Compost – Wetland	401	1	JOB	XXXXX	$ 560.00
12.	Rock Channels	28	1	JOB	XXXXX	$ 1,200.00
13.	Permanent Seeding	6	1	JOB	XXXXX	$ 6,875.00

Construction Contract TOTAL = $ 50,737.50

- Contracting/Accounting Services by *Penn's Corner Charitable Trust*
  (7.75% of grant projection $55,000.00) C/A TOTAL = $ 4,262.50

PROJECT TOTAL = $ 55,000.00