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Update on Use of Mine Pool Water for Power Generation

Environmental Science Division

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Update on Use of Mine Pool Water for Power Generation

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by
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Chapter 1 – Introduction

In 2004, nearly 90 percent of the country's electricity was generated at power plants using steam-based systems (EIA 2005). Electricity generation at steam electric plants requires a cooling system to condense the steam. With the exception of a few plants using air-cooled condensers, most U.S. steam electric power plants use water for cooling. Water usage occurs through once-through cooling or as make-up water in a closed-cycle system (generally involving one or more cooling towers).

According to a U.S. Geological Survey report, the steam electric power industry withdrew about 136 billion gallons per day of fresh water in 2000 (USGS 2005). This is almost the identical volume withdrawn for irrigation purposes. In addition to fresh water withdrawals, the steam electric power industry withdrew about 60 billion gallons per day of saline water.

Many parts of the United States are facing fresh water shortages. Even areas that traditionally have had adequate water supplies are reaching capacity limits. New or expanded steam electric power plants frequently need to turn to non-traditional alternate sources of water for cooling. This report examines one type of alternate water source—groundwater collected in underground pools associated with coal mines (referred to as mine pool water in this report).

In 2003, the U.S. Department of Energy's (DOE's) National Energy Technology Laboratory (NETL) funded Argonne National Laboratory (Argonne) to evaluate the feasibility of using mine pool water in Pennsylvania and West Virginia. That report (Veil et al. 2003) identified six small power plants in northeastern Pennsylvania (the Anthracite region) that had been using mine pool water for over a decade. It also reported on a pilot study underway at Exelon's Limerick Generating Station in southeastern Pennsylvania that involved release of water from a mine located about 70 miles upstream from the plant. The water flowed down the Schuylkill River and augmented the natural flow so that the Limerick plant could withdraw a larger volume of river water. The report also included a description of several other proposed facilities that were planning to use mine pool water.

In early 2006, NETL directed Argonne to revisit the sites that had previously been using mine pool water and update the information offered in the previous report. This report describes the status of mine pool water use as of summer 2006. Information was collected by telephone interviews, electronic mail, literature review, and site visits.

Chapter 2 – Abandoned Underground Mine Pools in Pennsylvania

The only examples of actual mine pool water usage by power plants occur in Pennsylvania. In addition, one planned project is located on the border between Pennsylvania and West Virginia. Because of Pennsylvania's strong involvement in projects using mine pool water, we offer a brief discussion of the state's efforts to address abandoned mines and mine pool water before reviewing the status of the specific projects.

In 2002, the Pennsylvania Department of Environmental Protection (PADEP) was faced with the reality that as many as 15 major underground mine drainage treatment plants could cease operations unless they were taken over by the Commonwealth. The Secretary of PADEP asked the Mining and Reclamation Advisory Board (MRAB), an advisory body created by statute in 1984, for input and advice on the looming underground mine pool issue. The MRAB responded by forming the Orphan Mine Discharge Task Force. In July 2003, the task force presented to the MRAB 19 resolutions organized into four topics—technology, outreach, financial, and legal and legislative.

The technology resolutions called for a Request for Proposal to demonstrate technologies related to mine pools (in-situ and ex-situ treatment of the mine water, reduction of infiltration of surface water, and economical metals recovery), the use of airborne geotechnology to map mine pools, and the development and consolidation of databases of mine pools and discharges. The outreach resolutions invited the PADEP to form partnerships with state and local agencies and industry to market recycling and reuse of mine pool water. The financial resolutions asked PADEP to develop funding partnerships and vehicles to address the long-term treatment of discharges. The legal resolutions covered the use of alternative treatment standards (for example, best professional judgment), Good Samaritan protection, mine discharge effluent trading, and ownership, access, and liability issues. The resolutions were unanimously adopted and presented to the Secretary of PADEP. In April 2004, the task force presented its action plan for addressing the 19 resolutions (OMDTF 2004) at an MRAB board meeting.

Two projects demonstrate the reuse of mine pools highlight PADEP's marketing approach:

- The Wadesville Mine pool in Schuylkill County, Pennsylvania (described in Chapter 4)
- The abandoned Shannopin deep mine in Greene County, Pennsylvania (described in Chapter 5)

The most innovative resolutions involve the marketing of mine pools to industries and other public and private water users to promote economic development. More than 1.3 trillion gallons of acid mine water are estimated to be ebbing and flowing in abandoned mines mostly beneath Fayette, Greene, and Washington counties in Pennsylvania and in Monongalia County in West Virginia. In the words of one official, it would take more than 230 years to accomplish a cleanup. As user demands for water from aquifers and streams increase, the promoters of unused underground mine pool water consider it a valuable resource to be utilized.

Chapter 3 – Use of Mine Pool Water in Northeastern Pennsylvania

Anthracite has been mined for many years in northeastern Pennsylvania through underground mines. The rock and coal residues that were left behind after the anthracite was removed are known as culm. The culm has a caloric value and is used as a fuel by some small power plants in the region. At least six such plants use mine pool water as a cooling source. Figure 1 shows the locations of the six plants. Veil et al. (2003) described the plants.

Each plant was contacted again in 2006 to learn if any significant changes in operation had occurred and to identify any problems or lessons learned. Table 1 provides a summary of the characteristics of those six plants. Two of the plants—Panther Creek Generating Station and Schuylkill Energy Resources—use the mine pool water as a back-up to their preferred water supply from a reservoir. During dry periods, the reservoirs cannot supply sufficient water, so the plants use the more expensive mine pool water.

Five of the six plants operate on a closed-cycle cooling system and use the mine pool water as makeup water for the cooling system. Some also use the water for boiler feed and other plant operations. The Northeastern Power Company uses an air-cooled condenser (also known as a dry cooling tower) for its main cooling source but maintains a small auxiliary wet cooling tower. Typically, circulating fluidized-bed boiler technology is used to produce steam for power generation. The rated capacity of the plants ranges from 31 MW to 83 MW. The volume of mine pool water used for process cooling (cooling towers) and boiler and water make-up range from 100 to 1,100 gpm.

All of the plants need to treat the mine pool water before using it. The details of their treatment systems are provided in Table 2. The mine pool water contains iron and/or other metals. Generally the pH of the water is raised to form metal hydroxides, which are then settled and/or filtered. Each plant uses similar but slightly different process components.

The authors visited four of the plants on July 28, 2006. Figures 2–12 show photographs taken during the site visits.

Figure 1 – Location of Plants in Northeastern Pennsylvania Using Mine Pool Water
Source: Modified from www.mapquest.com

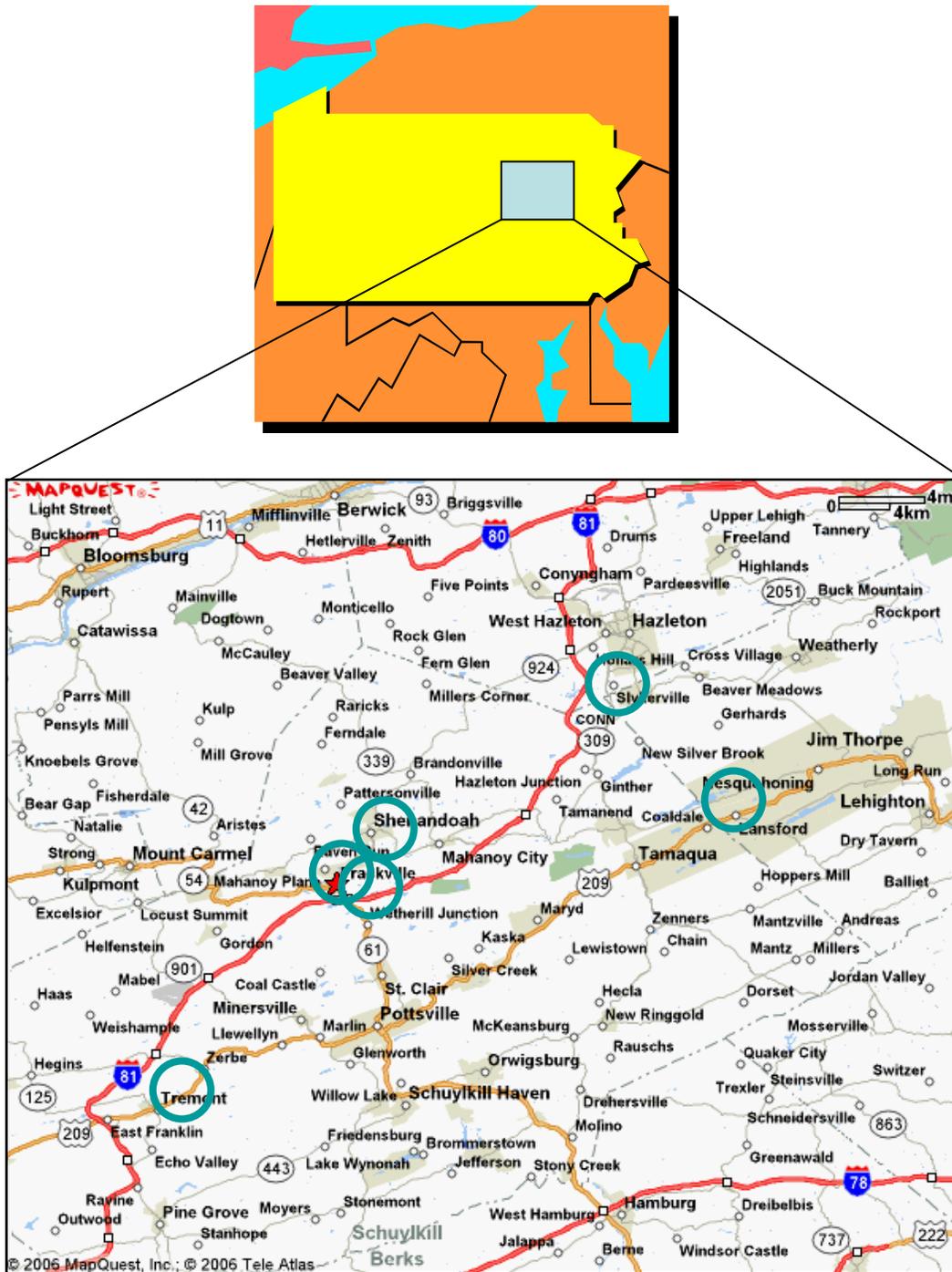


Table 1: Characteristics of Six Plants in Northeastern Pennsylvania Currently Using Mine Pool Water

Company Name	Plant Location	Generating Capacity	Source of Cooling Water	Withdrawal Rate	Distance from Mine Pool to Plant	Length of Time Using Mine Pool Water	Comments	Company Contact
Gilberton Power Company	Frackville, PA	80 MW	Unnamed mine pool	- 833 gpm - 1,500 gpm (pump capacity) - 500 MG/year	- 1.5 miles - change in elevation of 550–600 feet	> 15 years	- need a treatment system (\$0.20/1,000 gal) - pay \$0.20/1,000 gal to SRBC	Jim Weaver 570-874-4456, x421 jimweaver@culm2energy.com
Northeastern Power Company	McAdoo, PA	50 MW	Silverbrook mine basin	100 gpm	3,000 feet	17 years	- main cooling system is an air-cooled condenser - water is used for auxiliary cooling tower, boiler makeup, and other plant purposes - need to treat - need to clean the transfer line because of iron hydroxide precipitation	Jim Wetzel 570-929-3242 jwetzel@nepco2.com
Panther Creek Generating Station	Nesquehoning, PA	83 MW	Lausanne mine tunnel	- 764 gpm - 1.1 MGD	5 to 6 miles	14 years	- they have the ability to use mine pool water but have chosen a less expensive supply from a reservoir - mine pool water is used when reservoir is too low - need to treat - pumping and treatment costs are high	Jim Carroll 570-645-8721 jcarroll@panthercreekenergy.com
Schuylkill Energy Resources, Inc.	Shenandoah, PA	100 MW	Maple Hill mine	- 1,100 gpm maximum when in use - 500 gpm average	¾ mile	20 years	- need to treat - also can use reservoir or can blend the two sources - they prefer to use a reservoir when it is available	Bob Boretski, 570-462-2822, x25 bobbser@verizon.net
WPS – Westwood Generation Plant	Tremont, PA	31 MW	Used Lyken mine since 1993; previously used two other sources	800 gpm	< 200 feet	18 years	- have a backup well in another mine pool with worse water quality - treatment costs ~\$75,000 to 100,000 per year - pay \$0.14/1,000 gal to SRBC	Jim Shuey 570-695-3175 jshuey@wpsenergy.com
Wheelabrator Frackville Energy Co.	Frackville, PA	42 MW	Morea mine	400–700 gpm	300–600 feet	18 years	- need to treat	Duane Slonaker 570-773-0405 dslonake@wm.com

Table 2 – Summary of Processes Used to Treat Mine Pool Water

Company Name	Treatment Processes Used
Gilberton Power Company	<ul style="list-style-type: none"> - aeration tower - pH adjustment - polymer addition and solids contact tank - filtration - reverse osmosis and ion exchange to make boiler feed water
Northeastern Power Company	<ul style="list-style-type: none"> - oxygen addition - polymer addition - settling basin - boiler makeup is further treated in a demineralizer
Panther Creek Generating Station	<ul style="list-style-type: none"> - pH adjustment - polymer addition - coagulation and flocculation - clarification - filtration
Schuylkill Energy Resources, Inc.	<ul style="list-style-type: none"> - aeration - chlorination - pH control - polymer addition - coagulation - clarification - filtration - filtration, reverse osmosis, and ion exchange to make boiler feed water
WPS – Westwood Generation Plant	<ul style="list-style-type: none"> - coagulation - tube settlers - filtration
Wheelabrator Frackville Energy Co.	<ul style="list-style-type: none"> - pH adjustment - chlorination - polymer addition and flocculation - lamellar plate separation - filtration, reverse osmosis, and ion exchange to make boiler feed water

Figure 2 – Schuylkill Energy Resources Plant



Figure 3 – Pump to Lift Water from Mine—Schuylkill Energy Resources



Figure 4 – Mine Water Treatment Plant—Schuylkill Energy Resources



Figure 5 – Cooling Towers—Schuylkill Energy Resources



Figure 6 – Wheelabrator Frackville Plant



Figure 7 – View of Coal Waste Pile and Mine Water Source



Figure 8 – Gilberton Power Company Plant



Figure 9 – Conveyor for Waste Coal Fuel and Pipeline for Mine Pool Water—Gilberton Power Company



Figure 10 – Mine Water Treatment Plant—Gilberton Power Company



Figure 11 – Cooling Towers—Gilberton Power Company



Figure 12 – Panther Creek Energy Plant



Chapter 4 – Use of Mine Pool Water at Exelon’s Limerick Generating Station

Background

Exelon Generation Company LLC (Exelon) operates the Limerick Generating Station, a nuclear power plant, near Limerick in southeastern Pennsylvania, roughly halfway between Philadelphia and Reading. The plant consists of two units, each with a nameplate generating capacity of 1,138 MW (Edison Electric Institute 1996). The units are cooled by closed-cycle natural-draft cooling towers that combined require an average of 24,300 gpm and a maximum of 29,200 gpm at full power. This flow is equivalent to 17.5 million gallons per day (MGD) average and 21 MGD maximum.

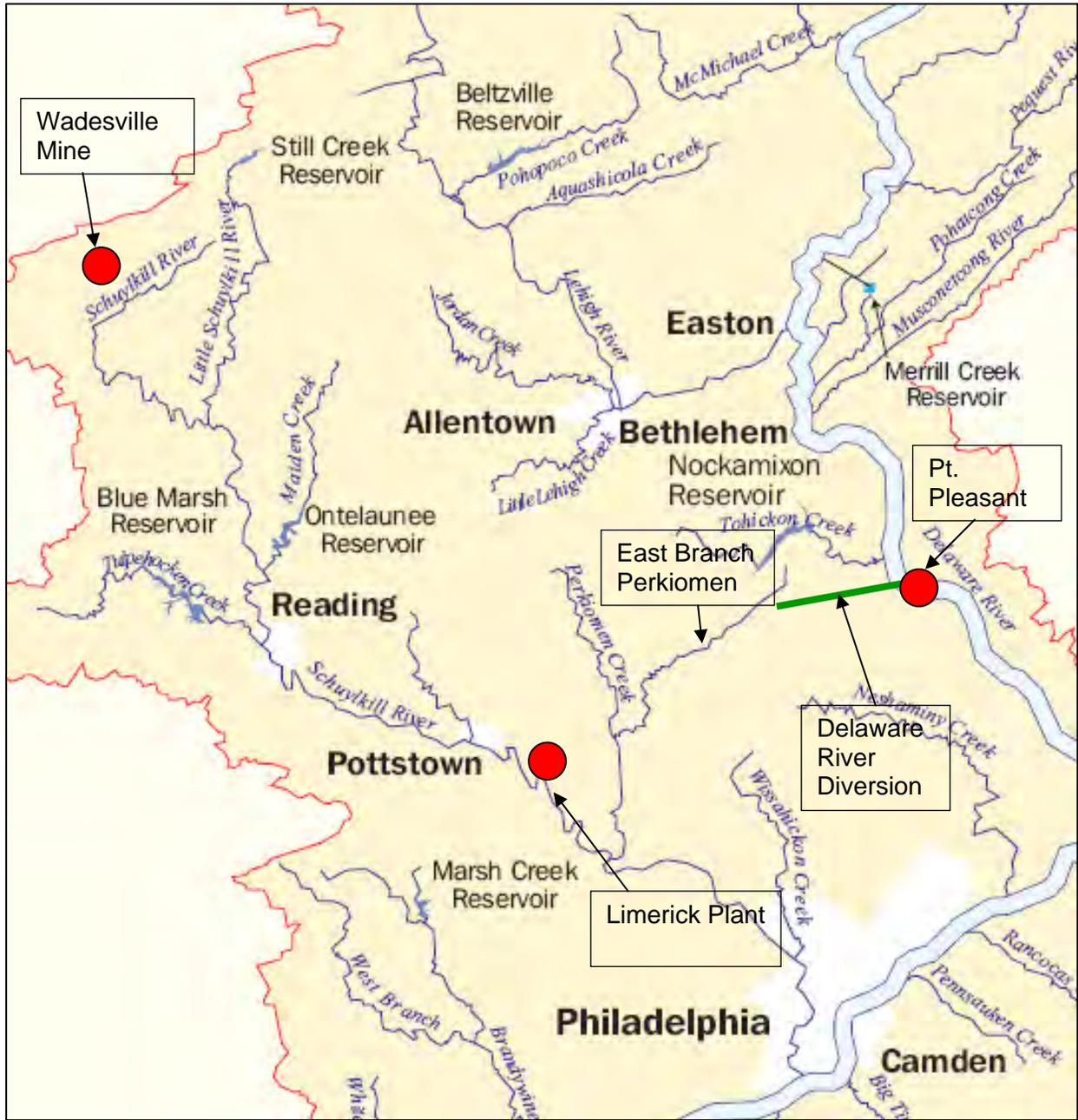
The Limerick plant’s primary cooling water intake is from the Schuylkill River. An alternate intake is located in Perkiomen Creek (a tributary that enters the Schuylkill River near Limerick). During parts of the year, the flows in the Schuylkill River and Perkiomen Creek are large enough that the plant can withdraw all of its cooling tower makeup water directly from the river and creek. Until the past few years, during the times of the year when the natural flows were low, Exelon supplemented natural flows by diverting water from the Delaware River into the East Branch of the Perkiomen Creek via the Point Pleasant pumping station and Bradshaw Reservoir. In addition to these water sources, Exelon had a contract with the Borough of Tamaqua Water Authority to release water from the Still Creek Reservoir on an emergency basis to supplement flow to the upper reaches of the Schuylkill River. Figure 13 shows a map of the Schuylkill River detailing the location of these key features.

Exelon’s Initial Demonstration Project

The process of diverting water from the Delaware River is costly. During 2002, Exelon evaluated other less costly alternatives for supplementing natural flows. Exelon identified a mine pool at the Wadesville mine located about 70 miles upstream along the Schuylkill River in Schuylkill County. The Wadesville mine property is owned by the Reading Anthracite Company, which pumps water from the mine to allow recovery of anthracite that would otherwise be flooded. Two vertical turbine pumps are installed in the mine shaft. They discharge to East Norwegian Creek, a tributary to the Schuylkill River. Unlike many other anthracite mines in the area, the Wadesville mine pool has near-neutral pH; the water quality is high enough that it can be discharged without treating it first, thereby avoiding treatment costs. Excess water from the mine pool could be discharged into the headwaters of the Schuylkill River and flow downstream to the Limerick cooling water intake.

Exelon was required to obtain approval from the Delaware River Basin Commission (DRBC) before it could use the Wadesville mine pool water. In June 2003, the DRBC made Revision 11 to Docket D-69-210 CP (Final) to authorize Exelon to conduct a short-term demonstration project of pumping up to 10,000 gpm of Wadesville mine pool water into the headwaters of the Schuylkill River to augment river flow. As part of the authorization, Exelon would need to conduct studies under an Operating and Monitoring Plan (included as Appendix A of Normandeau and URS 2004) to ensure that the addition of mine pool water did not cause

Figure 13 – Map Showing Schuylkill River Drainage and Key Features
Source: Modified from DRBC Website



environmental harm downstream. The plan outlines the responsibilities of Exelon, Reading Anthracite Company, and the DRBC. Exelon must conduct extensive monitoring for chemical, physical, and biological parameters at various locations from the mine pool to Pottstown, Pennsylvania, near Limerick. The level of the mine pool must be measured daily during the mine discharge period to determine drawdown and afterwards to determine the rate of recovery. Exelon must transmit the results of the monitoring data to the DRBC weekly.

Water was pumped from the Wadesville mine pool from July 11 to October 15, 2003. The results of the 2003 monitoring were compiled and reported in Normandeau and URS (2004). The key findings include:

- The daily water volume discharged from the mine ranged from 2.5 to 11.9 MGD. On most days more than 9 MGD were discharged.
- The water level of the mine pool dropped about 86 feet during pumping, but it recovered quickly after pumping stopped.
- The quality of the water discharged from the mine pool was relatively constant throughout the season.
- Little effect stemming from mixing water from East Norwegian Creek (containing the mine pool water) with Schuylkill River water was observed. However, total dissolved solids, specific conductance, total alkalinity, and pH were higher downstream, and iron levels were lower downstream.
- The biological monitoring showed no significant effects from the mine pool water.
- Discharge of mine pool water did not adversely affect the Pottstown Water Treatment Plant intake.

The demonstration was scheduled to run only during the flow-augmentation months of 2003. However, 2003 was a wetter-than-normal year, and stream flows were unusually high. Consequently, no opportunity arose to conduct environmental monitoring under typical low-flow and high-temperature conditions. Therefore, the DRBC agreed to extend the demonstration project for another year. Flows during the flow-augmentation months of 2004 were also much higher than normal, and therefore, it was not possible to conclusively demonstrate the effects of mine pool water discharge on downstream waters.

Revised Demonstration Project

Under the original Demonstration Project, Exelon needed to begin supplementing cooling water withdrawals when the Schuylkill River water temperature reached 59°F. During 2004, Exelon sought permission from the DRBC to modify and extend the Demonstration Project to show that water withdrawal when the river temperature exceeded 59°F would not cause adverse impacts. In October 2004, the DRBC approved Revision 12 to Docket D-69-210 CP (DRBC 2004). The approval expanded the scope of the Demonstration Project and extended operations through

2007, subject to an option to continue through 2008. Exelon is presently allowed to continue cooling water withdrawal from the Schuylkill River after the temperature reaches or exceeds 59°F, as long as the river flow at Pottstown is higher than 560 cubic feet per second (cfs) for two-unit operation or 530 cfs for one-unit operation.

In addition to continuing and expanding the monitoring program, Revision 12 created a Restoration and Monitoring Fund. Exelon must contribute to this fund based on the quantities of water that are not required to be augmented. The fund will be used to support projects that can improve water quality within the Schuylkill River basin.

Water was pumped from the Wadesville mine pool on 126 days between May 16 to October 13, 2005. The results of the 2005 monitoring were compiled and reported in Normandeau and URS (2006). The key findings include:

- The amount of rainfall and the resulting stream flows were considerable lower than in 2003 and 2004.
- The daily water volume was typically in the range of 7 to 8 MGD. The maximum discharge was measured at 14 MGD. The total volume of mine pool water discharged during the year was 852.5 million gallons.
- The water level of the mine pool dropped about 167 feet during pumping. However, one week after pumping stopped, the water level had already risen 14 feet.
- The quality of the water discharged from the mine pool was relatively constant throughout the season and was similar to the previous years.
- As in previous years, little effect from mixing water from East Norwegian Creek (containing the mine pool water) with Schuylkill River water was observed. The biological monitoring showed no significant effects from the mine pool water.
- Discharge of mine pool water did not adversely affect the Pottstown Water Treatment Plant intake or any other water supplies.
- Partial suspension of the 59°F temperature restriction did not cause any negative effect on downstream dissolved oxygen concentrations.
- By using the mine pool water, Exelon was able to reduce the previously required minimum diversion flow from the Delaware River to the East Branch Perkiomen Creek from 27 cfs to 10 cfs. At the time, some concern was voiced that this could cause impacts in that creek. Exelon's monitoring, however, showed that the 10 cfs minimum flow release maintained sufficient stream flow even under the near-drought conditions experienced there during 2005.

Exelon continues to monitor in 2006. According to Exelon's data submitted to the DRBC and posted on the DRBC website (<http://www.state.nj.us/drbc/wadesville.htm>), water was discharged

from the Wadesville Mine only seven days during June 2006. Particularly in late June, this region experienced very heavy rainfall that caused serious flooding. One of the two Wadesville Mine pumps is damaged and out of service indefinitely. This means that pumping rate capacities are reduced in half.

During a project update meeting with the DRBC on July 27, 2006, Exelon's consultant reported that he has identified a second mine, the Tracy shaft, near Minersville, PA. This mine, which discharges water near the surface, could provide additional clean mine pool water to the West Branch of the Schuylkill River. Exelon will continue to evaluate the feasibility of using the Tracy shaft water. In light of the evaluations, Exelon may seek a docket revision from the DRBC during the next year to use that source.

Author Veil visited the Limerick plant on July 27, 2006, and both authors visited the Wadesville mine on July 28, 2006. Figures 14–18 show photographs taken during these site visits.

Figure 14 – View of Wadesville Mine Pit Showing Surface of the Mine Pool



Figure 15 – Discharge Pipe from Wadesville Mine Pool Water Pump House



Figure 16 – Discharge of Wadesville Mine Pool Water to East Norwegian Creek



Figure 17 – Schuylkill River and Limerick Plant Water Intake



Figure 18 – Cooling Towers at Limerick Plant



Chapter 5 – Proposed Use of Mine Pool Water in Western Pennsylvania/West Virginia

Background

The Longview Power Plant (LPP), a 600-MW, coal-fired electric station, is a subsidiary of GenPower, LLC. GenPower is based in Needham, Massachusetts. GenPower developed the plant design, is ushering the project through the permitting stages, and has arranged for external financing.

The plant site is located in the community of Fort Martin (Monongalia County) near Morgantown, West Virginia, approximately one mile west of Allegheny Energy's Fort Martin plant and one mile from the Pennsylvania border. The plant site consists of 225 acres of cleared land, currently under option with the Monongalia County Development Authority.

According to GenPower, the LPP will utilize state-of-the-art technology. A pulverized coal boiler with a supercritical steam cycle will be used to generate electricity. Moreover, Best Available Control Technology (BACT) will reduce air emissions.

GenPower hopes to move the LPP into construction later in 2006 and complete the project in 2010. Construction costs of the LPP plant have been estimated at \$1 billion. According to GenPower and researchers at the West Virginia University, the construction and operation of Longview Power will have direct and economic impacts in the region. Estimates have calculated these at more than \$1 billion. They include increased business volume for area businesses and associated employment and total employee compensation. During the four-year construction phase, up to 1,200 workers are expected to find employment. Moreover, about 50 to 60 permanent jobs would be created.

Taxation Issues

GenPower and Monongalia County have agreed on a payment in lieu of tax (PILOT) for the project. Under the applicable statutes, a PILOT is a guaranteed yearly payment to the County. According to GenPower, the terms of the agreement are significant for the County. The payment schedule calls for \$5 million at the start of construction and \$2.1 million at commercial operation, escalating at 3 percent for each of the following 29 years. This translates into a total of \$105 million. West Virginia courts have rejected the opponents' legal challenge of the PILOT.

Fuel Supply

GenPower has entered into a general agreement with the Morgantown Energy Producing Company (MEPCO), Inc., a mining company with a facility adjoining the power-plant site, to supply the majority of coal necessary for the LPP. MEPCO's reserves are sufficient to last the projected 30-year life of the plant.

According to GenPower, investigation is underway to determine the feasibility of transporting coal via a four-mile long overland conveyor from Bobtown, Pennsylvania to Fort Martin, West

Virginia, reducing transport traffic and additional environmental impacts. Two coal mines are located in West Virginia near the LPP site, and three mines are located in Pennsylvania some distance away. GenPower notes that limestone, which is also essential to the development of the LPP project, is available in the region as well.

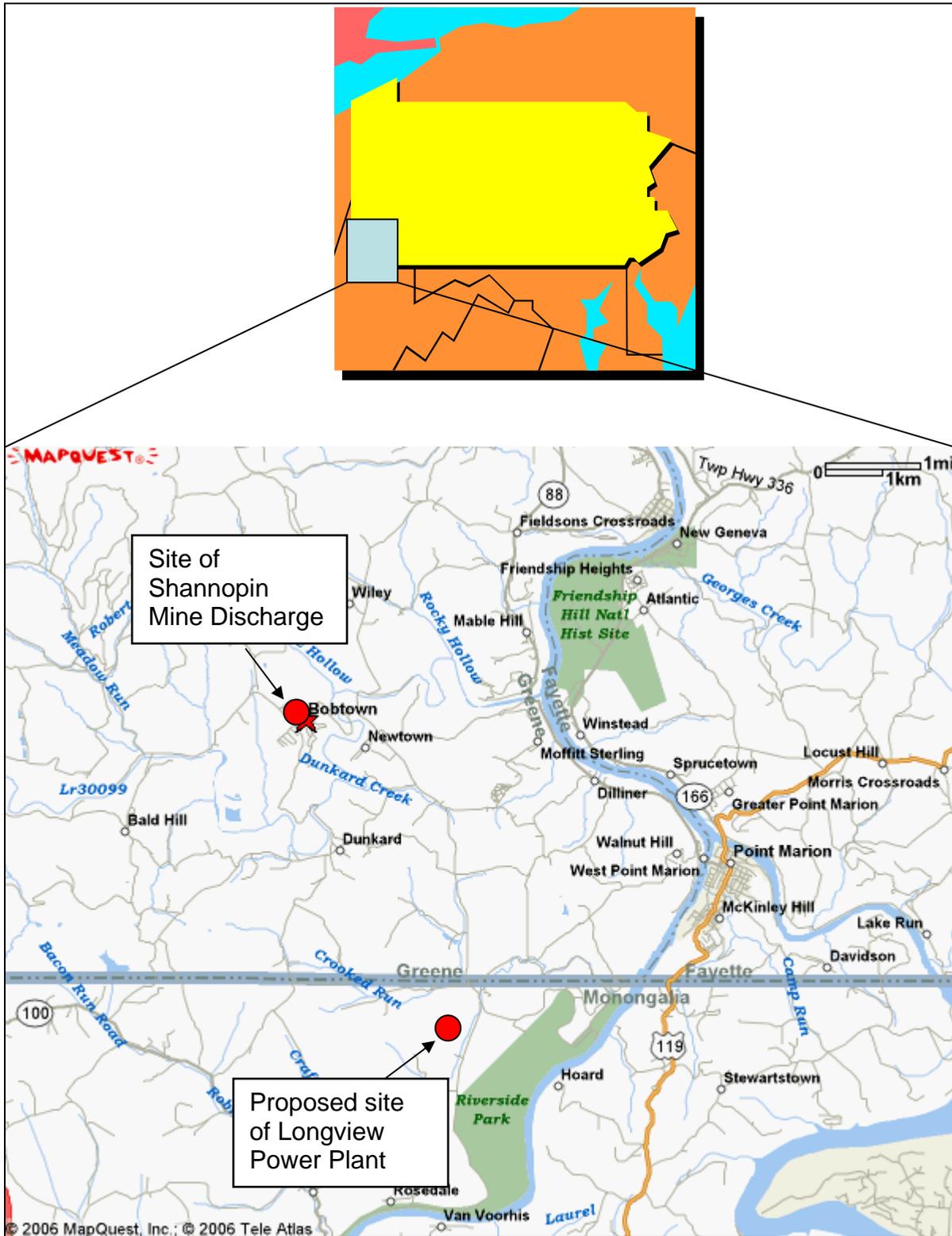
Water Source for Power Generation at the LPP

The Shannopin deep mine in Greene County, Pennsylvania (8,200 acres) was mined from the 1950s until 1993 by the Shannopin Mining Company. Since abandonment, it has remained in bond forfeiture status with the Pennsylvania Department of Environmental Protection. If the Shannopin mine pools overflowed, the discharge would directly go into Dunkard Creek at a flow rate of about 2,000 gpm. The flow from the mine, which is expected to be high in iron and pH, would create environmental harm to local waterways, streams, and recreational areas in the Monongahela River basin. Moreover, the flooding deep mine on the Pittsburgh coal seam was also threatening to inundate the overlying workings on the Sewickley coal seam. In 2002, the rising Shannopin pool flooded portions of Dooley Run and impacted the ventilation system. The Dooley Run was closed. If the Sewickley Coal seam were flooded, 400 million tons of recoverable coal would become inaccessible, translating into billions of dollars of financial damage.

The Commonwealth of Pennsylvania, AMD Reclamation Inc. (a non-profit organization formed by MEPCO and GenPower), and Dana Mining (a company distinct from MEPCO but owned by the same individuals) partnered to lessen the financial burdens involved with dewatering of Shannopin. Grants and loans from the PADEP, the Pennsylvania Infrastructure Investment Authority (PENNVEST), and the Department of Community and Economic Development (DCED) facilitated the construction of a treatment plant, which allowed for lowering of the mine pool and the resumption of mining of the Sewickley reserves. The PADEP contributed a \$1.8 million grant from the Commonwealth's "Ten Percent Set Aside" Fund, authorized under the federal Surface Mine Control and Reclamation Act of 1977. Through this provision, the states may set aside 10 percent of their annual allocation from the federal Abandoned Mine Reclamation fund. That percentage is then used for mine drainage abatement. In addition, the DCED provided a \$900,000 Industrial Sites Reuse Program loan and a \$100,000 Opportunities Grant to assist in this project. The DCED funds have been administered through AMD Reclamation Inc. PENNVEST provided a low-interest \$4.3 million loan to cover the cost of constructing the acid mine drainage treatment facility and two miles of outfall sewer lines. The treatment plant went on-line in June 2004, pumping and treating at a rate of 3,500 gpm. MEPCO has been paying the operating expense.

The LPP plans to buy and utilize 10 to 13 MGD of the water extracted from the mine pools. After being transported in a pipeline along the four-mile-long coal conveyor belt, the mine pool water will cool the steam that is used to drive the steam turbine. Figure 19 shows the location of Shannopin Mine and the proposed Longview Power Plant. Most of the water will be evaporated in the course of the steam-cooling process. According to GenPower, the small quantity of remaining mine-pool water will be used to facilitate pollution control equipment (like wet Flue Gas Desulfurization). Moreover, the use of mine-pool water will control dust around the facility. The LPP is expected to be a "zero discharger" for plant process water.

Figure 19 – Location of Shannopin Mine and Proposed Longview Power Plant
Source: Modified from www.mapquest.com



Once operational, the LPP will require demineralized water for boiler make-up and cooling tower operations. The planned treatment technology will be a combination of microfiltration and reverse osmosis through differential pressure across a membrane.

Permitting Requirements

Plant construction does not need approval from Monongalia County or other local bodies. The PILOT arrangement was approved by several local bodies.

Plant operations require two authorizations from the Virginia Public Service Commission (PSC): (1) a “Siting Certificate” for the LPP to construct and operate an electric wholesale generating facility; and (2) a separate “Certificate of Convenience and Necessity” to construct its miles-long high-voltage transmission line connecting the LPP into the Allegheny Energy Inc., grid. On June 26, 2006, the PSC issued a 135-page order approving the siting certificate for the plant and authorizing the construction of a transmission line to serve the plant.

LPP operations must have a permit to emit air pollution. This so-called Prevention of Significant Deterioration (PSD) permit was granted by the West Virginia Department of Environmental Protection, Division of Air Quality. The PSD process involved a demonstration that the expected emissions, their plume, and concentrations are in compliance with all applicable requirements established by the U.S. Environmental Protection Agency.

Wastewater discharges into the Monongahela River or other surface water bodies must be authorized by permit. According to GenPower, the LPP plans to recycle all liquid water onsite and aspires to “zero discharge.”

Chapter 6 – Involvement of River Basin Commissions

Several of the personnel interviewed at the power plants currently using mine pool water raised concerns over the involvement of river basin commissions in the course of project operations. River basin commissions, established by concurrent compact legislation adopted by the U.S. Congress and the legislatures of the basin states, are regional bodies entrusted to oversee, with the force of law, a unified approach to managing a river system without regard to political boundaries

The two river basins in which the existing users of mine pool water are located include the Delaware River basin and the Susquehanna River basin. The Delaware River basin, which measures more than 13,500 square miles in Pennsylvania, New Jersey, Delaware, and New York, is managed by the Delaware River Basin Commission (DRBC). The Delaware River is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania. The Delaware River drains 6,422 square miles in Eastern Pennsylvania. The Susquehanna River basin, which covers most of Eastern and Central Pennsylvania, and parts of New York and Maryland, is managed by the Susquehanna River Basin Commission (SRBC).

Each River Basin Commission coordinates federal, state, interstate, local and nongovernmental plans for the development of water and related land resources in its area, river basin, or group of river basins. They prepare and update comprehensive, coordinated, joint plans for federal, state, interstate, local and nongovernmental development of water and related resources.

Delaware River Basin

In the Delaware River Basin, groundwater and surface water withdrawals greater than 100,000 gallons per day (gpd) and groundwater withdrawals greater than 10,000 gpd in the Southeastern Pennsylvania Groundwater Protected Area require review and approval by the DRBC.

Project Review Fees: Project review by the DRBC incurs a fee. Table 3 shows the DRBC project review schedule.

Table 3 – DRBC Project Fee Schedule

Project Category	Fee
Privately sponsored project costing \$250,000 or less	\$500
Publicly sponsored project costing \$250,000 or less	\$250
Public or private project costing \$250,001 to \$10,000,000	0.2 per cent of project cost
Public or private project costing over \$10,000,000	0.006 percent of project cost, not to exceed \$50,000
Any project resulting in an out-of-basin diversion	Double the fee calculated in accordance with the above

Water Withdrawal Charges: The charges for surface water withdrawal imposed by the DRBC amount to \$0.06 per thousand gallons of consumptive use (loss of water through a manmade conveyance system) and six-tenths of a mill (\$0.0006) per thousand gallons for non-consumptive use. Direct use of groundwater incurs no fee. However, if the water is transferred into a stream and then withdrawn, surface water withdrawal fees are triggered.

Susquehanna River Basin

In the Susquehanna River Basin, the SRBC reviews and approves groundwater withdrawals greater than 20,000 gpd for projects resulting in consumptive use of water and 100,000 gpd for other projects. Diversion from the basin would be considered consumptive use of groundwater, and must comply with all applicable compensation requirements.

Project Review Fees: Project review by the SRBC incurs a fee. Table 4 shows the SRBC project review schedule.

Table 4 – SRBC Project Fee Schedule

Project Category	Requested Quantities or Capacities	Fee
Consumptive Use Projects Paying Consumptive Use Fee to Commission	20,000 gpd–100,000 gpd	\$750
	100,001 gpd–500,000 gpd	\$3,000
	500,001 gpd–1 MGD	\$6,000
	1,000,001 gpd–5 MGD	\$18,000
	Over 5 MGD	\$30,000
Consumptive Use Projects Not Paying Consumptive Use Fee to Commission	20,000 gpd–100,000 gpd	\$2,100
	100,001 gpd–500,000 gpd	\$9,700
	500,001 gpd–1 MGD	\$12,700
	1,000,001 gpd–5 MGD	\$38,000
	Over 5 MGD	\$50,000
Groundwater & Surface Water Withdrawals	Up to 250,000 gpd	\$ 1,500
	250,001 gpd–500,000 gpd	\$3,000
	500,001 gpd–1 MGD	\$4,500
	1,000,001 gpd–5 MGD	\$6,000
	5,000,001 gpd–10 MGD	\$18,000
	Over 10 MGD	\$18,000 + \$3,000 for each additional 1 MGD increment

Water Withdrawal Charges: Only projects approved under the first category shown in Table 4 pay a fee of \$0.14 per thousand gallons. Projects falling under the remaining two categories (the second type of consumptive use and ground and surface water withdrawals) incur the upfront fee only. They are not subject to a “user” fee for 25 years.

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