pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF ABANDONED MINE RECLAMATION

The History of Acid Mine Drainage Abatement Facilities Constructed in Pennsylvania under 'Operation Scarlift'

Introduction

The Commonwealth of Pennsylvania, Department of Environmental Protection, and its predecessor agencies, the Department of Environmental Resources and the Department of Mines & Mineral Industries, have constructed 16 acid mine drainage (AMD) treatment facilities in the Anthracite and Bituminous Regions from 1967 to 1992. Presently, the Department operates and maintains five of those treatment facilities. Treatment plants still in operation include Swamp Creek (SL106-3), Rausch Creek (SL112-1), Toby Creek (SL 132-5-106.2), Coal Hollow (SL 132-5-106.2), and Wildwood (SL 198-2).

Purpose

The purpose of this document is to provide a brief history of the constructed AMD treatment facilities, the current status of each plant with a succinct and straight forward explanation of the plants' complexity or simplicity, and operating success and problems. A brief discussion explaining why the plant may not be operational at this time is also included. This document was developed to memorialize the history of each plant and to accurately record and allay any misconceptions regarding the reasons for continued operation or closure.

Funding

The primary sources of funding for the construction and operation and maintenance of these facilities has been the Scarlift Bond Issue (Project 500 or Operation Scarlift). The Scarlift Program was implemented through bond issue funding and authorized by legislation enacted as part of the "Land and Water Conservation Act" of 1968. Beginning in 2003, funding for ongoing operation and maintenance is provided from Title IV of the Surface Mining Control and Reclamation Act of 1977 through the AMD Set-Aside Program.

The Treatment Facilities

SL 104
Slippery Rock Creek
Marion Township, Butler County

The system utilized flow diversion, equalization, hydrated lime, polymeric flocculent, clarification, a solids thickener, and settling lagoons.

Average Flow Rate MGD	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
3.6	4.12	2.02	12-15	$804,845.86	December, 1970

Many of the problems that were experienced were due to improper installation of equipment or instrumentation and were resolved. Among the most vexing problems was the proper control of the specific gravity in the lime slurry tank. Once the instrumentation was corrected and means were provided to unplug the air bubblers daily, that system became operational. Please refer to the Scarlift Report for a more detailed analysis of the operational problems and recommendations. Operations ceased at the plant in 1989 and the plant was officially taken off-line in 1990 because a much improved influent water quality made continued operation of the plant unnecessary.

SL 106-1
Sandy Run
Foster Township, Luzerne County

This system is categorized as a lime dosing or neutralization facility consisting of a hydrated lime storage silo, automatic feeder with a flow monitoring system, auxiliary power supply, Lightning Mixer, automatic timers and later an air compressor was employed to provide compressed air to a series of air injectors placed around the circumference of the silo. The facility was originally intended to be located at the Owl Hole Drainage Tunnel; however, eventually it was located over a portion of the main stream of Sandy Run because the Department could not secure landowner consent to construct the facility at the Owl Hole Drainage Tunnel. This plant was also intended to neutralize the discharge of the Sandy Run Drainage Tunnel and to diminish the pollution load entering the Lehigh River.

Average Flow Rate MGD	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
5	3.5	0.8	15	$48,516.80	April, 1970

Some of the problems encountered with the operation of the plant were caused by the elements of nature. Because the plant was an on-stream plant, stream borne debris such as leaves, twigs and other foreign matter required regular maintenance. The plant experienced operational difficulties during severe winter weather due to ice and freezing conditions, especially with the Lightning Mixer. Eventually the mixer was removed from service. The most severe operational problem involved the hydrated lime silo and the automatic feeder. From time to time, the volume and weight of the lime in the silo would overwhelm the automatic feeder, causing the silo to empty in a very short period of time. It was determined that moisture within the silo caused the lime to form an arch inside the silo and when the arch gave way, the weight and volume of the lime would overcome the capacity of the feeder. The air injectors were added around the circumference of the silo to keep the lime "fluffed" to prevent it from arching inside the silo. This approach was reasonably successful but not perfect. Eventually it became necessary to man the facility on a daily basis and the employee manually adjusted the feeder while at the plant. Following a thorough study of the facility's effect on Sandy Run and the Lehigh River, it was determined that operation of the plant had little to no effect on the conditions of the Lehigh River and it was decided to cease plant operations in September 1990. The plant was disassembled and removed under project number OSM 13, 40 (4966, 4121)101.1. That work was completed on January 19, 2006.

SL 106-2
Buck Mountain
Lausanne Township, Carbon County

This system is also categorized as a lime dousing or neutralization facility consisting of a hydrated lime storage silo, automatic feeder with a flow monitoring system, auxiliary power supply, Lightning Mixer, automatic timers and later an air compressor was employed to provide compressed air to a series of air injectors placed around the circumference of the silo. The facility was located at the Buck Mountain No. 2 Drainage Tunnel and its purpose was to neutralize this discharge and to diminish the pollution load entering the Lehigh River.

Average Flow Rate MGD	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
2	2.75	2.7	5	$40,025.00	April, 1970

Since this plant was located at the mouth of the discharge, stream borne debris such as leaves, twigs and other foreign matter had virtually no effect on the operation of the facility. The plant did experience operational difficulties during severe winter weather due to ice and freezing conditions, especially with the Lightning Mixer.

Eventually the mixer was removed from service. The most severe operational problem involved the hydrated lime silo and the automatic feeder, identical to the problem at the Sandy Run facility. From time to time, the volume and weight of the lime in the silo would overwhelm the automatic feeder, causing the silo to empty in a very short period of time. It was determined that moisture within the silo caused the lime to form an arch inside the silo and when the arch gave way, the weight and volume of the lime would overcome the capacity of the feeder. The air injectors were added around the circumference of the silo to keep the lime "fluffed" to prevent it from arching inside the silo. This approach was reasonably successful but not perfect. Eventually it became necessary to man the facility on a daily basis and the employee manually adjusted the feeder while at the plant. Following a thorough study of the facility's effect on Buck Mountain Creek and the Lehigh River, it was determined that operation of the plant had little to no effect on the conditions of the Lehigh River and it was decided to cease plant operations in September 1990. The plant was disassembled and removed under project number OSM 13, 40 (4966, 4121)101.1. That work was completed on January 19, 2006.

SL 106-3
Swamp Creek
Jones Township, Elk County

The Swamp Creek Plant is located the village of Rasselas. This plant was built in 1968. Approximately, 1000 GPM mine drainage discharge is treated with hydrated lime at this plant. The raw water has an average pH of 4.6, iron of 1 mg/l, and the aluminum is 1.5. The effluent water that discharges into Swamp Creek has an average pH of 7.0, iron of 0.7, and the average aluminum is 0.8. Approximately, 19 tons of hydrated lime is used every six weeks at this plant. The lime silo was updated with a new electrical unit, auger, and automatic dial system in 2007. The 2007 annual operating cost was $30,842. Treated water from this plant flows into East Branch Lake.

All flow and water quality data is available in the Department's Sample Information System (SIS).

Average Flow Rate MGD	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
3.0	3.9	3.00	10	$70,729.50	October, 1970

SL 107-5-3
Ernest Mine Complex
Carl A. White Water Reclamation Plant
Creekside, Indiana County

The mine drainage abatement scheme developed for the Ernest Mine Complex included a system of seals and barriers at the previously existing mine openings to divert the acid mine water to a central location where it could be treated and discharged into McKee Run, a tributary of Crooked Creek. To accomplish this objective, it was necessary to increase the elevation of the water in the mine an additional 35 feet, achieving a gravity flow, without pumping, to the treatment plant site.

This facility operates by neutralization with lime, aeration and settling out of the settleable solids by clarification. Raw water is pumped from an abandoned mine heading under the plant site, processed through the plant and ultimately discharged to McKee Run. Waste sludge is discharged back into the mine. The plant ceased operation in 1983 or 1984 because the waste sludge began to re-circulate into the plant influent and caused significant operational problems.

Average Flow Rate MGD	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
4.5	3.8	304	4.5	$4,327,979.17	1982

SL 112-1
Rausch Creek
Hegins Township, Schuylkill County

The Rausch Creek facility is an on-stream plant and the entire flow of Rausch Creek is intercepted at the head works intake and diverted into the treatment plant. Both the East Branch and West Branch of Rausch Creek are fed by surface springs and mine discharges from active and abandoned workings.

The acidic waters taken into the plant flow into a 17 x 17 foot flash mixer where the water is mixed with lime slurry made from pebble lime. The neutralized water then flows into two aeration tanks where it is aerated for 30 minutes in order to oxidize the iron. At the effluent of the aeration tanks, a polymer is added to obtain better settling of flocculants. The aerated water then passes into two 90-foot diameter clarifiers where the solids settle out. The clear water flows into two large polishing lagoons for further settling and then back into Rausch Creek. The sludge from the clarifiers is pumped into a thickener where it is dewatered to approximately 2.5 percent solids. The sludge is then

processed on a belt filter press to approximately 12-18 percent solids and hauled to a disposal area. Two large sludge holding ponds are also located at the plant for storage in emergency situations. The supernatant from the thickener and a portion of the sludge from the clarifier are recirculated into the flash mixer for better stabilization of the neutralized water.

The plant facilities also include a control building which houses office facilities, a lime-slurry feeding arrangement, laboratory, air compressor, standby diesel-driven 300 KW emergency generator, and motor control centers; a deep well with an elevated water storage tank of 100,000 gallons capacity; a leaf removal system; and a pebble lime storage silo.

Average Flow Rate MGD	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
8.8	4.2	17	16	$3,555,297.63	April, 1974

The removal and processing of anthracite coal upstream of the Rausch Creek Treatment Plant causes many changes in the hydrology of the basin. Stream-flow is affected by diversions and consumptive use of water for the processing of the coal. Groundwater flow is altered by artificial drainage in mines and stripping pits. The character of the water is altered by introduction of silt and soluble materials. The silt and other debris are deposited over time in the head works structure and need to be removed periodically. Because the plant is an on-stream plant, stream borne debris such as leaves, twigs, silt and other foreign matter contribute to operational problems. Most of the leaf, twig and other debris are successfully handled by the leaf removal system; however, silt and other fines do pass through the plant. While the silt and fines help to stabilize the neutralized water, they ultimately are deposited in the polishing lagoons and require periodic removal.

The plant is capable of treating a maximum flow of 16 million gallons per day; however, after periods of heavy rainfall the flow has exceeded 150 million gallons per day. Flow in excess of 16 million gallons per day, is by-passed around the plant and neutralized with lime slurry. In the past, flows of that magnitude became very problematic; however, with a new head works structure and other plant improvements, high volume flows are much better handled today.

With the abatement of the pollution of the waters of Rausch Creek, a total of 27 miles of streams from the Susquehanna River eastward to Rausch Creek can now be classified as "clean, unpolluted streams". The 27 miles includes eight miles of Pine Creek and 19 miles of Mahantongo Creek, which are periodically stocked with trout and provide two of the best recreational fishing streams in the area. The Rausch Creek AMD

Treatment Plant was placed in operation during April 1974 and has been in continuous operation since that time.

SL 114-1
Smith Township, Washington County

Average Flow Rate MGD	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
			0.5	$576,993.00	April, 1971

SL 116-3
Altoona
Logan Township, Blair County

The City of Altoona, like many other communities, has been faced with the problem of supplying an adequate quantity of potable water. The purpose of the water treatment facility is twofold: first, the treatment of acid mine drainage in (Sugar Run, Glen White Run and Kittanning Run) to stream quality standards; second, the treatment of stream quality water to public water supply standards. The primary or acid mine water neutralization phase consists of flash mixing, coagulation and flocculation, aeration, and clarification. The secondary or potable water treatment phase consists of lime-soda ash softening including mixing, coagulation and flocculation, and clarification followed by filtration with facilities for pH adjustment and disinfection.

Average Flow Rate MGD	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
Approx. 12.5	3.2	57.8	15	$5,074,529.30	January, 1975

Soon after the plant was placed into operation, it was transferred to the City of Altoona to provide a safe, potable supply of water for its residents. The facility was still in operation as of 2013. The extent of alterations and upgrades made to the plant over the years has not been followed by the Department.

SL 117-1
Hawk Run
Morris Township, Clearfield County

The Hawk Run acid mine drainage treatment plant was located in the Village of Hawk Run near Philipsburg, Pennsylvania. The plant utilized an ion exchange process developed by Rohm and Haas Company, Philadelphia, designated as the "Modified Desal Process" to remove mineral acidity. Subsequent treatment steps consisting of aeration, softening and filtration will remove iron, other metals and hardness and produce water meeting the U.S. Public Health Service standards for drinking water. The Hawk Run plant had very few operational problems other than the high cost to treat the AMD to drinking water standards. The plant is no longer operated.

Average Flow Rate MGD	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
0.5	3 to 4	250	0.5	$2,713,236.77	February, 1973

SL 132-5-106.2
Toby Creek
Fox Township, Elk County

The Toby Creek Plant is located in the village of Toby. The plant was built in 1992. Average 500 GPM mine drainage from three separate locations is treated with hydrated lime stone at this plant. The raw water has an average pH of 4.1, iron of 8.6 mg/l, and the aluminum is 9. The effluent water that is discharged into Little Toby Creek has an average pH of 6.8, iron of 1.5, and the average aluminum is 2.

About 300, 55 lbs. bags per month hydrated lime are used. The site includes an in ground clarifier pond with a settling pond adjacent. An anionic polymer is used to help settle out the iron. The 2007 annual operating cost for Toby Creek and Coal Hollow plant was $225,586.

All flow and water quality data is available in the Department's Sample Information System (SIS).

Average Flow Rate GPM	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
500	4.1	8.6	0.72		1992

SL 132-5-106.2
Coal Hollow
Fox Township, Elk County

The Coal Hollow plant is in the Village of Coal Hollow. This plant was built in 1992. An average of 300 GPM of mine drainage discharge is treated with high calcium limestone screenings at this plant. The raw water has an average pH of 4.3, iron of 1.5 mg/l, and the aluminum is 3.5. The effluent water that discharges into Little Toby Creek has an average pH of 6.5, iron of 1.3, and the average aluminum is 2.5. Approximately six tons of limestone per month is used at this plant. The 2007 annual operating cost is included with Toby Creek Plant.

All flow and water quality data is available in the Department's Sample Information System (SIS).

Average Flow Rate GPM	Average Raw Water Quality		Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
	pH	Fe mg/l			
300	4.3	1.5	0.43		1992

SL 135-10-102.1
AMD Demonstration Project
Quakake Water Level Tunnel

The Quakake Tunnel prototype installations were designed and constructed during 1978 and 1979. A total of 30 individual process units representing variations of four basic design processes were installed. All the units employed crushed limestone for neutralization of AMD. The installed processes included both static and abrasive processes. High calcium crushed limestone was used for the demonstration and a high magnesium limestone was used for comparative purposes in the tumbling drums.

The acid mine drainage treatment processes demonstrated included static limestone barriers, filter type units that were designed to operate in three modes; downflow, upflow and alternating downflow-upflow, tumbling drums and autogenous mill. The autogenous mill is a method of passing AMD through motorized rotating tubes partly filled with crushed limestone to neutralize AMD. One such installation was transferred from its original Hollywood, Pennsylvania, location to the Quakake Tunnel. The combined treatment capacity of the prototypes was three cfs. Flow was delivered to the units by a turbine pump capable of delivering 1,800 GPM at a 50 foot head

Average Flow Rate cfs	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity cfs	Construction Cost	Date Plant Placed in Operation
21.2	3.6	2.3	3	$331,185.16	July 10, 1979

Several problems developed during operation which required correction. The siphon units in the alternating filter units did not function because they were unable to develop sufficient head to purge the air in the pipes between the units. To correct the situation, the siphon in the upper unit was replaced with a mechanical flusher, while the siphon in the third unit was replaced by a commercial sanitary siphon with non-pressure discharge. Both modifications worked satisfactorily, although the modification of the backwashing equipment required the removal of some of the stone, thereby reducing neutralization capability. Having demonstrated the feasibility of automatic backwashing on some of the units, the remaining filter-type units were backwashed manually.

Major problems were encountered in the units containing the 5mm (1/4-inch) stone. The rate at which the limestone fouled was much greater than had been originally anticipated. The front face of the stone beds of barriers 2, 4a and 6 became clogged which reduced the permeability of the stone bed to the point that the AMD ran over the tops of the beds rather than through them. This was particularly problematic in barrier No. 6 which was on a 30 percent slope. The permeability of the filter units was also seriously reduced by clogging. The original design of these units used a 1/8-inch screen to retain the stone at the base of each bin. These screens became almost totally clogged after three weeks of operation. In several instances, the upper one foot of the downflow units was actually "cemented" by the fouling coat and could not be backwashed. Mechanical prodding was necessary to break the "cemented" layer so that the stone could be cleaned. After sampling No. 8, the stone and screens were removed from the upflow and downflow units and a graded filter was placed in lieu of the screening. Also, the monitoring of barrier No. 6 was halted at this time.

Evaluation of the results from the first sampling run indicated that the monitoring procedures would have to be revised in order to adequately investigate the rate of limestone consumption and fouling. It was clear that an increased sampling rate would be required because the rate at which the stone reactivity decreased necessitated hourly rather than daily measurements as had been originally anticipated.

Similarly, the filter units required more frequent backwashing to maintain reactive limestone surfaces. In addition, the three to four day sampling intervals did not allow the gathering of sufficient data to describe the short term operations of the tumbling drums. The refilling cycle for the drums coincided with the sampling frequency approximately three to four days. As a result, the data gathered was primarily for freshly filled or nearly empty drums.

Another problem associated with the drum operations was that the detention time provided by the units was insufficient. It was observed that the AMD leaving the process units was milky colored, indicating that the reaction of the limestone fines with the AMD was not complete. The Quakake Tunnel prototypes were operated periodically over a two-year period and the facility was dismantled.

SL 139-1-5-201.1
Aylesworth Creek
Archbald Borough, Lackawanna County

This simplified system consists of a series of revolving water wheel limestone drums that are driven by the force of the water. As the drums rotate, the limestone collides and is rubbed and scuffed to provide a reactive surface area that results in added alkalinity to the influent. The facility provides alkalinity to a small portion of Aylesworth Creek and the U.S. Army Corps of Engineers Aylesworth Creek Lake, a flood control dam.

Average Flow Rate cfs	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity cfs	Construction Cost	Date Plant Placed in Operation
1.2	4.8	0.08	11	$344,519.10	March, 1983

Most of the problems encountered with the operation of the plant were caused by the elements of nature. Because the plant was an on-stream plant, stream borne debris such as leaves, twigs and other foreign matter required regular maintenance. The automatic siphons in the intake structure would also occasionally malfunction, due to debris. The plant could not be operated during severe winter weather due to ice buildup on the drums. Another drawback was that the limestone had to be manually shoveled from a concrete pad to refill the drums. These issues made the facility very labor intensive. The Bureau of Abandoned Mine Reclamation (BAMR) ceased plant operations in 1986 to focus its efforts on a mandated re-inventory of all the abandoned mine features in the Anthracite Region. Normal wear on the drum bearings coupled with vandalism of the facility rendered the plant inoperable. The Department entered into an Agreement with the Aylesworth Creek Reservoir Park Authority, a volunteer organization formed by the Boroughs of Archbald and Jermyn, on November 23, 1992, to operate the facility. BAMR completed refurbishing of the facility in May 1993 at a cost of $36,797.23 and the Authority operated the facility until its membership dwindled down to only a few members and the facility was vandalized. The plant ceased operation in about December 2000 and the Department terminated the Agreement with the Authority on March 3, 2006. In mid-summer of 2006, Lackawanna County took over management of Aylesworth Park through a 25-year, $1 lease from the U.S. Army Corps of Engineers, which owned the property. The county assumed responsibility for fishing

and swimming on the four-acre lake. A $191,000 project to improve water quality in Aylesworth Lake by replacing the malfunctioning Aylesworth Creek acid mine drainage treatment system with an anoxic limestone drain was completed in 2006. Lackawanna County funded the work through the Lackawanna Watershed 2000 program, established a decade ago with a $30 million federal Environmental Protection Agency grant to address acid mine drainage and other water-quality issues.

SL 142-1
Pigeon Creek
Carroll Township, Washington County

The location of the Pigeon Creek project can be found on the Monongahela USGS 7.5' Quadrangle in the vicinity of north latitude 40° 11' 06" and west longitude 79° 56' 22". The site is located along the south side of Pigeon Creek Road just west of the intersection with SR 481. The treatment system consisted of a collection system to convey a mine discharge from the Dunkirk Mine under Pigeon Creek Road to property owned by Carroll Township where a small oxidation and settling facility was constructed. The treatment system was approximately 0.5 acres in size and was fenced. The treatment system included a series of baffles, flow diverters, and aeration trays to help aerate and retain the water long enough to allow for the dissolved iron to oxidize, precipitate, and settle. The system is currently in complete disrepair and the settling basin is completely full of settled iron sludge. This was likely one of the earliest (if not the first) passive treatment systems constructed in the Commonwealth.

Average Flow Rate gpm	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
300	7.7	5.3	1.15	$53,187.48	September, 1970

SL 198-2 & AMD 02(0703)101.1
Wildwood
Hampton Township, Allegheny County

The location of the project can be found on the Glenshaw USGS 7.5' Quadrangle in the vicinity of north latitude 40° 35' 35" and west longitude 79° 58' 19". The site is located along the south side of Wildwood Road approximately two miles west of the intersection of State Route 8 and Wildwood Road. The treatment facility is located in a secluded area immediately below a highway overpass. Its eastern property limit borders an active rail line owned by the Norfolk and Southern railroad. Access to the site is by a gated roadway through a contiguous commercial property. The treatment facility also

has an additional gated entryway and has fencing surrounding the facility to further prohibit unauthorized access.

Average Flow Rate GPM	Average Raw Water Quality pH	Fe mg/l	Daily Plant Capacity MGD	Construction Cost	Date Plant Placed in Operation
700	7.1	8.9	1.15	$214,884.00	October , 1974

In 1974, under Pennsylvania's Operation Scarlift program, a chemical treatment plant (Wildwood AMD treatment plant) was constructed to address the discharge and maintain the quality of Pine Creek. The facilities are operational and have been successfully treating this abandoned underground mine discharge in the Pine Creek watershed for the past 29 years. The plant treats an average flow of 700 GPM.

Plant operations include the injection of hydrogen peroxide into the artesian mine discharge and subsequent retention in settling basins for metals precipitation. Approximately 4,500 gallons of 52 percent hydrogen peroxide per year is used at the facility. The annual operating cost of the Wildwood Mine Drainage Treatment Plant is approximately $32,000. Periodic iron sludge removal from the settling basins occurs when retention falls below minimum criteria. Historically this task has been required on an approximate five to seven year interval. Iron sludge disposal occurs at a permitted solid waste site.

In the spring of 2008, an experimental mechanical aeration system was installed at this plant with the understanding that some day we may be able to dismantle Hydrogen Peroxide treatment. Unfortunately, the new system did not produce the expected results and the Hydrogen Peroxide is still being use to treat the mine drainage discharge at this plant.

The raw water has an average pH of 7.1 with an average of 8.9 mg/l iron. The treated water has an average pH of 7.8 with an average of 1.8 mg/l iron.

All flow and water quality data is available in the Department's Sample Information System (SIS).

BM 113
Little Scrubgrass
Scrubgrass Township, Butler County

This plant is identical to the Swamp Creek treatment facility, a hydrated lime doser directly to the stream. The plant ceased operations circa 1980.