Appendix D: Referenced BBNPP FSAR Excerpts

(BBNPP Final Safety Analysis Report, Rev 2. Unistar, 2010)

FSAR 2.4.12.1.3

FSAR 2.4.12.1.3

FSAR 2.5.4

The USGS monitors groundwater elevations in select monitoring wells across the Commonwealth of Pennsylvania. Hydrographs of several of these monitoring wells located in Luzerne County are presented in Figure 2.4-60 and Figure 2.4-61. Hydrographs for two wells screened in the Catskill Formation (Figure 2.4-60) show that annual fluctuations of water levels were approximately 6 to 8 ft (1.8 to 2.4 m). The highest groundwater levels generally occurred in the winter and spring months each year. Hydrographs for two wells screened in the glacial outwash (Figure 2.4-61) show that annual fluctuations of water levels were approximately 8 to 14 ft (2.4 to 4.3 m). In general, the highest groundwater levels in these two wells also occurred in the winter and spring months each year.

2.4.12.1.3 Local and Site-Specific Hydrogeology and Sources

At the BBNPP, ground elevations range from 650 ft (198 m) above mean sea level (msl) along Walker Run in the southwest corner of the site up to elevations of approximately 800 ft (244 m) msl on the hilltop located just north of the power block (USGS, 1989). North of Beach Grove Road, the elevation rises sharply upward to elevations of 1,100 to 1,150 ft (335 to 350 m) msl along the crest of the ridge (Figure 2.4-3). Thus, total topographic relief in the immediate vicinity of BBNPP is approximately 500 ft (152 m). The creeks, ponds, and wetlands within the area influence the shallow aquifer systems beneath the site, and vice versa.

Geotechnical and hydrogeological investigations have provided information on the BBNPP site to depths of 600 ft (183 m) bgs. Subsurface information was collected from over 73 borings and monitoring wells. A detailed description of the geotechnical subsurface investigation, including the locations of the borings is provided in Section 2.5. Details regarding the depth and geologic materials encountered in these borings are also described in Section 2.5.

Forty-one (41) groundwater observation wells were installed across the site (Table 2.4-43). Twenty-six (26) of these wells were installed as 2 or 4 in (5 or 10 cm) diameter monitoring wells. The remaining 15 monitoring wells are 1 to 1.5 in (2.5 to 3.8 cm) in diameter and were installed in geotechnical borings once the borings were completed. Table 2.4-43 specifies which monitoring wells were installed in geotechnical borings and which specific boring is associated with each well. Of the 41 monitoring wells installed, 14 of them are screened in the glacial overburden deposits, or Glacial Overburden aquifer ("A" wells), 19 are screened in shallow bedrock ("B" wells, including MW313C, excluding MW302B and MW307B), and 8 are isolated in deeper bedrock which are 175 ft (53 m) bgs or deeper ("C" wells, including MW302B and MW307B, excluding MW313C). Monitoring wells MW302B and MW307B were originally intended to be "B" wells. However, shallow bedrock was very tight with few water-bearing zones. Hence, these two wells were drilled deeper than originally intended and are now grouped with the "C" wells. The total depth of Monitoring Well MW313C was originally intended to be 200 ft (61 m) deep. However, blockage occurred near the bottom of the boring and the well could not be installed down to 200 ft (61 m) bgs. Instead, the bottom portion of the boring was grouted and the well screen was set at a depth of 130 ft (40 m) bgs. Therefore, this well is grouped with the shallow bedrock "B" wells.

The locations of monitoring wells are presented on Figure 2.4-62. The wells were located in order to provide adequate distribution with which to determine site groundwater levels, subsurface flow directions, and hydraulic gradients beneath the site. Well clusters were installed at selected locations to determine vertical gradients. Monthly water levels were measured in monitoring wells from October 2007 through September 2008 (Table 2.4-44). Water level elevations were also measured monthly in four ponds and seven stream locations. The surface water monitoring locations are shown on Figure 2.4-63. Surface water elevation data are tabulated in Table 2.4-45. The water levels in the four ponds are assumed to be

continuous with the local water table in the glacial overburden, and have been used to construct the potentiometric surfaces for the Glacial Overburden aquifer.

Figure 2.4-64 shows the locations of two hydrogeologic cross sections, which are presented in Figure 2.4-65 and Figure 2.4-66. They extend through the entire BBNPP site and continue south and east, respectively, to the Susquehanna River. These cross sections are based on the geotechnical borings and monitoring wells installed at the BBNPP site, monitoring wells at the SSES, and domestic wells north and south of BBNPP.

2.4.12.1.3.1 Geohydrology

The elevations, thicknesses, and descriptions of the geological materials comprising the geological strata encountered to depths up to 600 ft (183 m) bgs were determined from BBNPP geotechnical and hydrogeological borings. Geotechnical and geological descriptions of the material encountered are described in Section 2.5.

2.4.12.1.3.1.1 Glacial Overburden Aquifer

The Glacial Overburden aquifer consists almost entirely of sand and gravel deposited during the Pleistocene Epoch. These deposits include stratified kame, kame terrace, and outwash, as well as unstratified ground moraine, end moraine, and colluvial deposits. On the upland terrace occupied by the BBNPP and SSES, the glacial deposits are 0 to 100 ft (0 to 30 m) thick. Figure 2.4-67 presents a map showing the saturated thickness of the glacial overburden for the entire BBNPP site. The greatest thickness of overburden at the BBNPP site (approximately 60 ft (18 m)) occurs along Beach Grove Road on the north side of the site (at monitoring well MW305C) and southeast of the power block area at monitoring well MW313B).

At the SSES, kame and glacial outwash deposits are up to 100 ft (30 m) thick near the north and eastern sides of the Spray Pond. There is an elongated trough of glacial deposits that trends east-west and parallels Beach Grove Road. This channel thins to the west near the MW303 monitoring well cluster and drops in elevation as it passes eastward through the SSES property. SSES production wells TW-1 and TW-2 are screened in this elongated wedge of glacial sand and gravel. This trough is shown on Figure 2.4-68, which displays the topography of bedrock erosional surface. The "northern trough" probably represents an outwash channel that was deeply eroded by glacial meltwater as the Wisconsinan glacier advanced, and was filled by outwash, kame, and moraine deposits as the glacier overrode the site and then retreated. The northern trough drops in elevation to the east and empties into the Susquehanna River Valley deposit.

A second trough of thick glacial sand and gravel deposits starts near Confers Lane Road (County Road T-438), trends west-southwest, and passes through the southern edge of the BBNPP power block area (Figure 2.4-68 and Figure 2.4-69). As mentioned previously, the greatest thickness of glacial sand and gravel deposits has been measured in the "southern trough" at monitoring well MW313C (Figure 2.4-69).

The northern trough is bounded on the north side by Beach Grove Road and the ridge to the north formed by Trimmers Rock Formation (resistant siltstone and sandstone). The northern trough is separated from the southern trough by a series of hills which represent Mahantango Formation bedrock highs. This series of hills paralleling the bedrock strike represents the more resistant Tully Limestone Member that is found at the top of the Mahantango Shale (described below). These hills include the bedrock high that occurs below the cooling towers at the SSES, the two hills on the northern side of the BBNPP site (location of the CWS Makeup Water cooling towers and apple orchard), and another hill located directly west of the BBNPP cooling tower on the west side of Walker Run. These hills are dissected by small creeks and drainages that run

north to south. Walker Run flows through the western notch that separates the hills on the BBNPP site from the hill located west of Walker Run (Figure 2.4-68). A southward-flowing, unnamed creek flows through the eastern notch that separates the two BBNPP hills from the SSES bedrock high. The SSES West Building lies in the bedrock low that separates the SSES bedrock high from the BBNPP bedrock hills (Figure 2.4-68).

Another set of hills (bedrock highs) lie along the southern edge of the BBNPP site and extends westward on the west side of Walker Run and eastward onto SSES property (Figure 2.4-68). Walker Run flows southwestward through a gap between the bedrock hills located halfway between surface water gauging stations G2 and G13 (Figure 2.4-63). Groundwater in the southern trough also discharges to the southwest through this gap.

The thickness of the glacial overburden varies from 12.5 to 62.0 ft (3.8 to 18.9 m) in the vicinity of the power block. With the exception of some loose sand pockets, the overburden consists of over-consolidated, brown silty sand and sand containing gravel and large rounded cobbles and boulders. The presence of the boulders increases with depth.

2.4.12.1.3.1.2 Harrell Shale

The Harrell Shale is approximately 120 ft (37 m) thick, is located along the north edge of the site, and dips to the north beneath the ridge of Trimmers Rock Formation. Because the Harrell Shale is weaker and less resistant to weathering and erosion, the northern trough has formed where the Harrell Shale crops out. Lithologically, the Harrell Shale is similar to the noncalcareous Mahantango shale units. It is believed the hydraulic properties of the Harrell Shale are similar to those of the Mahantango Shale (Section 2.4.12.3.2.2)

2.4.12.1.3.1.3 Mahantango Shale

The Mahantango Shale is approximately 1,500 ft (457 m) thick. The uppermost portion of the formation (Tully Member) crops out in the hills where the BBNPP cooling tower is located (Figure 2.4-49). Shale, calcareous shale, and silty shale units of this formation are the uppermost bedrock southward and eastward from the BBNPP site to the Susquehanna River (Figure 2.4-49). Because the Harrell and Mahantango shales are so similar, they will be treated as a single, continuous bedrock aquifer in the area. The shale aquifer is folded, jointed, and fractured. The degree of fracturing is one of the most important factors that affects the hydraulic conductivity of the Mahantango and Harrell Shales, as discussed in Section 2.4.12.3.2.2. The exact depth to the next formation (Marcellus Shale) is unknown but is believed to be 1,000 to 1,200 ft (300 to 365 m) below the BBNPP ground surface. In addition, because of its depth, the hydraulic conductivity of the Marcellus Formation is expected to be much lower than the hydraulic conductivity of the Mahantango Shale. Therefore, the evaluation of the groundwater flow system does not include the Marcellus Shale or older (deeper) formations.

2.4.12.1.4 BBNPP Groundwater Use Projections

Surface water from the Susquehanna River will provide the cooling water during the operation of the BBNPP. The CWS Makeup Water Intake Structure is located 700 ft (213 m) south of the SSES water intake structure. The new cooling water pipelines will travel up the hillside and skirt the southern side of the SSES and enter the BBNPP site on the eastern side.

A separate water line will be installed and will bring potable water from the south to the BBNPP site. The potable water line will be installed along Confers Lane and will bring the potable water from a main supply pipeline located along U.S. Route 11. This water, supplied by a municipal

2.4.12.2.6 Northeastern Pennsylvania Groundwater Demands

The PADEP, along with the Statewide Water Resources Committees, and six Regional Water Resources Committees, is currently developing a new State Water Plan in response to the Water Resources Planning Act (Act 220 of 2002). This Act calls for the State Water Plan to be prepared by March 2008, and updated every 5 years thereafter (PADEP, 2008c). This State Water Plan replaces the last plan that was developed between 1975 and 1983. When completed, this updated Plan will provide goals and recommendations to attain sustainable water use over a 30-year planning horizon. The Plan includes inventories of water availability, an assessment of current and future water use demands, assessments of resource management alternatives, and proposed methods of implementing recommended actions. One of the actions proposed in the new Plan is to identify and evaluate Critical Water Planning Areas, where the water demand exceeds, or threatens to exceed, water availability.

In June 2005, the SRBC published a "Groundwater Management Plan for the Susquehanna River Basin" (SRBC, 2005). The goals of the SRBC Plan are similar to the Pennsylvania Plan, namely monitor and manage the water resources in order to attain long-term sustainable use of the resource. The SRBC has identified several geographic areas in the Susquehanna River Basin where existing or projected groundwater withdrawals and uses are anticipated to exceed long-term sustainability or cause frequent conflicts between users. Areas where demand will exceed sustainable resources are termed Potentially Stressed Areas (PSAs) by the SRBC. Areas where the permeabilities of the rocks are low and the available groundwater resource is small are termed Water Challenged Areas (WCAs) (SRBC, 2005). SRBC-defined PSAs and WCAs are shown on Figure 2.4-77. To date, the SRBC has classified eight areas as PSAs and two areas as WCAs. As observed in Figure 2.4-77, there are no PSAs or WCAs located in or near Luzerne or Columbia counties.

The state projections for population trends predicts that Luzerne County will have a 7 percent decrease in population between 2000 and 2030 (PADEP, 2008a). This suggests that the demand for groundwater will also decline over the next 20 to 30 years. The abundant supply of groundwater and the declining demand for groundwater use in Luzerne and Columbia counties means that groundwater supplies will not be overdrafted in the two counties, and demand will not surpass available supplies in the future.

2.4.12.3 Subsurface Pathways

2.4.12.3.1 Observation Well Data

Water level data measured from groundwater observation wells and surface staff gauges installed for the BBNPP site were used to:

- develop groundwater potentiometric surface maps,
- determine groundwater flow directions (horizontal and vertical) and hydraulic gradients,
- evaluate short-term and seasonal changes in surface water and groundwater elevations and gradients,
- identify areas of potential groundwater recharge and discharge, and
- calculate flow velocities of groundwater.

A total of 41 observation wells with depths extending to 400 ft (120 m) bgs were installed in September and October 2007 (except MW301C, which was installed in May 2008). Observation wells were installed in three different groundwater-bearing intervals (Table 2.4-43):

- 14 wells were screened in the Glacial Overburden aquifer at depths of 9.2 to 76.0 ft (2.8 to 23.2 m) bgs ("A" wells),
- 19 wells were screened in shallow shale bedrock 50 to 181 ft (15 to 55 m) bgs ("B" wells, including MW313C, and excluding MW302B and MW307B), and
- 8 wells were screened in the Deep Shale Bedrock aquifer at 170 to 400 ft (52 to 122 m) bgs ("C" wells, excluding MW313C, and including MW302B and MW307B).

The Glacial Overburden aquifer is distinctly different than the shale bedrock aquifer. The shale bedrock aquifer has been divided into "shallow" and "deep" bedrock aquifer, as a means to determine if the hydraulic properties, the hydraulic potentials, or the groundwater flow directions are different between the shallow and deeper shale bedrock. In other words, the division of "shallow" versus "deep" provides a means to evaluate groundwater flow characteristics in the bedrock in three dimensions, rather than two dimensions. A depth of 175 ft (53 m) bgs has been selected as the division between the "Shallow" and "Deep" Bedrock aquifers.

Monitoring well locations are shown in Figure 2.4-62. A total of 31 monitoring wells were installed at the first 10 drilling locations (MW301-MW310), thereby creating 10 well clusters. Well clusters are a series of wells placed at the same location, with each well monitoring installed in a different water-bearing interval. Each cluster consists of two or more wells. This was done in order to measure vertical differences in hydraulic head, vertical hydraulic gradients, and vertical differences in hydraulic conductivity.

Water level measurements in monitoring well MW311C indicate that the well is very slow to recover after the initial installation and development. The water level measurements from this well indicate that the water level is rising very slowly and do not correspond to other water levels measured in the vicinity. Accordingly, the groundwater elevation maps, flow directions, and flow rates presented below do not consider data from this well.

The geotechnical borehole (B301) corresponding to Monitoring Well MW301C was drilled in September 2007, but was left as an open borehole until geophysical testing could be completed. The well (MW301C) was not installed until May 2008. As a result, measurements of water levels in this well became available starting in May 2008.

Between October 2007 and September 2008, water levels in the monitoring wells were measured monthly to characterize seasonal trends in groundwater levels, flow directions, and hydraulic gradients for the BBNPP site. In addition, pressure transducers were installed in six monitoring wells and two surface water monitoring stations between April and September 2008 to evaluated short-term fluctuations in water level. The following groundwater potentiometric surfaces, hydraulic gradients, and temporal trends are based on these data.

2.4.12.3.1.1 Glacial Overburden Aquifer

Surface water and groundwater flows from north to south through the notches between the hills located on the south side of Beach Grove Road. Walker Run flows southward through the "western notch" and the unnamed tributary of Walker Run flows through the "eastern notch" (Figure 2.4-68). Groundwater elevations measured in the Glacial Overburden aquifer are

tabulated in Table 2.4-44. In addition, elevations of four ponds (Table 2.4-45) have been used to map the water table surface in the Glacial Overburden aquifer.

The data exhibit temporal variability in groundwater elevations during the observation period (October 2007 to September 2008). Groundwater elevations versus time for the ten well clusters are plotted in Figure 2.4-78 through Figure 2.4-84. A seasonal influence during this monitoring period was observed: lower groundwater elevation generally occurred in fall (October and November 2007), followed by gradually increasing levels in winter, peak groundwater elevations in February and March 2008, and decreasing groundwater elevations in April through September 2008.

For the Glacial Overburden monitoring wells, the lowest elevations generally occurred in October 2007 and the highest elevations occurred in February and March 2008. The differences between the annual high and low elevations for each well ranged from 1.67 to 6.31 ft (0.51 to 1.92 m). The greatest annual variations occurred in the MW302 cluster and MW309A. Less than 5 ft (1.5 m) of variation occurred in each of the other Glacial Overburden wells.

The monthly groundwater elevation data (Table 2.4-44) and the monthly surface water elevation data for four ponds (Table 2.4-45) were used to develop groundwater elevation contour maps for the Glacial Overburden aquifer. These maps are presented for October 2007 (fall), January 2008 (winter), March 2008 (spring), and July 2008 (summer) (Figure 2.4-85 through Figure 2.4-88, respectively).

Groundwater levels measured in MW303A are the highest measured anywhere in the Glacial Overburden aquifer. MW303A is located near a surface water and groundwater divide in the northern trough of the Glacial Overburden aquifer (Figure 2.4-85 through Figure 2.4-88). Groundwater in the glacial overburden near this point flows either westward toward Walker Run or flows eastward toward the SSES Spray Pond area. Some groundwater in the northern trough along with surface water in the unnamed tributary flows southward through the eastern bedrock notch and enters the southern trough.

In the southern trough (where the BBNPP power block is located), groundwater in the glacial overburden is flowing from east to west and then southwest (Figure 2.4-85 through Figure 2.4-88). In October 2007 (month of lowest groundwater levels), the highest groundwater level in the southern trough (668.74 ft (203.83 m) msl) was measured in well MW304A. The lowest water level (653.86 ft (199.30 m) msl) was measured in Pond G8. Thus, a total head loss of nearly 15 ft (4.6 m) occurred across the southern trough in October 2007 (Figure 2.4-85). Between October 2007 and March 2008, the groundwater levels in all wells increased approximately 3.4 to 5.5 ft (1.0 to 1.7 m). In March 2008 (month of highest groundwater levels), the highest groundwater level in the southern trough was again located in MW304A (672.16 ft (204.87 m) msl) and the lowest level was again recorded in Pond G8 (654.30 ft (199.43 m) msl) (Figure 2.4-87). In March 2008, the total head loss across the southern trough (from MW304A to Pond G8) was approximately 18 ft (5.5 m).

A ridge of bedrock separates the southern trough from monitoring wells MW307A and MW309A. Groundwater in the Glacial Overburden aquifer in this area belongs to a separate flow system, which flows south and southeast and discharges to Unnamed Tributary 3, a drainage system altogether separate from the Walker Run watershed (Figure 2.4-72 through Figure 2.4-75).

Horizontal hydraulic gradients have been calculated for several flowpaths in the Glacial Overburden aquifer (Table 2.4-51). Flowpath GO1 goes from MW304A to MW302A1; Flowpath

GO2 goes from MW302A1 to MW301A, and Flowpath GO3 goes from MW301A to Pond G8. Together, these three flowline segments represent a flowline down the center of the southern trough, from east to west. Segment GO3 represents the horizontal flowline between the center of the power block and Pond G8. The horizontal hydraulic gradients computed for the southern bedrock trough are listed in Table 2.4-51 for fall (October 2007), winter (January 2008), spring (March 2008), and summer (July 2008) conditions. The largest gradients (0.0030 to 0.0112 ft/ft) generally occurred in March 2008 (spring) when the groundwater elevations were highest. The gradient between the power block and Pond G8 (Pathline GO3) was lowest in October 2007 (0.0041 ft/ft) and highest in March 2008 (0.0112 ft/ft).

The Glacial Overburden aquifer discharges as springs and seeps into Pond G8, the wetlands along the southern border of the BBNPP site, and into Walker Run. In February 2008, the surface of Ponds G6, G7, and G9 were all frozen with a layer of 2 to 3 in (0.05 to 0.08 m) of ice. However, no ice was present on the surface of Pond G8, indicating that warm groundwater was discharging into the pond during winter. In addition, Pond G8 discharges water all year long, even in the extremely dry summer and fall months, which also indicates that groundwater discharges in this area. As the southern bedrock trough approaches Pond G8 and surface water gauging stations G2 and G13 on Walker Run (Figure 2.4-63), the trough constricts and the glacial overburden thins considerably. As a consequence, groundwater flowing southeastward is forced to the surface in various locations near Pond G8 and the wetlands south and southwest of Pond G8. This area is considered a groundwater discharge area for the Glacial Overburden aquifer.

2.4.12.3.1.2 Shallow Bedrock Aquifer

Groundwater elevation data for the Shallow Bedrock aquifer are listed in Table 2.4-44. Variation of groundwater levels versus time in the Shallow Bedrock aquifer are presented in Figure 2.4-78 through Figure 2.4-84. These graphs show that the seasonal variations in groundwater elevations in the shallow bedrock are approximately the same as the magnitude of variation encountered in the Glacial Overburden wells. The rise and fall of groundwater elevations in the shallow bedrock also seem to generally coincide in time with variations in water levels in the Glacial Overburden aquifer. The highest groundwater elevations in the Shallow Bedrock aquifer were generally present in February and March 2008. The lowest groundwater elevations measured in the Shallow Bedrock aquifer generally occurred in October 2007 and September 2008.

The groundwater elevation data tabulated in Table 2.4-44 and graphed in Figure 2.4-78 through Figure 2.4-82 were used to develop groundwater potentiometric surface maps for the Shallow Bedrock aquifer. These maps are presented for October 2007 (fall), January 2008 (winter), March 2008 (spring), and summer (July 2008) in Figure 2.4-89 through Figure 2.4-92, respectively.

For each quarter, the spatial trends of the potentiometric surface and the horizontal hydraulic gradients are similar, although elevations in March 2008 are greater. Potentiometric contours in the Shallow Bedrock aquifer generally reflect surface topography. For example, the contours circle around the two hills on the northern side of the BBNPP site. Overall, lateral flow in the Shallow Bedrock is to the south and southwest, as shown on Figure 2.4-89 through Figure 2.4-92.

Horizontal hydraulic gradients have been calculated for six flowpath segments in the Shallow Bedrock aquifer (Table 2.4-51). The points defining each flowpath segment are listed in Table 2.4-51. Together, these six flowline segments represent the range of flow directions and gradients that exist beneath the power block and surrounding areas. The horizontal hydraulic

gradients computed for the Shallow Bedrock aquifer are listed in Table 2.4-51 for fall (October 2007), winter (January 2008), spring (March 2008), and summer (July 2008) conditions. The largest horizontal gradients (0.0081 to 0.1188 ft/ft) generally occurred in March 2008 (spring) when the groundwater elevations were highest. The lowest gradients (0.0079 to 0.0963 ft/ft) generally occurred in January 2008 (Table 2.4-51).

2.4.12.3.1.3 Deep Bedrock Aquifer

Groundwater elevation data for the Deep Bedrock aquifer are tabulated in Table 2.4-44. Variation of groundwater levels versus time in the Deep Bedrock aquifer are presented in Figure 2.4-78 through Figure 2.4-84. These graphs show that the seasonal variations in groundwater elevations in the eight Deep Bedrock wells are usually of the same magnitude of variation encountered in the Shallow Bedrock and the Glacial Overburden wells. A very large seasonal variation in groundwater elevations observed in Well MW307B was an exception; water levels rose almost 26 ft (7.9 m) between October 2007 and March 2008. The rise and fall of groundwater elevations in the deep bedrock also seem to generally coincide in time with variations in water levels in the other two units. The highest groundwater elevations in the Deep Bedrock aquifer were generally present in winter (February and March 2008). The lowest groundwater elevations in the Deep Bedrock aquifer were generally present in fall (October 2007 and September 2008).

The groundwater elevation data tabulated in Table 2.4-44 and graphed in Figure 2.4-78 through Figure 2.4-82 were used to develop groundwater potentiometric surface maps for the Deep Bedrock aquifer. These maps are presented for October 2007 (fall), January 2008 (winter), March 2008 (spring), and July 2008 (summer) in Figure 2.4-93 through Figure 2.4-96, respectively.

For each quarter, the spatial trends of the potentiometric surface and the horizontal hydraulic gradients are similar, although elevations in March 2008 are slightly greater. Potentiometric contours in the Deep Bedrock aquifer generally reflect surface topography. The contours bend somewhat around and encompass the two hills on the northern side of the BBNPP site. The overall flow direction in the Deep Bedrock is to the south, southeast, and probably the southwest, as shown on Figure 2.4-93 through Figure 2.4-96.

Horizontal hydraulic gradients have been calculated for two flowpath segments in the Deep Bedrock aquifer (Table 2.4-51). The points defining each flowpath segment are listed in Table 2.4-51. Together, these two flowline segments represent the range of flow directions and gradients that exist beneath the power block and surrounding areas. The horizontal hydraulic gradients computed for the Deep Bedrock aquifer are listed for fall (October 2007), winter (January 2008), spring (March 2008), and summer (July 2008) conditions. The calculated horizontal gradients in the Deep Bedrock aquifer ranged from 0.0154 to 0.0228 ft/ft, which are considerably lower than the gradients calculated for the Shallow Bedrock, but slightly higher than the gradients determined for the Glacial Overburden aquifer. Unlike the other two hydrogeologic units, the horizontal hydraulic gradients in the Deep Bedrock seem to be largest in the fall when groundwater levels were lowest. The lowest gradients (0.0079 to 0.0964 ft/ft) generally occurred in March 2008 (Table 2.4-51).

2.4.12.3.1.4 Vertical Hydraulic Gradients and Vertical Flow Directions

A total of twelve well clusters were installed around the BBNPP site. Each cluster has two or more wells intersecting two or three of the hydrogeologic units. Differences in hydraulic heads between wells screened in different intervals indicate that vertical gradients exist and that vertical flow of groundwater (either upward or downward) is likely occurring. Vertical head

differences do not necessarily imply that a continuous or discontinuous aquitard separates two aquifer units; it simply means that vertical flow can occur.

For each well cluster, the wells were identified as belonging to the Glacial Overburden (A), Shallow Bedrock (B), or Deep Bedrock (C) aquifers (note: three wells, MW302B, MW307B, and MW313C, have suffixes different than the aquifer in which they are screened, for reasons previously discussed). Vertical gradients have been calculated by taking the difference in hydraulic heads between two wells and divide by the vertical distance between the midpoints of the two well screens. The calculated vertical gradients for four different seasons are listed in Table 2.4-52. The well pairs with positive vertical gradients indicate that the direction of groundwater flow is downward; negative gradients indicate an upward direction of groundwater flow.

For gradients calculated between the Glacial Overburden and the Shallow Bedrock, upward flow (negative gradient) was detected at 3 out of 8 well clusters (MW301, MW303, and MW310). For gradients calculated between the Glacial Overburden and the Deep Bedrock, upward flow was determined at 3 out of 6 clusters (MW302, MW306, and MW310). Based on these results, upward flow of groundwater from the bedrock is apparent in roughly half of the well clusters. The clusters that indicate upward flow include the MW301, MW302, MW303, MW306, and MW310 clusters (Table 2.4-52). The largest gradients for upward flow were found at clusters MW301, MW302, MW303, and MW310. In three of these locations, artesian pressure was encountered in bedrock wells MW301B4, MW302B, MW310C and geotechnical boring B302. Artesian pressure was also detected in monitoring wells MW312B and MW313C, located in the wetlands on the south side of the power block. Figure 2.4-97 displays the areas where upward-flowing groundwater from the bedrock may be occurring. Upward-flowing groundwater from the bedrock was not visually observed anywhere at the BBNPP site. If upward flow from bedrock is occurring, it will discharge to and dissipate within the Glacial Overburden aquifer. Therefore, the locations of bedrock discharge and the rate of groundwater discharge to the Glacial Overburden aquifer is difficult to estimate. As shown in Figure 2.4-97, there are two areas of suspected upward flow from bedrock. The first area lies along Beach Grove Road in the northwest corner of the site, west of well MW305B, and extends to Walker Run. The second area covers a large portion of the southern bedrock trough, including all of the wetlands and the BBNPP power block.

Although vertical gradients suggest that upward groundwater flow is occurring, the exact areas where upward flow takes place, the overall rate of flow, and the temporal changes in flow rate, are not known with any degree of certainty.

2.4.12.3.2 Hydrogeologic Properties

The hydraulic properties of the geologic materials present at the BBNPP site were characterized by several means:

- Fourteen (14) Glacial Overburden wells and 11 bedrock wells were slug tested (falling head and rising head tests). The results are presented in Table 2.4-53.

- Two (2) pumping tests were performed. One test was performed in the glacial overburden at well cluster MW302 and the other was performed in shale bedrock at well cluster MW301 (center of nuclear island). Each test consisted of a 24-hour pumping test and 12-hour recovery test. For the Glacial Overburden test, monitoring wells MW302A2, MW302A3 and MW302A4 were used as observation wells for pumping well MW302A1. For the Bedrock test, monitoring wells MW301B2, MW301B3 and MW301B4 were used as observation wells for pumping well MW301B1. Prior to each

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Williams, 1987. Groundwater Resources of the Berwick-Bloomsburg-Danville Area, East-Central Pennsylvania, Pennsylvania Dept of Environmental Resources, Topographic and Geologic Survey, Water Resource Report 61, 76 p., J. Williams and D. Eckhardt, 1987.}

2.5.4 STABILITY OF SUBSURFACE MATERIALS AND FOUNDATIONS

The U.S. EPR FSAR includes the following COL Item for Section 2.5.4:

> A COL applicant that references the U.S. EPR design certification will present site-specific information about the properties and stability of soils and rocks that may affect the nuclear power plant facilities, under both static and dynamic conditions including the vibratory ground motions associated with the CSDRS and the site-specific SSE.

This COL Item is addressed as follows:

{This section addresses site-specific subsurface materials and foundation conditions. It was prepared based on the guidance in relevant sections of NRC Regulatory Guide 1.206, Combined License Applications for Nuclear Power Plants (LWR Edition) (NRC, 2007a).

Unless otherwise indicated, the information presented in this section is based on results of a subsurface investigation program implemented at the Bell Bend Nuclear Power Plant (BBNPP) site, and evaluation of the collected data. The Susquehanna Steam Electric Station (SSES) Units 1 and 2 Final Safety Analysis Report (FSAR) (PPL, 2004) contains a summary of the geotechnical information collected previously for the construction of SSES Units 1 and 2. The planned Bell Bend NPP is to be located approximately 0.5 mi (0.8 km) west of SSES Units 1 and 2. The geologic and geotechnical work performed for the BBNPP is a "stand-alone" investigation. The outcome and conclusions do not rely on the existing SSES Units 1 and 2 FSAR. This document provides the complete investigation data set, including both geotechnical boring logs, and results from the laboratory testing program. The data is organized within the text, body, tables, and figures to provide an engineering recommendation based on geotechnical parameters. The topographic reference to elevation values in this subsection are based, for the initial ground control and establishment, on the state Plane Coordinates North American Datum of 1983 (NAD83) PA NORTH datum (NGS, 1983). For the establishment of the vertical datum, North American Vertical Datum, 1988 (NAVD 88), is utilized unless stated otherwise (NGS, 1988).

2.5.4.1 Geologic Features

Section 2.5.1.1 addresses the regional geologic settings, including regional physiography and geomorphology, regional geologic history, regional stratigraphy, regional tectonic and non-tectonic conditions, and geologic hazards, as well as maps, cross-sections, and references. Section 2.5.1.2 addresses the geologic conditions specific to the site, including site structural geology, site physiography and geomorphology, site geologic history, site stratigraphy and lithology, site structural geology, seismic conditions, and site geologic hazard evaluation, accompanied by figures, maps, and references. Pre-loading influences on soil deposits, including estimates of consolidation, pre-consolidation pressures, and methods used for their estimation are addressed in Section 2.5.4.2. Related maps and stratigraphic profiles are also addressed in Section 2.5.4.2.

The site lies within the Ridge and Valley Physiographic Province (Inners, 1978). The soils at the site are characterized by glacio-fluvial deposits, and were subjected to both glacial and periglacial events during the Quaternary period. Underneath this glacio-fluvial overburden (glacial overburden) lies the middle Devonian bedrock denominated the Mahantango Formation, part of the Hamilton Group. This formation is characterized by dark gray, slightly fossiliferous, hard shale and was found to be at least 400 ft (122 m) thick based upon the BBNPP site geotechnical investigation. A past report places the total thickness of the Mahantango Formation at approximately 1,500 ft (457 m) (Inners, 1978). Harper (Harper, 1999) describes the Mahantango Formation as "a complex series of interbedded shales, siltstones, and sandstones ranging from 1,200 ft (366 m) to 2,200 ft (671 m)" although Inners (Inners, 1978) reports a site specific thickness of approximately 1,500 ft (457 m). The shales and siltstones encountered during the BBNPP site investigation were typically dark gray, ranged in hardness from soft to moderately hard, increased progressively in the level of calcareous content with depth, and were slightly pyritic and fossiliferous throughout. Harper (Harper, 1999) suggests that the Mahantango Formation was deposited as a prograding marine shoreline during the early stages of the Catskill delta.

The glacial overburden soils and the Mahantango formation were the subject of a detailed subsurface exploration for the COL investigation, as described below.}

2.5.4.2 Properties of Subsurface Materials

The U.S. EPR FSAR includes the following COL Item in Section 2.5.4.2:

A COL applicant that references the U.S. EPR design certification will reconcile the site-specific soil properties with those used for design of U.S. EPR Seismic Category I structures and foundations described in Section 3.8.

This COL Item is addressed as follows:

{This section presents the properties of underlying materials encountered at the BBNPP Site. It is divided into five subsections, as follows.

- Section 2.5.4.2.1 provides an introduction to the soil profile and subsurface conditions,
- Section 2.5.4.2.2 provides a description of the field investigation program, including borings, sampling, and in-situ tests,
- Section 2.5.4.2.3 provides a description of the laboratory testing program,
- Section 2.5.4.2.4 provides a narrative on the origin and characteristics of the engineered fill soils, and
- Section 2.5.4.2.5 provides the BBNPP recommended soil properties.

2.5.4.2.1 BBNPP Soil Profile

The natural topography at the BBNPP site, at the time of the subsurface exploration, was a gently sloping open field cut across by a highly eroded east-west trending bedrock anticlinorium. The maximum variation in relief was about 144.5 ft (44 m) across the site. Ground surface elevations at the time of exploration ranged from approximately 800 ft to 656 ft (244 to 200 m) mean sea level (msl), with an average elevation of about 680 ft (207 m). The ground surface elevations in the Powerblock area ranged from about 656 ft to 675 ft (200 to 206 m), with the centerline of the BBNPP through the Reactor Building at an elevation of 666.6 ft (203.2 m). The Powerblock includes the Reactor Building, Fuel Pool Building, Reactor Auxiliary Building, Safeguard Buildings, Radioactive Waste Processing Building, Emergency Power Generating Buildings, Essential Service Water System (ESWS) Cooling Towers, and Turbine Building.

The BBNPP subsurface investigation focused on the upper 400 ft (122 m) of the subsurface structure. The site geology is comprised of glacial soil deposits underlain by bedrock, which is, on average, 38.9 ft (11.9 m) below the ground surface. The subsurface structure is divided into the following stratigraphic units:

- Overburden Soil: - Glacial Till
- Bedrock: - Mahantango Formation

Identification of soil and rock layers was based on their physical and engineering characteristics. The characterization of the soils and rocks was based on a suite of tests performed on these soils and rocks, consisting of standard penetration tests (SPT) in soil borings including auto-hammer energy measurements, geophysical testing, pressuremeter tests (PMTs) and laboratory testing.

Figure 2.5-180 provides a general soil column profile. Overall, the subsurface conditions encountered throughout the site are uniform, in both depth and area extension.

The thickness of the glacial till varies from 12.5 (3.8 m) to 62.0 ft (18.9 m). With the exception of some loose sand pockets, the till consists of over-consolidated brown silty sand or sand containing gravel and large rounded cobbles and boulders. The presence of boulders increases with depth.

The overburden soil is not an adequate foundation strata for safety related structures or facilities that will impose high contact pressures. Even though these soils have shear wave velocities in the excess of 1000 ft/sec (305 m/sec), several zones of loose sands were encountered during the investigation. These zones originated from wind deposited processes during the glaciation periods. Low blow counts were recorded in areas at the south side of the power block. Such areas are susceptible to liquefaction.

The Mahantango Shale is very dark gray to black, thin bedded to massive bedded, with few to no fractures. There are also calcareous zones, thin pyrite lenses that increase in abundance with depth, and calcite veins perpendicular to the bedding plane that are micro-faulted. The upper surface of the Mahantango Formation shows the effects of solution and weathering in a few areas, but it is predominantly very competent and indurated. For SSES Units 1 and 2, this layer supports large and safety-related structures (PPL, 2004).

The thicknesses and termination elevations of rock are summarized in Table 2.5-27 The table provides the minimums, maximums, and averages from forty eight geotechnical boring logs. The positions of the soil and rock strata are best visualized by cross section drawings and contour elevation plots. These are developed at locations where the main power block and other safety related facilities will be placed. The following plots are presented for visualization purposes:

- Figure 2.5-137, Boring Location Plan
- Figure 2.5-138, Location of Cross Sections
- Figure 2.5-139, Geotechnical Subsurface Section A-A'
- Figure 2.5-140, Geotechnical Subsurface Section B-B'
- Figure 2.5-141, Geotechnical Subsurface Section C-C'
- Figure 2.5-142, Geotechnical Subsurface Section D-D'
- Figure 2.5-143, Surface Elevation Contours
- Figure 2.5-144, Overburden Thickness
- Figure 2.5-145, Thickness of Weathered Rock
- Figure 2.5-146, Elevation of Competent Rock
- Figure 2.5-147, Overburden Thickness and Elevation of Rock (Area near Essential Service Water Emergency Makeup System - ESWEMS)

2.5.4.2.2 Field Investigation Program

A thorough field investigation program was designed and implemented at the BBNPP site. The program included:

Enclosure 2

Application Fee

M. J. Caverly
VP-Financial Nuclear-Development

PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.6522 Fax 610.774.2618
mjcaverly@pplweb.com

January 5, 2012

Project Review Coordinator
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

BELL BEND NUCLEAR POWER PLANT
APPLICATION FOR GROUNDWATER WITHDRAWAL
BNP-2012-007 Docket No. 52-039

Enclosed for the Susquehanna River Basin Commission's review and approval is an application for groundwater withdrawal at the proposed Bell Bend Nuclear Power Plant (BBNPP), to be located in Salem Township, Luzerne County, PA. BBNPP is owned and will be operated by PPL Bell Bend, LLC (PPL BB). PPL BB is owned by PPL Bell Bend Holdings, LLC which in turn is an indirect subsidiary of PPL Corporation.

General Information

BBNPP will be a single-unit nuclear power plant with a net electrical output of approximately 1,600 megawatts. BBNPP will be located southwest of and adjacent to the Susquehanna Steam Electric Station (SSES). It will employ a U.S. Evolutionary Power Reactor, which is a pressurized water reactor expected to have a life of at least 60 years. PPL BB expects to receive a license from the U.S. Nuclear Regulatory Commission (NRC) for an initial period of 40 years.

On October 10, 2008 PPL BB submitted a Combined License Application (COLA) for the construction and operation of BBNPP to the NRC. On December 19, 2008 the NRC accepted the COLA for docketing. The COLA may be viewed on the NRC website at:

http://www.nrc.gov/reactors/new-reactors/col/bell-bend.html

Although the corporation has made no final decision on whether to build the plant at this time mobilization and site preparation activities are tentatively scheduled to begin during the second quarter 2013, and initial commercial operation of BBNPP is tentatively scheduled for December 2020. PPL BB will advise the Commission of any substantive changes to these dates.

Application for Groundwater Withdrawal

PPL BB is applying for approval of groundwater withdrawal to construct the Essential Service Water Emergency Make-up System (ESWEMS) pond. Dewatering is needed during excavation and fill placement for the ESWEMS pond. This pond is a safety-related plant feature and must have a foundation placed on competent bedrock. The excavation to bedrock and placement of structural fill to design elevations must be done in a dry condition during foundation construction, which may extend up to two years.

The anticipated pumping rate for the initial dewatering of the excavation area is estimated to be 715 gpm (1.0 mgd) for about 85 days. After initial dewatering, the steady state pumping

rate is estimated to be 350 gpm (0.5 mgd) (Sargent and Lundy 2010). To minimize the area of influence of the groundwater drawdown during the excavation to the area immediately adjacent to the pond construction, a bentonite slurry flow barrier will be used. Actual pumping rates may be less than the estimated 0.5 mgd depending on hydrologic conditions and the effectiveness of the flow barrier.

The groundwater withdrawn during construction will be temporarily stored in a series of two settling ponds which will overflow to unnamed tributary #2 to Walker Run. These ponds will be a source of water for a spray irrigation system, to be used as necessary to maintain hydrology in the adjacent wetlands. All pumped water will be returned, via overflow or irrigation to the adjacent stream and wetlands which are fed by the shallow glacial outwash aquifer from which the water is pumped. Therefore, there will be no consumptive use of the groundwater.

The daily amount of groundwater withdrawal will be monitored and reported by PPL BB in accordance with a monitoring plan approved by the Commission. Details of the Construction Dewatering Mitigation Plan and associated monitoring were previously provided in Appendix C of the Aquifer Test Waiver request dated June 28, 2011 and in the Joint Permit Application, Revision 1, Binder 1C, Section R, Dewatering Mitigation Narrative, revision 1, dated November 21, 2011.

Project Review Fee

Based on the Commission's Project Fee Schedule effective June 11, 2011 enclosed herewith is a check in the amount of $14,950.

Public Notice of Application

PPL BB is proceeding to issue public notice of this application in accordance with the Commission's regulations. Notifications will be made to Luzerne County, the Luzerne County Planning Commission, Salem Township, Pennsylvania Department of Environmental Protection EP Program Manager, four local newspapers, and owners of properties contiguous to the BBNPP site. Proof of public notice will be filed with the Commission upon receipt of documentation.

Should you or your Staff have any questions, please contact Gary Petrewski at 610.774.5996 or gpetrewski@pplweb.com.

We look forward to working with your Staff in this matter.

Respectfully,

Michael J. Caverly

OFFICE OF GENERAL COUNSEL
BY:
DATE: 1/4/12

MJC/kw

Enclosures: 1) Form 24-G Groundwater Withdrawal Application
2) Proposed Construction Dewatering Well Location Map

cc: (w/ Enclosures)

Mr. John Fringer
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike Mailstop: T-6 C32
Rockville, MD 20852

Ms. Paula Ballaron
Manager, Policy Implementation & Outreach
Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102

Ms. Jamie Davis
Office of Environmental Programs (3EA30)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Mr. Joshua Longmore
Luzerne Conservation District
485 Smiths Pond Road
Shavertown, PA 18708

Ms. Amy Elliott
U.S. Army Corps of Engineers
State College Field Office
1631 South Atherton Street, Suite 102
State College, PA 16801

Ms. Jennifer Kagel
United States Fish & Wildlife Service
Pennsylvania Field Office
315 S. Allen St. #322
State College, PA 16801

Mr. Tom Shervinskie
Pa Fish & Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Mr. Gene Trowbridge
Pennsylvania Department of
Environmental Protection
Northeast Regional Office
2 Public Square
Wilkes-Barre, PA 18711

Mr. Thomas W. Beauduy
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-0425

Ms. Karen J. Karchner
Zoning/Building Code Official
38 Bomboy Lane
Berwick, PA 18603

Enclosure 1

Form 24-G Groundwater Withdrawal Application

SRBC #24G
Rev. 9/99

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

Ground-Water Withdrawal Application

1. Applicant Information:

Company Name PPL Bell Bend, LLC

Mailing Address 38 Bomboy Lane

Suite 2

City Berwick State PA Zip 18603

Contact Person Mike Caverly Title VP- Bell Bend Project Development

Telephone (570)802-8111 Fax (570)502-8119 E-mail mjcaverly@pplweb.com

2. a. Location of proposed well(s):

State PA County Luzerne

Municipality Salem Twp.

b. You must attach a copy of a USGS 7 1/2 Minute Quadrangle map indicating location of proposed well(s), all existing project wells, and any nearby wells.

3. Purpose of proposed withdrawal(s): Construction Dewatering (Temporary)

4. Requested withdrawal from proposed well(s) (based on a 30-day average):

Well Number 1 - 0.5 mgd.

Well Number _____ - _____ mgd.

Well Number _____ - _____ mgd.

Well Number _____ - _____ mgd.

5. Total combined withdrawal from proposed well(s) 0.5 mgd (based on a 30-day average).

6. Existing and projected total water use:

Total Project Water Usage[1]	Existing (mgd)[2]	Projected (mgd)[3] for Design Year _____
Average Daily Water Demand	**0**	**0**
Maximum Daily Water Demand	**0**	**0**
System Capacity[4]	**1.0**	**0.5** (following initial pump- down)

Explanation

[1] Project water usage should be on an annual basis, unless the application is for a seasonal operation. For seasonal uses, indicate the duration of the use (the number of months on which the average is based).

[2] For new projects, the existing use should be the proposed use during the first year of operation.

[3] The projected use should be for 25 years in the future (design year). If the project duration is less than 25 years, indicate the year for which projections were made.

[4] The existing system capacity should not include the proposed sources unless the application is for a new project having no prior withdrawal.

7. Existing sources of water:

a. Wells

Well Number	Well Depth (ft)	Cased Depth (ft)	Screened Interval (ft to ft)	Existing Pump Capacity (mgd)	Average Daily Withdrawal (mgd)	Metered (yes/no)

b. Other sources of water (stream intakes, interconnections, reservoirs, springs, etc.):

Name	Description	Average Daily Withdrawal (mgd)	Number Days Used During Calendar Year	Safe Yield (mgd)	Metered (yes/no)

8. Well record (proposed well(s)):

Well No. 1 — Geologic Formation Glacial Overburden

Date Drilled TBD — Well Driller TBD

Depth Drilled ~58 ft ft — Diameter 24 - 36 in

Casing: Min. Diameter 12 in — Max. Length 46 ft

Well Screen: Type SS 12" PS 25 slot (0.025") — Diameter 12 in

Top of Screen 46 ft — Bottom of Screen 60 ft

Well Yield TBD gpm — Specific Capacity TBD gpm/ft

Permanent Pump: Type submersible

Capacity TBD gpm — Intake Setting TBD ft

Air Line Depth TBD ft — Type of Metering TBD

Well No. _____ — Geologic Formation _____

Date Drilled _____ — Well Driller _____

Depth Drilled _____ ft. — Diameter _____ in

Casing: Min. Diameter _____ in — Max. Length _____ ft

Well Screen: Type _____ — Diameter _____ in

Top of Screen _____ ft — Bottom of Screen _____ ft

Well Yield _____ gpm — Specific Capacity _____ gpm/ft

Permanent Pump: Type _____

Capacity _____ gpm — Intake Setting _____ ft

Air Line Depth _____ ft — Type of Metering _____

Attach copies of this page as needed.

9. Existing nearby wells:

Attach map identifying all nearby wells owned by others that could be affected by pumpage of the proposed well(s) and complete items below for each well.

Existing nearby wells:

Owner PPL Susquehanna LLC Phone 570-542-3445

Address 769 Salem Blvd., Berwick, PA 18603-0467

Well No. 129135 Well Use Not in Use

Date Drilled 8-26-1981 Well Driller Unknown

Well Depth 225 ft Estimated Yield 35 gpm

Depth to Water-Bearing Zone(s) 7.0 ft Screened Interval Unknown ft to ft

Pump Type N/A Pump Intake Setting N/A ft

Distance from Proposed Well(s) 1700 ft

Owner _____ Phone _____

Address _____

Well No. _____ Well Use _____

Date Drilled _____ Well Driller _____

Well Depth _____ ft Estimated Yield _____ gpm

Depth to Water-Bearing Zone(s) _____ ft Screened

Interval _____ ft to _____ ft

Pump Type _____ Pump Intake Setting _____ ft

Distance from Proposed Well(s) _____ ft

Attach copies of this page as needed.

10. Driller's log:

Attach separate sheet describing the nature and depth interval of subsurface materials and water-bearing zones penetrated during drilling of each proposed well.

11. Pumping test:

NOTE: **Review and approval by the Susquehanna River Basin Commission of the test procedures to be used by the applicant are necessary before the test is started.**

Attach copies of basic data sheets and any resultant water level charts, tables, graphs, etc., for the pumped well, monitoring wells, and nearby perennial stream sites. The pumping test shall be of not less than 48 hours pumping duration and at a constant withdrawal rate not less than the proposed rate. A step-drawdown pumping test may precede the 48-hour test, however, water levels should be allowed to essentially recover prior to the constant rate test. The following information from the test is generally required:

a. Date and time of all static, pumping, and recovery water level measurements.
b. Record of pumping rate measured frequently throughout the test.

c. Sufficient static water level measurements in all wells to determine any trends in water level changes prior to the beginning of pumping. All water levels are to be measured to an accuracy of one-tenth of a foot.
d. Pumping and recovery measurements from the pumped well.
e. Monitoring data from a sufficient number of wells to determine all possible interference.
f. Records of precipitation, measurements or observations of nearby streamflows, and weather conditions throughout the test.

12. Preparer:

Name Benjamin J. Ehrhart, PE

Title Water Resources Engineer

Company LandStudies, Inc.

Address 315 North Street

Lititz, PA 17517

Phone (717)627-4440 Fax (717)627-4660

Signature

Date 12-9-11 E-mail Address ben1@landstudies.com

13. Applicant:

Name (print or type) Michael J. Caverly Title VP Bell Bend Project-Development

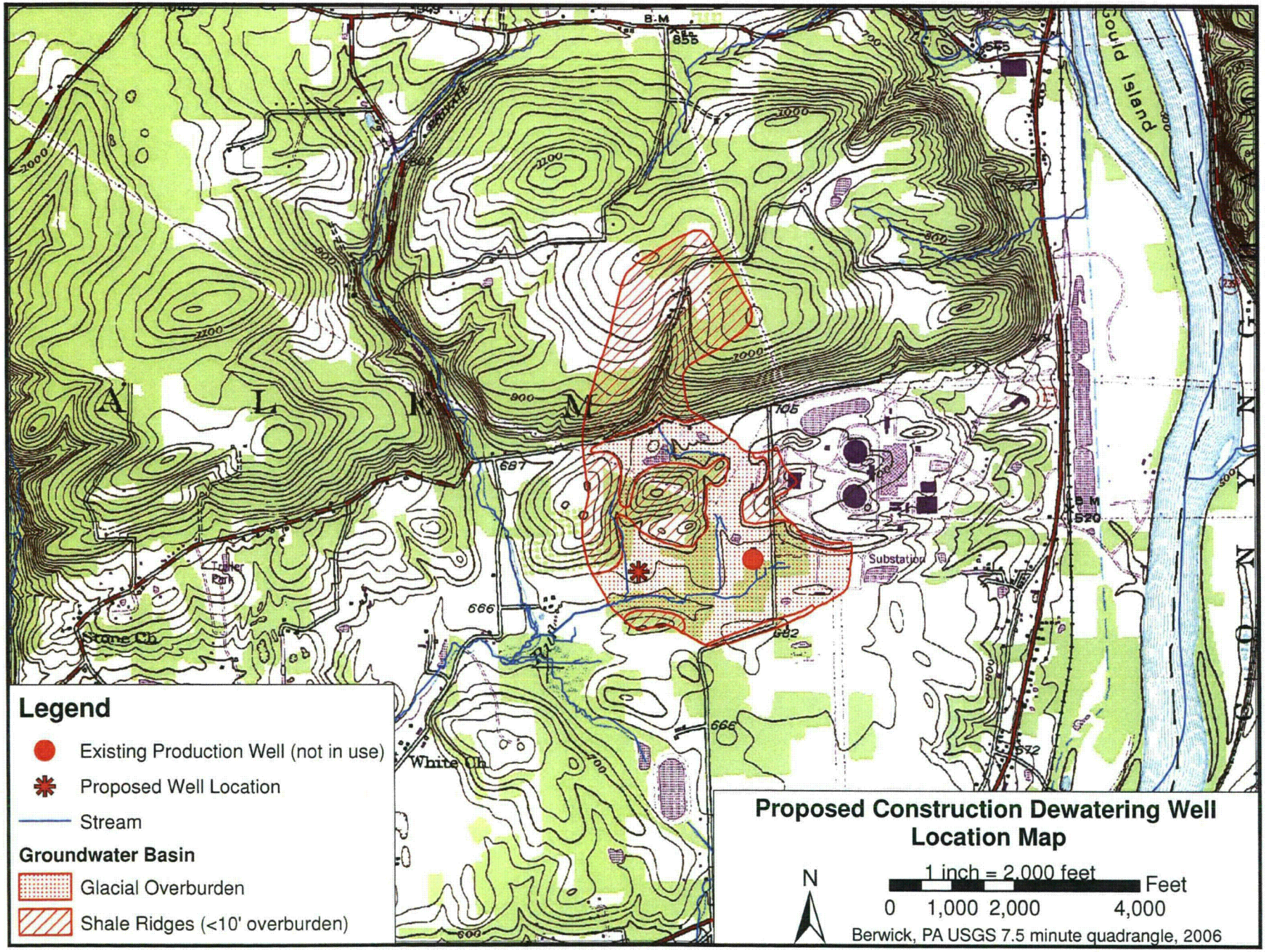
Signature Date 1/5/12

K:\DATA\JPAIN\WORD\FORMS\SRBC\24G (Ground-Water Instructions and Application).DOC

OFFICE OF GENERAL COUNSEL
BY:
DATE: 1/4/12

Enclosure 2

Proposed Construction Dewatering Well Location Map


Legend
Existing Production Well (not in use)
Proposed Well Location
Stream
Groundwater Basin
Glacial Overburden
Shale Ridges (<10' overburden)
Proposed Construction Dewatering Well Location Map
N
1 inch = 2,000 feet
Feet
0 1,000 2,000 4,000
Berwick, PA USGS 7.5 minute quadrangle, 2006
Gould Island
Substation
Stone Ch
White Ch
Trailer Park
B.M. 855
B.M. 520

M. J. Caverly
VP-Nuclear Project Development

PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.6522 Fax 610.774.2618
mjcaverly@pplweb.com

March 21, 2012

Glenda Miller – ABR Program
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

BELL BEND NUCLEAR POWER PLANT
APPROVAL BY RULE APPLICATION
FOR GROUNDWATER WITHDRAWAL
BNP-2012-058 Docket No. 52-039

Enclosed for the Susquehanna River Basin Commission's review and approval is an Approval by Rule application for groundwater withdrawal from the Pennsylvania American Water Company – Berwick (PAWC) station. The water is to be supplied to and used by the proposed Bell Bend Nuclear Power Plant (BBNPP) during construction and operation. BBNPP will be located in Salem Township, Luzerne County, PA. BBNPP is owned and will be operated by PPL Bell Bend, LLC (PPL). PPL is owned by PPL Bell Bend Holdings, LLC which in turn is an indirect subsidiary of PPL Corporation.

General Information

BBNPP will be a single-unit nuclear power plant with a net electrical output of approximately 1,600 megawatts. BBNPP will be located southwest of and adjacent to the Susquehanna Steam Electric Station (SSES). It will employ a U.S. Evolutionary Power Reactor, which is a pressurized water reactor expected to have a life of at least 60 years. PPL expects to receive a license from the U.S. Nuclear Regulatory Commission (NRC) for an initial period of 40 years.

On October 10, 2008 PPL submitted a Combined License Application (COLA) for the construction and operation of BBNPP to the NRC. On December 19, 2008 the NRC accepted the COLA for docketing. The COLA may be viewed on the NRC website at: http://www.nrc.gov/reactors/new-reactors/col/bell-bend.html

Although the corporation has made no final decision on whether to build the plant at this time and based on a recent update of the overall project schedule, mobilization and site preparation activities are tentatively scheduled to begin during the fourth quarter 2015, and initial commercial operation of BBNPP is tentatively scheduled for the second quarter 2023. PPL will advise the Commission of any substantive changes to these dates.

Approval by Rule Application for Groundwater Withdrawal

PPL is applying for an Approval by Rule for groundwater withdrawal from PAWC to construct and operate the proposed BBNPP. The PAWC Canal Street Pumping Station consists of a cluster of 4 wells that have a total capacity of 4.5 MGD and is currently supplying an average of 1.6 MGD. During construction of BBNPP, the maximum service volume is estimated to be 345,600 gpd and the nominal withdrawal during operation will be 136,800 gpd. However, due to

potential metering errors of up to 5%, PPL is requesting Commission approval of a maximum service volume of 363,000 gpd.

The daily amount of PAWC supplied water will be monitored and reported by PPL in accordance with a monitoring plan approved by the Commission. Meter(s) at the point of connection with PAWC will provide a continuous and accurate record of water used.

Project Application Fee

Based on the Commission's Project Fee Schedule effective June 11, 2011, enclosed herewith is a check in the amount of $2,875.

Public Notice of Application

PPL is proceeding to issue public notice of this application in accordance with the Commission's regulations. Notifications will be made to Luzerne County, the Luzerne County Planning Commission, Salem Township, Pennsylvania Department of Environmental Protection EP Program Manager, and the four local newspapers. Proof of public notice will be filed with the Commission upon receipt of documentation.

Should you or your Staff have any questions, please contact Gary Petrewski at 610.774.5996 or gpetrewski@pplweb.com.

We look forward to working with your Staff in this matter.

Respectfully,

Michael J. Caverly

MJC/kw

Enclosures:
1) Approval By Rule Application Form with Project Location Map (Map Size 11X17).
2) Form 72 SRBC Project Information Form with Pennsylvania Department of State Corporation Bureau approved name registration for PPL Bell Bend Holdings, LLC.
3) Map showing location of facility and withdrawal point from public water supplier (Conceptual Layout, Main Header, Potable Water System) (Size 11X17)
4) Flow chart showing the movement of water through the facility (Conceptual Piping and Instrumentation Diagram, Potable Water System) (Size 11X17)
5) Public Water Supplier letter(s) of agreement
   a. Joseph Woodward, PAWC, to Terry Harpster, PPL Bell Bend, "Re: Water Availability, Bell Bend Site, Salem Township, Luzerne County, PA." November 1, 2012.
   b. Terrry Harpster, PPL Bell Bend, to Bernard J. Grundusky, PAWC, "Bell Bend Nuclear Power Plant Water Service Application", March 3, 2011.
6) Project Application Fee

cc: (w/ Enclosures)

Mr. John Fringer
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike Mailstop: T-6 C32
Rockville, MD 20852

Mr. Tom Shervinskie
Pa Fish & Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Ms. Paula Ballaron
Manager, Policy Implementation & Outreach
Susquehanna River Basin Commission
1721 N. Front Street
Harrisburg, PA 17102

Mr. Gene Trowbridge
Pennsylvania Department of
Environmental Protection
Northeast Regional Office
2 Public Square
Wilkes-Barre, PA 18711

Ms. Jamie Davis
Office of Environmental Programs (3EA30)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Mr. Thomas W. Beauduy
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-0425

Mr. Joshua Longmore
Luzerne Conservation District
485 Smiths Pond Road
Shavertown, PA 18708

Ms. Karen J. Karchner
Zoning/Building Code Official
38 Bomboy Lane
Berwick, PA 18603

Ms. Amy Elliott
U.S. Army Corps of Engineers
State College Field Office
1631 South Atherton Street, Suite 102
State College, PA 16801

Ms. Jessie Muir
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike Mailstop: T-6 C32
Rockville, MD 20852

Ms. Jennifer Kagel
United States Fish & Wildlife Service
Pennsylvania Field Office
315 S. Allen St. #322
State College, PA 16801

Ms. Laura Quinn-Willingham
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mailstop: T-6 C32
Rockville, MD 20852

Enclosure 1

Approval By Rule Application Form with Project Location Map(Map Size 11X17).

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

NOTICE OF INTENT FOR APPROVAL BY RULE
Pursuant to 18 CFR Section 806.22(e)

Application

1. Project Sponsor Information:

Company Name: PPL Bell Bend, LLC

Mailing Address: 38 Bomboy Lane, Suite 2

City: Berwick State: PA

Zip: 18603

Contact Person: Gary Petrewski Title: Environmental Manager

Telephone: (610) 774-5996 Fax: (610) 774-2618

Mobile: (610) 613-1338 E-mail: gpetrewski@pplweb.com

2. Company or Facility Description:

Type of facility Nuclear Power Plant

Date operations began or will begin: 2nd Qtr. 2023

3. Location of Facility:

Municipality: Salem Township County: Luzerne State: PA

Latitude: 41° 05' 21.19" Longitude: -76° 09' 57.34" ° (decimal degrees [to six figures] North American Datum of 1983 [NAD 83] format)

You must attach a copy of a USGS 7 ½ minute quadrangle map indicating the location of the facility. Please indicate quadrangle name. Berwick, PA

4. Proposed Consumptive Use Type(s): (check all that apply)

☐ Incorporation Into Product ☐ Transpiration/Evaporation ☐ Injection

☒ Other: Water for construction and potable uses

Maximum Daily Consumptive Water Use Requested: 0.363 million gallons per day (mgd)

(This is the maximum amount that will be consumptively used in any 24-hour period.)

5. Public Water Supply Information:

System 1:

System Name: Pennsylvania American Water Company

Mailing Address: 852 Wesley Drive

City: Mechanicsburg State: PA

Zip: 17055

Contact Person: Joseph Woodward Title: Manager – Central PA Field Operations

Telephone: (717) 790-3028 Fax: (717) 795-1915 E-mail: Joseph.Woodward@amwater.com

Permitted System Capacity:	Current Average System Demand:	Historical Peak System Demand:
4.6 mgd	1.6 mgd	_____ mgd

Type of Water Being Supplied: ☐ Raw Water ☒ Finished (Treated) Water

Anticipated Maximum Daily Amount: 363,000 gallons per day (gpd) purchased from the public water supplier

State Permit Number(s): PA4190013

SRBC Docket Number(s) (if applicable): N/A

Description of Public Water Supply Connection:

Location: Approximately 3,000 ft from US 11 along Confers Lane, Salem Township, Luzerne County

Latitude: 41°. 5' 2.8" Longitude: -76°. 9' 26.8" (decimal degrees [to six figures] North American Datum of 1983 [NAD 83] format)

Metered by: ☒ Water Supplier ☐ Project Sponsor ☐ Other _____

Meter Make: Unknown Model: Unknown Serial #: Unknown

(Water withdrawal must be made through a manmade conveyance owned by the public water supply.)

6. Project Description:

Describe all water-related and appurtenant facilities and activities related to the project.

Water supplied will be used for potable and sanitary purposes and plant humidification equipment;

During construction it will also be used for:

a. Concrete batch plant for concrete mixing, curing, and washdown;

b. Site dust control and hydrostatic testing; and

c. Backfill compaction.

7. **Provide flow chart showing the movement of water through the facility, including location and amount of any losses.**

8. **Water Requirements:**

Water Use	Million gallons per day (mgd)	
	Present or proposed	Future Use (15 Years)
Maximum Daily Total Withdrawal	0.363	0.144
Maximum Daily Consumptive Use	0.235	0.093

9. **Consumptive Use Monitoring, Recordkeeping, and Reporting (including type of meters):** The project sponsor shall comply with metering, monitoring, and quarterly reporting as specified in Sections 806.22(e)(2) and 806.30, as follows:

Metering:

a. Measure and record on a daily basis, the quantity of all water withdrawn from the Public Water Supply system using meters approved by the Commission.
b. Certify at the time of installation and no less frequently than once every five (5) years, the accuracy of all meters to within five (5) percent of actual flow.
c. Maintain metering to provide a continuous, accurate record of the withdrawal.

Reporting: Project sponsors shall report:

a. The daily metered consumptive water use as measured by the meter installed on the Public Water Supply system withdrawal quarterly, and as otherwise required. Quarterly monitoring reports shall be submitted on-line and are due within thirty (30) days after the close of the preceding quarter.
b. Violations of consumptive use limits or any conditions of approval within five (5) days of such violation.

10. **Consumptive Use Mitigation:** In accordance with 18 CFR Section 806.22(e)(4), project sponsors shall select one of the two following options as mitigation for consumptive use.

☐ The project sponsor agrees to exclusively use, as a source of consumptive use water, surface storage that is subject to maintenance of a conservation release acceptable to the Commission in accordance with Section 806.22(b)(2). ***(Limited applicability – additional information will need to be submitted and reviewed; please contact SRBC staff.)***

☒ The project sponsor agrees to comply with the consumptive use mitigation requirements by payment of the consumptive use fee in accordance with Section 806.22(b)(3), based on the rate of $0.21 per 1,000 gallons of the water consumptively used by the project. The rate of payment, after appropriate notice to consumptive users of water using this method of

compliance, is subject to change at the Commission's discretion. ***(Note: PPL will apply for a Corporate-wide Pool Asset Approach to mitigate all corporate consumptive use in the Susquehanna River Basin.)***

11. Application Fee: Project sponsor shall make payment of a nonrefundable project review fee in accordance with the Project Fee Schedule in effect as excerpted below. (Based on request indicated in Section 806.22(e)(1)(i)(A).)

Effective January 1, 2011 to December 31, 2011:

	Requested Quantity	Application Fee (Approval by Rule)
☐	20,000 gpd – 99,999 gpd	$ 1,425
☒	100,000 gpd – 499,999 gpd	$ 2,875
☐	500,000 gpd – 999,999 gpd	$ 5,700
☐	1.000 mgd – 5.000 mgd	$17,100
☐	Over 5.000 mgd	$28,525

12. Notices: As required by 18 CFR Section 806.22(e)(1)(i), the project sponsor shall submit a copy of this Notice of Intent to the appropriate agencies of the member state and to each municipality and county in which the project is located. For notification examples, see "Guidelines for Completing Public Notice Requirements" on the SRBC website, www.srbc.net, under the Forms and Applications Section.

a. Ms. Jennifer Means, EP Program Manager, PADEP, 208 West Third Street, Suite 101, Williamsport, Pa 17701
b. Luzerne County, 200 North River Street, Wilkes-Barre, PA 18711
c. Salem Township, 38 Bomboy Lane, Berwick, PA 18603

Note: Proof of Notice will be provided when received.

13. Publication of Notice: Project sponsor shall within ten (10) days after submittal of the Notice of Intent submit to the Commission proof of publication in a newspaper of general circulation in the location of the project that contains a sufficient description of the project, its purpose, and its location. The Notice of Intent shall also contain the Commission's address, electronic mail address (gmiller@srbc.net), telephone number (717-238-0423), and fax (717-909-0468). For notification examples, see "Guidelines for Completing Public Notice Requirements" on the SRBC website, www.srbc.net, under the Forms and Applications Section.

A. Newspaper name
   i. The Press Enterprise, Bloomsburg, PA
   ii. Citizens Voice, Wilkes-Barre, PA
   iii. Times Leader, Wilkes-Barre, PA
   iv. Standard Speaker, Hazleton, PA

Note: Proof of publication will be provided when received.

14. Required Attachments:

- ☒ Project Information Form (SRBC Form # 72), go to SRBC website, www.srbc.net, Forms and Applications.
- ☒ Map showing location of facility and withdrawal point from public water supplier
- ☒ Flow chart showing the movement of water through the facility, including location and amount of any losses
- ☒ Public water supplier letter or agreement
- ☒ Application fee
- ☐ Proof of submission of notices
- ☐ Proof of publication for newspaper notice
- ☐ SRBC Form #55 (go to SRBC website, www.srbc.net, Forms and Applications).

15. Name and Signature of Project Sponsor:

The undersigned representative of the project sponsor certifies, under penalty of law (or perjury), as provided by 18 Pa. C. S. §4904, Section 210.45, of the New York Penal Law, Section 9-101 Maryland Crimes Code and 28 U.S.C. §1746, and attests that the information contained herein and all information accompanying this application is true and correct, and they are authorized to act as representatives of the project sponsor.

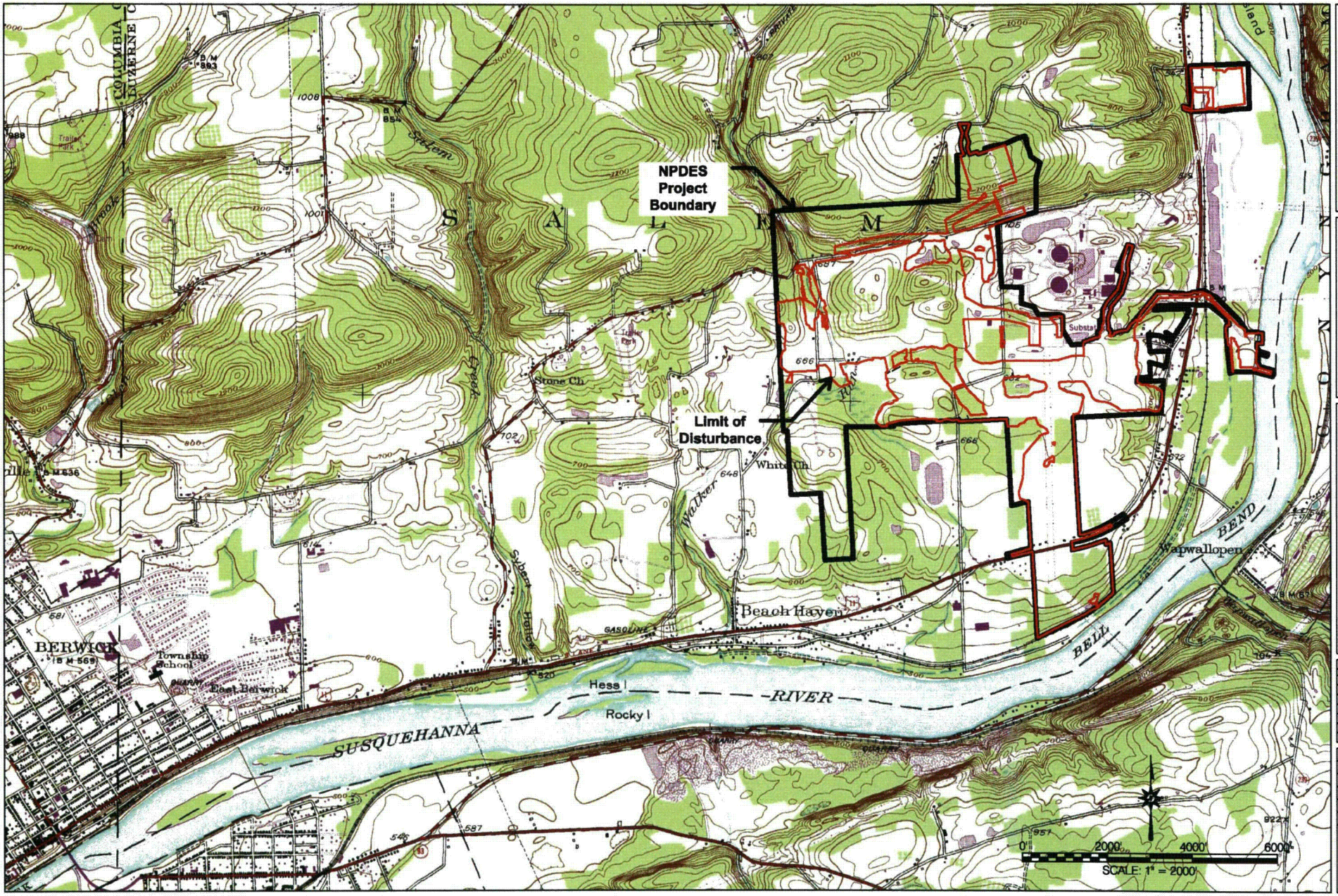
Project Sponsor Representative: Michael J. Caverly Date: 3/19/12

Signature: Michael J. Caverly

Title: Vice President – Nuclear Project Development

Company: PPL Bell Bend, LLC

Revised 12/2011



PA 042594
717-627-4440
fax: 717-627-4560
landstudies.com
landstudies@landstudies.com
315 North Street | Lititz, PA 17543

Project Location Map

Location: 41° 05' 36" N 76° 09' 50" W
Source: USGS 7.5 minute Quadrangle - Berwick, PA

Client

Bell Bend Nuclear Power Plant

Salem Township
Luzerne County, Pennsylvania

No.	Date	Description
1	6/17/11	Add LOD
2	8/7/11	Update LOD Per NRC Request
3	10/13/11	Update LOD Per NRC Request

Project Number	E-728-L8
Client By	EPU
Checked By	SE
Date	AUGUST 2010
Scale	1" = 2000'
Drawing File Name	BB-LM-001
Sheet Number	1 OF 1

Enclosure 2

Form 72 SRBC Project Information Form with Pennsylvania Department of State Corporation Bureau approved name registration for PPL Bell Bend Holdings, LLC.

Revised 11/09

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

PROJECT INFORMATION

1. Project Owner's Name, Registered Fictitious Name or Trade Name* PPL Bell Bend, LLC

Address 38 Bomboy Lane, Suite 2

City Berwick State PA Zip 18603

Type of Organization (Owner):

- ☐ Sole Proprietorship
- ☐ Corporation
- ☐ General Partnership
- ☐ Limited Partnership
- ☒ Limited Liability Company
- ☐ Limited Liability Partnership
- ☐ Government Agency
- ☐ Other

Authorized Contact Person Gary Petrewski Title Environmental Manager

Address (if different) 2 North Ninth Street

City Allentown State PA Zip 18101

Telephone (610) 774-5996 Fax (610) 774-2618 E-Mail gpetrewski@pplweb.com

2. Project Operator's Name or Registered Fictitious or Trade Name* (if different from No. 1)

Address

City State Zip

Type of Organization (Operator):

- ☐ Sole Proprietorship
- ☐ Corporation
- ☐ General Partnership
- ☐ Limited Partnership
- ☐ Limited Liability Company
- ☐ Limited Liability Partnership
- ☐ Government Agency
- ☐ Other

3. Authorized Contact Person Title

Address (if different)

City State Zip

Telephone ( ) Fax ( ) E-Mail

4. Parent Corporation Name, and Registered Fictitious or Trade Name* (if different from No. 1): (Use additional sheets, if necessary, to describe the corporate hierarchy.) PPL Bell Bend Holdings, LLC

Corporate Registration: Entity No. 3829311 State PA

Address (if different) 2 North Ninth Street

City Allentown State PA Zip 18101

* Please attach a copy of your Department of State, Division of Corporations, State Records and UCC (New York), Division of Corporations (Pennsylvania), or Department of Assessments and Taxation (Maryland) **approved** name registration or trade name registration.

5. All Proprietors, Corporate Officers and Directors, or Partners: (add as many lines as needed)

Name	Title	Address	Telephone	Fax	E-mail
Victor N. Lopiano	President/ Manager	2 North Ninth Street Allentown, PA 18101	(610) 774-3913	610-774-6092	vnlopiano@pplweb.com
Michael J. Caverly	Vice President-Nuclear Project Development	Same	(610) 774-6522	(610) 774-2618	mjcaverly@pplweb.com
Paul A. Farr	Treasurer/ Manager	Same	(610) 774-2426	(610) 774-7016	pfarr@pplweb.com
Elizabeth Stevens Duane	Secretary	Same	(610) 774-4107	(610) 774-5019	esduane@pplweb.com
David G. DeCampli	Manager	Same	(610) 774-4247	(610) 774-6092	dgdecampli@pplweb.com

6. Corporate Contact:

Name Victor N. Lopiano

Title President/ Manager

Address 2 North Ninth Street

City Allentown State PA Zip 18101

Telephone (610) 774-3913 Fax (610) 774-6092 E-Mail vnlopiano@pplweb.com

7. Project Hydrogeologist:

Name Not Applicable Title

Company

Address

Telephone Fax E-Mail

P.G. License No. State Expiration Date

8. Project Engineer:

Name George John Kuczynski Title Director-Engineering Procurement Construction

Company PPL Nuclear Development, LLC

Address 2 North Ninth Street

Allentown, PA 18101

Telephone (610) 774- 6385 Fax (610) 774-2618 E-Mail gjkuczynski@pplweb.com

P.E. License No. 027657E State PA Expiration Date September 30, 2013

9. Representing Attorney, if applicable:

Name _____

Firm _____

Address _____

_____

_____

Telephone ( ) _____ Fax ( ) _____ E-Mail _____

10. Name(s) and Signature(s) of Preparer and Project Owner:

The undersigned representatives of the project sponsor certify, under penalty of law (or perjury), as provided by 18 Pa. C.S.A. §4904; Section 210.45, of the New York Penal Law; Section 9-101 Maryland Crimes Code and 28 U.S.C. §1746, attest that the information for all parts contained herein and all information accompanying this application(s) is true and correct, and that they are authorized to act as representatives on behalf of their respective corporate entities.

Preparer Name Bradley A. Wise Date 3/19/12

Signature Bradley A. Wise

Title Environmental Permitting Supervisor

Company PPL Bell Bend, LLC

Preparer Name _____ Date _____

Signature _____

Title _____

Company _____

Project Owner Name PPL Bell Bend, LLC; Michael J. Caverly Date 3/19/12

Signature Michael J. Caverly

Title Vice President-Nuclear Project Development

Company PPL Bell Bend, LLC

(P.G. Seal) *(P.E. Seal)*

Notes:

1. Mark any information on the application that is considered confidential or proprietary.
2. Items 1 through 6 and 10 are required, and items 7 through 9 are project specific.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF STATE
CORPORATION BUREAU
206 NORTH OFFICE BUILDING
P.O. BOX 8722
HARRISBURG, PA 17105-8722
WWW.CORPORATIONS.STATE.PA.US/CORP

PPL Bell Bend Holdings, LLC

THE CORPORATION BUREAU IS HAPPY TO SEND YOU YOUR FILED DOCUMENT. THE CORPORATION BUREAU IS HERE TO SERVE YOU AND WANTS TO THANK YOU FOR DOING BUSINESS IN PENNSYLVANIA.

IF YOU HAVE ANY QUESTIONS PERTAINING TO THE CORPORATION BUREAU, PLEASE VISIT OUR WEB SITE LOCATED AT WWW.CORPORATIONS.STATE.PA.US/CORP OR PLEASE CALL OUR MAIN INFORMATION TELEPHONE NUMBER (717)787-1057. FOR ADDITIONAL INFORMATION REGARDING BUSINESS AND / OR UCC FILINGS, PLEASE VISIT OUR ONLINE "SEARCHABLE DATABASE" LOCATED ON OUR WEB SITE.

ENTITY NUMBER: 3829311

CT CORPORATION SYSTEM
116 Pine Street, Suite 320
Harrisburg, PA 17101

Entity #: 3829311
Date Filed: 08/14/2008
Pedro A. Cortés
Secretary of the Commonwealth

PENNSYLVANIA DEPARTMENT OF STATE
CORPORATION BUREAU

Application for Registration - Foreign

(15 Pa.C.S.)

- ☐ Registered Limited Liability General Partnership (§ 8211)
- ☐ Registered Limited Liability Limited Partnership (§ 8211)
- ☐ Limited Partnership (§ 8582)
- ☒ Limited Liability Company (§ 8981)

Name

Address: CT CORP-COUNTER

City State Zip Code

Document will be returned to the name and address you enter to the left.

⇐

Fee: $250

In compliance with the requirements of the applicable provisions (relating to registration), the undersigned, desiring to register to do business in this Commonwealth, hereby states that:

1. The name to be registered is:
PPL Bell Bend Holdings, LLC

2. *(If the name set forth in paragraph 1 is not available for use in this Commonwealth, complete the following):*

The name under which the limited liability company/limited liability partnership/limited partnership proposes to register and do business in this Commonwealth is:

3. The name of the jurisdiction under the laws of which it was organized and the date of its formation:

Jurisdiction: Delaware Date of Formation: Aug. 1, 2008 .

4. The (a) address of its initial registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is:

(a) Number and street	City	State	Zip	County
Two North Ninth Street	Allentown	PA	18101	Lehigh

(b) Name of Commercial Registered Office Provider County

Commonwealth of Pennsylvania
APPLICATION FOR REGISTRATION 3 Page(s)

PA057 - 10/10/06 C T System Online

2008 AUG 14 PM 12: 28

PA DEPT OF STATE

T0822711141

5. *Check and complete one of the following:*

[X] The address of the office required to be maintained by it in the jurisdiction of its organization by the laws of that jurisdiction is:

1209 Orange Street	Wilmington	DE	19801
Number and street	City	State	Zip

[ ] It is not required by the laws of its jurisdiction of organization to maintain an office therein and the address of its principal office is:

Number and street	City	State	Zip

6. *For Restricted Professional Limited Liability Company Only. Strike out if inapplicable:* ~~The company is a restricted professional limited liability company organized to render the following professional service:~~

Limited Liability Partnership and Limited Partnership: Complete paragraphs 7 and 8

7. The name and business address of each general partner.

Name	Business Address

8. The address of the office at which is kept a list of the names and addresses of the limited partners and their capital contribution is:

Number and street	City	State	Zip	County

The registered partnership hereby undertakes to keep those records until its registration to do business in the Commonwealth is canceled or withdrawn.

IN TESTIMONY WHEREOF, the undersigned has caused this Application for Registration to be signed by a duly authorized officer/member or manager thereof this

14th day of August, 2008.

PPL Bell Bend Holdings, LLC
Name of Partnership/Company

Signature

Elizabeth Stevens Duane, Secretary
Title

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF STATE
CORPORATION BUREAU
206 NORTH OFFICE BUILDING
P.O. BOX 8722
HARRISBURG, PA 17105-8722
WWW.CORPORATIONS.STATE.PA.US/CORP

PPL Bell Bend, LLC

THE CORPORATION BUREAU IS HAPPY TO SEND YOU YOUR FILED DOCUMENT. THE CORPORATION BUREAU IS HERE TO SERVE YOU AND WANTS TO THANK YOU FOR DOING BUSINESS IN PENNSYLVANIA.

IF YOU HAVE ANY QUESTIONS PERTAINING TO THE CORPORATION BUREAU, PLEASE VISIT OUR WEB SITE LOCATED AT WWW.CORPORATIONS.STATE.PA.US/CORP OR PLEASE CALL OUR MAIN INFORMATION TELEPHONE NUMBER (717)787-1057. FOR ADDITIONAL INFORMATION REGARDING BUSINESS AND / OR UCC FILINGS, PLEASE VISIT OUR ONLINE "SEARCHABLE DATABASE" LOCATED ON OUR WEB SITE.

ENTITY NUMBER: 3829312

CT CORPORATION SYSTEM
116 Pine Street, Suite 320
Harrisburg, PA 17101

Entity #: 3829312
Date Filed: 08/14/2008
Pedro A. Cortés
Secretary of the Commonwealth

PENNSYLVANIA DEPARTMENT OF STATE
CORPORATION BUREAU

Application for Registration - Foreign

(15 Pa.C.S.)

- [ ] Registered Limited Liability General Partnership (§ 8211)
- [ ] Registered Limited Liability Limited Partnership (§ 8211)
- [ ] Limited Partnership (§ 8582)
- [X] Limited Liability Company (§ 8981)

Name

Address CT CORP-COUNTER

City State Zip Code

Document will be returned to the name and address you enter to the left. ⇐

Fee: $250

In compliance with the requirements of the applicable provisions (relating to registration), the undersigned, desiring to register to do business in this Commonwealth, hereby states that:

1. The name to be registered is:
PPL Bell Bend, LLC

2. *(If the name set forth in paragraph 1 is not available for use in this Commonwealth, complete the following):*

The name under which the limited liability company/limited liability partnership/limited partnership proposes to register and do business in this Commonwealth is:

3. The name of the jurisdiction under the laws of which it was organized and the date of its formation:

Jurisdiction: Delaware Date of Formation: Aug. 1, 2008 .

4. The (a) address of its initial registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is:

(a) Number and street	City	State	Zip	County
Two North Ninth Street	Allentown	PA	18101	Lehigh

(b) Name of Commercial Registered Office Provider County

Commonwealth of Pennsylvania
APPLICATION FOR REGISTRATION 3 Page(s)

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PA DEPT OF STATE

DSCB:15-8981/8211/8582-2

5. *Check and complete one of the following:*

[X] The address of the office required to be maintained by it in the jurisdiction of its organization by the laws of that jurisdiction is:

1209 Orange Street	Wilmington	DE	19801
Number and street	City	State	Zip

[ ] It is not required by the laws of its jurisdiction of organization to maintain an office therein and the address of its principal office is:

Number and street	City	State	Zip

6. *For Restricted Professional Limited Liability Company Only. Strike out if inapplicable:* ~~XXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX~~

Limited Liability Partnership and Limited Partnership: Complete paragraphs 7 and 8

7. The name and business address of each general partner.

Name	Business Address

8. The address of the office at which is kept a list of the names and addresses of the limited partners and their capital contribution is:

Number and street	City	State	Zip	County

The registered partnership hereby undertakes to keep those records until its registration to do business in the Commonwealth is canceled or withdrawn.

IN TESTIMONY WHEREOF, the undersigned has caused this Application for Registration to be signed by a duly authorized officer/member or manager thereof this

14th day of August, 2008.

PPL Bell Bend, LLC
Name of Partnership/Company

[signature]
Signature

Elizabeth Stevens Duane, Secretary
Title

Enclosure 3

Map showing location of facility and withdrawal point from public water supplier (Conceptual Layout, Main Header, Potable Water System) (Map Size 11X17).

LEGEND

POTABLE WATER LINE

NOT FOR CONSTRUCTION

NON-SAFETY RELATED

NOTES

1. THE BACKGROUND OF THIS DRAWING IS DRAWING NO. SK-12198-400-001 REV.4, REDUCED SCALE SITE UTILIZATION PLOT PLAN.
2. THE LOCATION OF BUILDING CONNECTIONS IS APPROXIMATE. THE LOCATION OF THE CONNECTIONS WILL BE SET DURING FINAL DESIGN.
3. FOR BUILDING TYPES, REFER TO THE TABLE ON DRAWING SK-12198-400-001.

REFERENCE DRAWINGS

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

300' 0 300' 600'
GRAPHIC SCALE

TRUE NORTH
PLANT NORTH
5.33°

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	06/15/2010	P.MATHUR	L.ANDERSON		ISSUED FOR CAR
0	09/09/2010	S.B.MOUINE	L.ANDERSON		FOR USE

FILENAME:12198-400-PSWS-002.dgn

SCALE 1"=300'

PROJECT NUMBER 12198-415

CONCEPTUAL LAYOUT MAIN HEADER POTABLE WATER SYSTEM

BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Sargent & Lundy

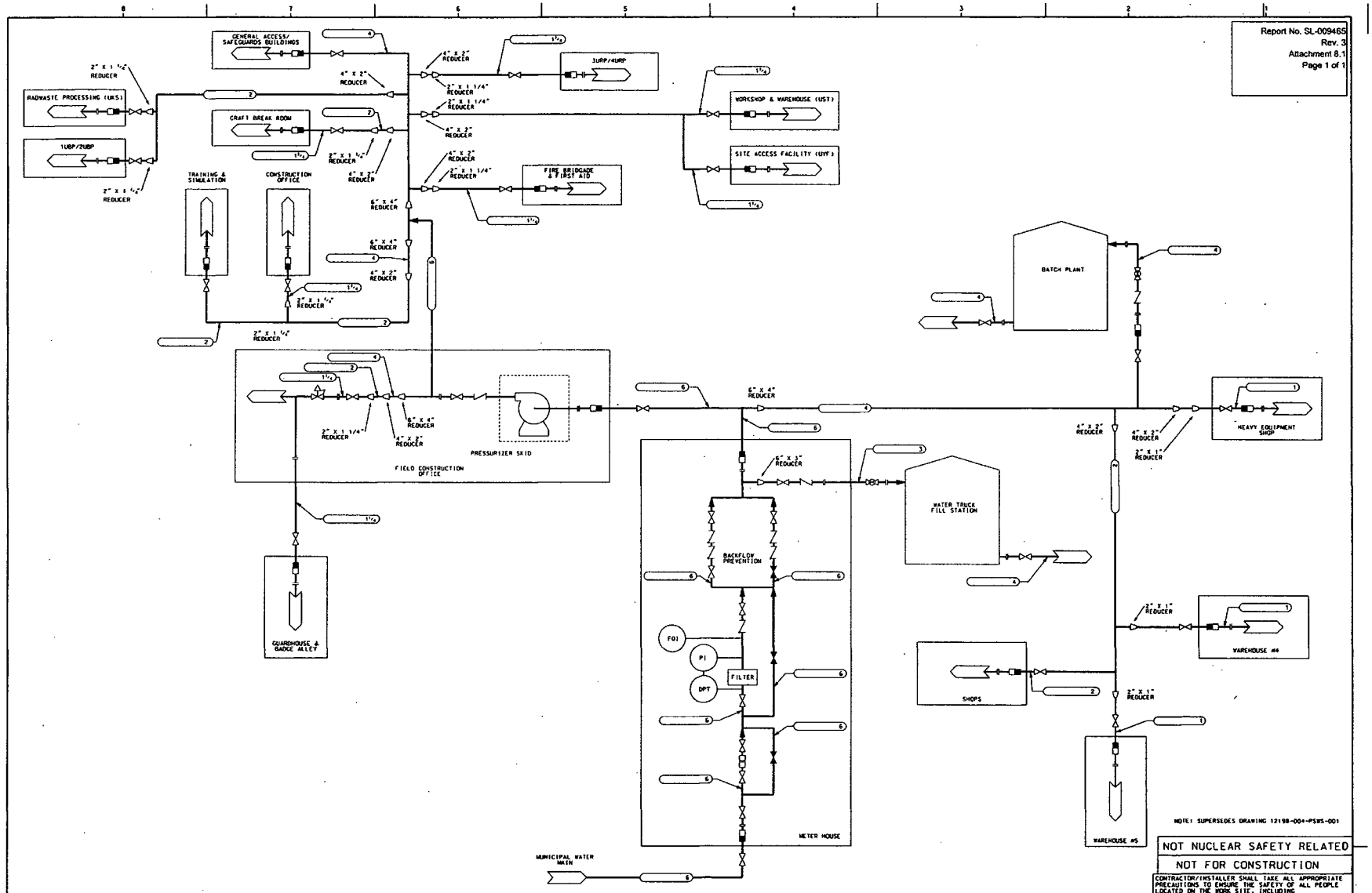
DRAWING NO. 12198-400-PSWS-002 REV. 0

SHEET 1 OF 1

12198-400-PSWS-002.dgn 9/9/2010 11:14:02 AM

Enclosure 4

Flow chart showing the movement of water through the facility (Conceptual Piping and Instrumentation Diagram, Potable Water System) (Map Size 11X17).



NOTE: SUPERSEDES DRAWING 12198-004-PSWS-001

NOT NUCLEAR SAFETY RELATED

NOT FOR CONSTRUCTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE. INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
0	07/20/10	A. AGOSTINO	L. ANDERSON		ISSUED FOR CAR	
0	09/01/10	A. AGOSTINO	L. ANDERSON		FOR USE	

SCALE: NONE

PROJECT NUMBER: 12198-415

CONCEPTUAL PIPING & INSTRUMENTATION DIAGRAM POTABLE WATER SYSTEM

BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Sargent & Lundy

DRAWING NO. 12198-400-PSWS-001

REV. 0

SHEET 1 OF 1

Enclosure 5

Public Water Supplier letter(s) of agreement

a. Joseph Woodward, PAWC, to Terry Harpster, PPL Bell Bend, "Re: Water Availability, Bell Bend Site, Salem Township, Luzerne County, PA." November 1, 2010.

b. Terry Harpster, PPL Bell Bend, to Bernard J. Grundusky, PAWC, "Bell Bend Nuclear Power Plant Water Service Application", March 3, 2011.

PENNSYLVANIA
AMERICAN WATER

Joe Woodward P 717-790-3028
852 Wesley Drive F 717-795-1915
Mechanicsburg, PA 17055
Joseph.Woodward@amwater.com

November 1, 2010

Terry Harpster
PPL Bell Bend, LLC
38 Bomboy Lane
Suite 2
Berwick, PA 18603

RECEIVED NOV 08 2010

RE: Water Availability
Bell Bend Site,
Salem Township, Luzerne County, PA

Dear Mr. Harpster:

Pennsylvania-American Water Company (PAWC) has received your request for public water availability at the above referenced site. PAWC does service this particular franchise territory and we intend to provide water service in strict accordance with the Tariff Rules and Regulations as filed with the Pennsylvania Public Utility Commission.

Please be advised that the developer will be required to pay for all improvements required to extend water to the site. This work may include but is not limited to water main extensions, pump stations, water storage tanks and other improvements as necessary

To assist us with the design of the main extension, it is mandatory for you to submit certain data for the sizing of the main, service and meter. Please submit the following information as soon as possible to avoid any delay in providing service.

- The latest site plan showing the proposed building layout and the meter pit location in correct scale.
- Plumbing Plans
- Sprinkler Plans – including a pump performance curve in applicable and hydraulic calculations
- Backflow Prevention Device Specifications
- Meter Pit

We are enclosing a PAWC Water Service Application and a PAWC Water Connection Form that will need to be completed for this service. We will require the aforementioned information be returned to this office for review as promptly as possible. We are also providing you with a copy of our current schedule of rates and standard master metering

PENNSYLVANIA
AMERICAN WATER

detail. There will be no tap fees or connection fees associated with the individual water service connection. There will be a one time, thirty dollar ($30) per service activation fee to set up the individual account. This fee will be included in the first month's water bill.

If you have any questions, please contact me at (717) 691-2108.

Sincerely,

Joseph Woodward
Manger – Central PA Field Operations

Cc: David Kaufman, PAWC Vice President – Engineering
Michael Salvo, PAWC Senior Director – Field Operations
Joel Mitchell, PAWC Project Manager – Engineering
Bernie Grundusky, PAWC Manager – Business Development

Office Use Only Premise # _____ NSI Account #

PENNSYLVANIA
AMERICAN WATER

WATER SERVICE APPLICATION

Please complete Property, Applicant and Signatures boxes below to apply for water service. Thank you for the opportunity to be YOUR water utility.

	HOUSE#	STREET PREFIX	STREET NAME & SUFFIX		
	MUNICIPALITY	APT/LOT#	CITY	STATE	ZIP CODE
	SEWAGE AUTHORITY	TYPE OF SERVICE: ( ) Residential ( ) Commercial ( ) Industrial ( ) Other _____ TYPE OF HEAT: ( ) Hot Water ( ) Forced Air ( ) Other _____			
	NAME (First, Middle, Last)		PHONE#	CELL#	
	NAME (First, Middle, Last)		PHONE#	CELL#	
	MAILING ADDRESS (if different than service address)				

(I) (We), the Applicant(s) for water service from Pennsylvania-American Water have read and understood the above application. (I) (We) will be jointly and severally bound by this application to:

1. Pay a one-time fee of $30.00 to cover the cost of setting up (MY) (OUR) account which will be added to your first bill. DO NOT SEND.

READ ABOVE STATEMENTS BEFORE SIGNING

	APPLICANT FOR SERVICE x	APPLICANT FOR SERVICE x
	DATE	DATE

FOR OFFICE USE ONLY PWSID:

USAGE DATA	WORK ZONE	AW AREA	DISTRICT CODE	CREW	WORK ORDER
SERVICE TAP DATE	TAP SIZE	SERVICE SIZE	SERVICE TYPE		
METER ROUTE	METER STOP	METER NUMBER	METER SIZE	# DIALS	
METER SET DATE	METER SET READING	METER LOCATION			
METER READ INSTRUCTIONS					
ADDITIONAL NOTES Rate Code _____ Sewage Code _____ Distribution Zone _____ Engineering Area _____					

Copy To: ( ) Dispatch ( ) Call Center ( ) ( ) ( ) ( ) WO File ( ) Other

Re: Potable Water Supply to Proposed Bell Bend Plant Site
Joel.Mitchell to: HOWARD.L.ANDERSON
Cc: JEFFERY.SALTARELLI, MAURY.A.PRESSBURGER

05/14/2010 03:10 PM

Larry,

A couple of minor comments/additions. See below. If you have any questions, please let me know.

Thanks,

Joel A. Mitchell, P.E.
Project Manager
Pennsylvania American Water
852 Wesley Drive
Mechanicsburg, PA 17055
Office # 717-691-2108
Fax# 717-790-3058
Cell # 717-943-5963
Nextel D.C. # 196*2*4048

HOWARD.L.ANDERSON
@sargentlundy.com

05/14/2010 03:50 PM

To
Joel.Mitchell@amwater.com
cc
MAURY.A.PRESSBURGER@Sargentlundy.com,
JEFFERY.SALTARELLI@sargentlundy.com
Subject
Potable Water Supply to Proposed Bell Bend Plant Site

Hi Joel,

Thanks for sending the service request form. I will forward it to PP&L, since I've been informed that they will need to submit it to Penn American Water.

Based on our phone conversation yesterday, I would like to confirm the following items:

Penn American will have no problem with supplying the requested 240 gpm flowrate. PAWC will provide service in accordance with our tariff, and should be able to provide the requested 240gpm.

A new water main will need to be run [approximately 5 miles] east of Berwick along Route 11 to Confers Lane, and from there to the customer's meter house. The customer would be required to cover the cost of the water main extension. The upcharge for over-sizing the pipe main to allow for supplying future customers would be covered by Penn American. The main extension, pump station and upsizing (if required) would be discussed and finalized as part of the Extension Deposit Agreement.
A minimum 40 psig supply pressure at the meter house will not be achievable without the installation of a pumping station, which would also be paid for by the customer. A minimum water pressure at the site meter house without use of a pumping station would be 25 psig. Looking at the elevation 3,200 feet along confers lane, should provide a STATIC pressure of approximately 35 psi. This does not take into account any headloss or variation in pressure due to system demand or your demand. Obviously these factors would impact the pressure at your point of connection.

If you have any corrections, comments or clarifications, please feel free to respond.

Thanks,

Larry Anderson
Sargent & Lundy, LLC
55 East Monroe Street
Chicago, IL 60603-5780
312.269.2464
Howard.L.Anderson@sargentlundy.com

PENNSYLVANIA-AMERICAN WATER COMPANY
WATER SERVICE CONNECTION FORMS
Page one of two

GENTLEMEN:

To review your request for a water service connection in Pennsylvania, the following information must be submitted. Please complete both copies of this form. All questions must be answered. Return the completed form, along with one copy of the site plan showing the water service diagram, to Pennsylvania-American Water Company, 852 Wesley Drive, Mechanicsburg, PA 17055-4475.

1. Owner's Name: _____ Phone No. _____

   Service Address: _____

   Billing Address: _____

2. Designer's Name: _____ Phone No. _____

   Address: _____

3. Plumber's Name: _____ Phone No. _____

   Address: _____

4. Information Furnished On This Form By:

   Name: _____ Phone No. _____

   Address: _____

5. Comments: _____

Continued on Next Page

PENNSYLVANIA-AMERICAN WATER COMPANY
WATER SERVICE CONNECTION FORMS
Page two of two

6. Type of Building: _____

7. Service Required and Size:	Yes	No	Size	Comments
Domestic:				
Irrigation:				
Fire Protection:				
Combined Service:				

8. Domestic Service Requirements: (At Point of Connection)
Maximum Service Demand in GPM: _____

Detail of Service:	Quantity	Fixtures or Equipment (describe)	GPM

9. Irrigation Service Requirements: (Residual at Point of Connection)
Maximum Flow Requested: _____ GPM at _____ PSI
Minimum Flow Requested: _____ GPM at _____ PSI

10. Fire Protection Service Requirements: (Residual at Point of Connection)
Fire Flow Requested: _____ GPM at _____ PSI
Number of Fire Hydrants: _____ and Capacity Each in GPM _____
Number of Hose Cabinets: _____ and Capacity Each in GPM _____
Number of Sprinklers: _____ and Capacity Each in GPM _____
Maximum Height of Sprinklers Above Ground Elevation: _____
Anti-Freeze Solution Being Planned into Fire ystem: Yes: No:

11. Schedule for Service: _____
Installation of Meter: Inside: _____ Outside (Pit): _____
Is There Access T (a) 115 VAC Power Yes: _____ No: _____
(b) Telephone Line Yes: No:

RULES AND REGULATIONS GOVERNING THE
DISTRIBUTION AND SALE OF WATER

26. Classification of Revenue

26.1 Residential

Sales to single premises residences, or to multiple premises residences, including apartment houses or apartment buildings, where each unit or premises is served through a separate meter.

26.2 Commercial

A. Sales to multiple premises residence served through a single meter or battery of meters.

B. Sales to all private institutions and organizations.

C. Sales to manufacturing or processing establishments where the water is not used principally in the manufacturing or processing functions.

D. Include sales to residences such as apartment and boarding houses, hotels, offices, office buildings, retail and wholesale commercial establishments, laundries, churches, private schools and colleges, private hospitals, private cemeteries, etc., where water is not used primarily for industrial purposes.

26.3 Industrial

A. Sales to manufacturing or processing establishments where the water is used principally in the manufacturing or processing functions.

B. Sales of water to manufacturing and industrial consumers such as steel works, automobile manufacturers, breweries, public utilities (other than sales to other water utilities), stock yards, packing houses, grain elevators, bottling works.

26.4 Municipal

A. Sales to governmental agencies (other than sales of water for resale).

B. Sales of water for municipal and other public purposes, other than public fire protection. Include sales for sewer and street flushing, also for street and sidewalk construction when done by the municipality. Also include sales such as the filling of public swimming pools, drinking and display fountains, parks, schools, hospitals, cemeteries, buildings. Sales of water for City, County, State and Federal uses are to be included in this classification.

26.5 Sales for Resale (C)

Sales to private or public water utilities where the water is to be resold to customers of the utilities.

Group A: Customers purchasing water as a primary source of supply as evidenced by their relationship of maximum day use to average day use.

Group B: Customers purchasing water for emergency or peak shaving purposes as evidenced by their relationship of maximum day use to average day use.

26.6 Private Fire Protection

Covers all unmetered charges for fire protection service other than charges for public fire protection.

26.7 Public Fire Protection

Charges rendered to municipalities for public fire hydrant (rental) stand-by charges.

RULES AND REGULATIONS GOVERNING THE
DISTRIBUTION AND SALE OF WATER

5. Meters and Meter Installations

5.1 Meter Installations (C)

The Company will furnish and install for each Customer, without charge, a suitable meter and will keep the same in repair. The customer, however, shall properly protect the meter from damage by frost or other causes and shall be held responsible for repairs or replacement of the meter made necessary by the negligence or intentional act of the customer.

5.2 Meter Space and Location

The Customer shall provide a safe, readily-accessible, and protected location for the installation of a meter at such point as will control the entire supply to the premise. The location must be acceptable to the Company as most convenient for its service so that the meter may be easily examined, read, or removed. In addition, at the Company's option, the Customer shall also provide a safe and readily accessible location outside of his residence for the installation of a remote meter reading device. If the Customer does not maintain ready access to the meter and the remote meter reading device, the Company may install an outside meter setting at the Customer's expense.

5.3 Automatic Meter Reading

The Company, without charge to the Customer, may install meters capable of being read automatically from a central location using telephone lines. To install this automatic meter reading equipment, the Company will require access to a telephone line of the premise receiving water service. If installation is denied, the Company may impose a meter reading fee equal to the cost of manually reading the meter or terminate service. If the automatic meter reading equipment can be installed, the Customer must provide the Company with the telephone number of the line to which the equipment will be connected and immediately advise the Company of any changes in the number.

5.4 Outside Meter Installations

At the Company's discretion, a meter shall be placed by the Customer in a meter tile or vault which meets the Company's specifications. Installation of the meter tile or vault shall be at the Customer's expense. The meter tile or vault shall be placed immediately inside the Customer's property line or at such other location as may be ordered by the Company.

RULES AND REGULATIONS GOVERNING THE
DISTRIBUTION AND SALE OF WATER
(Continued)

5.5 Meter Service

All service provided by the Company except public fire protection shall be metered.

5.6 Meter Installations for Flat-Rate Accounts and Unmetered Private Fire Services

Within 45 calendar days of notification by the Company, a flat-rate or unmetered private fire service Customer will provide a suitable meter setting at his own expense. The Company will provide the Customer with standard specifications for the meter setting. Any Customer who does not provide a suitable meter setting within the 45-day period will be subject to termination of service; or, at the option of the Company in the case of an unmetered fire service Customer, the installation will be made by the Company and a surcharge applied to the Customer's bill. The surcharge will be an annual fee equal to 17% of the total actual cost of installation.

5.7 Tampering with Meters or other Utility Equipment

When a meter or other utility equipment on a Customer's premises has been tampered with and the customer enjoys the use of or receives benefit from the water service intended to be metered, it may be reasonably inferred that the Customer tampered with the meter or other utility equipment. The penalties for tampering include but, are not limited to, termination of service, recovery by the Company of all costs related to the tampering, including payment for such water service as the Company may estimate from available information has been used but not registered by the Company's meter, and criminal sanctions pursuant to the laws of the Commonwealth.

SCHEDULE OF RATES APPLICABLE TO RATE ZONE 1
FOR ALL RATE CLASSES EXCEPT INDUSTRIAL

METER RATES

All water supplied by the Company for any and all purposes, excep Industrial, Qualified Private Fire Hydrants and Public Fire Hydrants, shall b metered as hereinafter set forth. All meters shall be read monthly o bimonthly and the water used shall be paid for in accordance with th following schedule of rates.

Service Charges
For All Rate Classes Except Industrial

All metered customers shall be subject to a monthly service charge, base on the size of meter required to render adequate service. (I)

Size of Meter	Service Charge Per Month Except Other Water Utilities	Service Charge Per Month Other Water Utilities Group A & B
5/8 inch	$ 13.00	$ 17.30
3/4 inch	19.60	26.40
1 inch	32.60	43.10
1-1/2inch	53.40	87.30
2 inch	85.40	138.60
3 inch	159.40	260.80
4 inch	200.10	434.00
6 inch	299.50	866.80
8 inch	579.90	1,386.90
10 inch	839.90	1,994.30
12 inch	1,313.53	3,121.90

Consumption Charges For all Rate Classes Except Industrial

The following rates shall apply per 100 gallons.

	FIRST 16,000/MONTH	NEXT 584,000/MONTH	ALL IN EXCESS OF 600,000/MONTH	
Residential	.7890	.7890	.7890	(I)
Commercial	.7656	.5869	.5869	(I)
Municipal	.7890	.6532	.6532	(I)
Other Water Utilities Group A	.5374	.5374	.5374	(I)
Other Water Utilities Group B	1.5142	1.5142	1.5142	

SCHEDULE OF RATES APPLICABLE TO RATE ZONE 1 FOR INDUSTRIAL RATE CLASS

METER RATES

All water supplied by the Company for Industrial purposes shall metered as hereinafter set forth. All meters shall be read monthly bimonthly and the water used shall be paid for in accordance with t following schedule of rates.

Service Charges For Industrial Rate Class

All metered customers shall be subject to a monthly service charge, bas on the size of meter required to render adequate service.

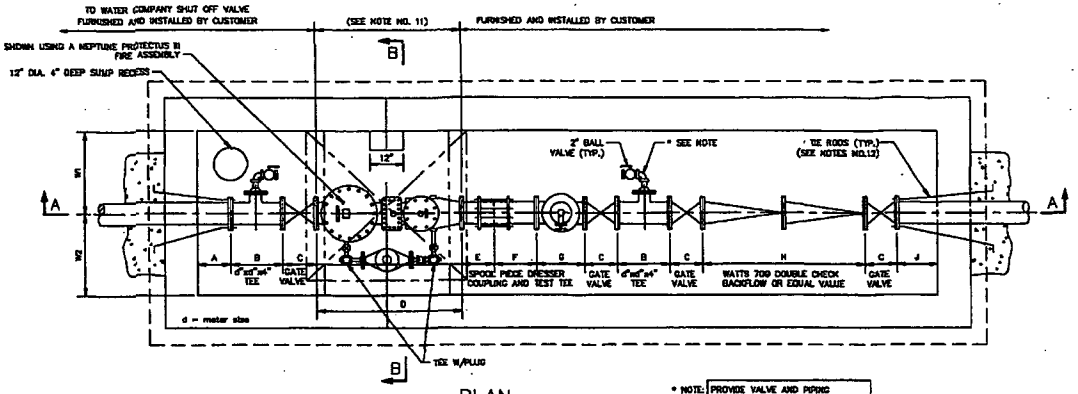
Size of Meter	Per Month
5/8 inch	$ 18.70
3/4 inch	28.10
1 inch	46.70
1-1/2 inch	93.40
2 inch	149.40
3 inch	280.70
4 inch	467.50
6 inch	933.90
8 inch	1,494.30
10 inch	2,148.50
12 inch	3,362.10

Consumption Charges For Industrial Rate Class (I)

The following rates shall apply per 100 gallons per month.

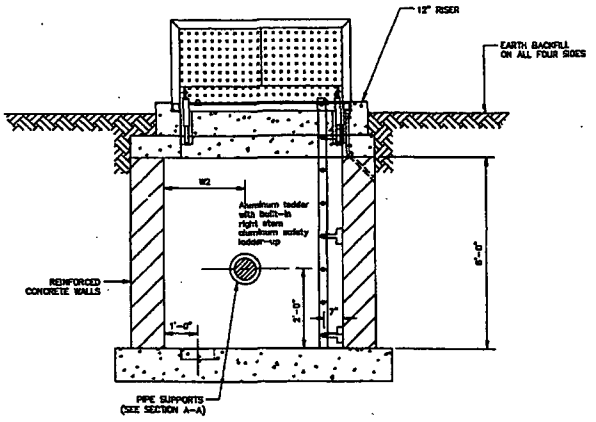
Industrial		Industrial Curtailment*	
First 16,000	.7890	First 16,000	.7890
Next 584,000	.5897	Next 584,000	.5897
All in Excess of 600,000	.4676	Next 14,400,000	.4676
		All In Excess Of 15,000,000	.3158

* Subject to the availability criteria and terms and conditions of t industrial curtailment rate (pages 9A1 and 9A2, hereof), the foregoi rates shall apply per 100 gallons per month for service provided under t Industrial Curtailment Rate.

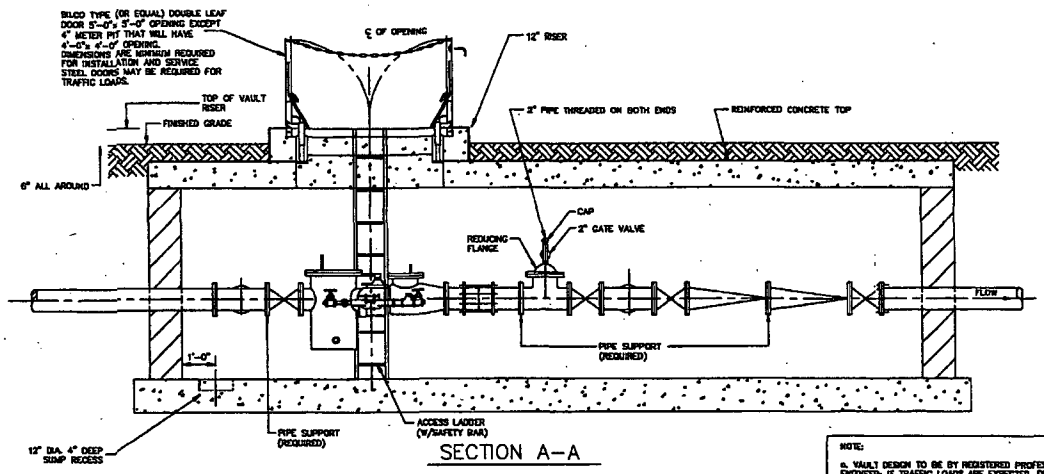


PLAN

* NOTE: PROVIDE VALVE AND PIPING SIZED TO MATCH PIPING ON METER BY - PASS.



SECTION B-B



SECTION A-A

DOOR LATCH TYPE		PADLOCKED (Specification)		SNAP SHUT (None)		CASTLE LOCK (Size No.)		(Comments)					
NEPTUNE PROTECTUS III LAYING LENGTHS													
METER SIZE	W1	W2	A	B	C	D	E	F	G	H		J	TOTAL
4"	30"	24"	12"	13"	9"	33"	6"	SEE NOTE 11	13"	37 1/8"		18"	16'-0"
6"	38"	30"	12"	16"	10 1/2"	45"	8"	SEE NOTE 11	16"	44 1/2"		18"	19'-6"
8"	36"	30"	12"	18"	11 1/2"	53"	12"	SEE NOTE 11	18"	53 3/4"		18"	22'-6"
10"	36"	30"	12"	22"	13 1/2"	66"	15"	SEE NOTE 11	22"	66 5/8"		18"	27'-0"

NOTES:

1. CUSTOMER TO CONSTRUCT METERING VAULT AS SHOWN TO MINIMUM DIMENSIONS AND GENERAL CONFIGURATION.
2. PIPE SUPPORTS, TIE RODS, ANCHORS AND THRUST BRACING AT FITTINGS AND VALVES SHALL BE PROVIDED SUFFICIENT, TO ALLOW PIPING TO STAND WITH REMOVAL OF METERS, FRICTION CLAMPS ARE NOT PERMITTED FOR RESTRAINT OF PIPING SYSTEMS.
3. DOUBLE CHECK BACKFLOW PREVENTION DEVICE IS REQUIRED AS SHOWN AND/OR BACKFLOW PREVENTION DEVICE OF REDUCED PRESSURE PRINCIPAL DESIGN MAY BE REQUIRED. THIS TYPE OF DEVICE IS TO BE INSTALLED ON THE SERVICE LINE, INSIDE AND AT THE POINT WHERE IT ENTERS THE BUILDING. (TYPE AND MANUFACTURES OF BACKFLOW DEVICE MAY AFFECT DIMENSIONS.)
4. 2" VALVES AND UNDER ARE I.P.S. 4" VALVES AND OVER ARE FLANGED - 125 P.S.I. CLASS FLANGE W/125 P.S.I. DRILLING.
5. IT WILL BE NECESSARY FOR THE CUSTOMER TO INSTALL PROPER DRAINAGE OR OTHER MECHANICAL MEANS TO KEEP VAULT DEWATERED.
6. WATER SERVICE WILL NOT BE PROVIDED UNTIL VAULT IS COMPLETED AS DETAILED. WATER COMPANY TO REVIEW FINAL DESIGN OF VAULT BY CUSTOMER FOR DIMENSIONS AND OVERALL CONFIGURATION.
7. GATE VALVES AND PIPING MUST BE SAME SIZE AS METER.
8. ALL VALVES AND BACKFLOW PREVENTORS TO BE MAINTAINED BY CUSTOMER.
9. BILCO TYPE DOOR SHALL BE CENTERED OVER METER ASSEMBLY AND ACCESS LADDER
10. METER ASSEMBLY WILL NOT BE INSTALLED UNTIL ALL PIPING IS COMPLETED IN THE VAULT. A FILLER PIECE SHOULD BE INSTALLED TO ASSURE PROPER ALIGNMENT OF FLANGES. METER ASSEMBLY FURNISHED AND INSTALLED BY PENNSYLVANIA - AMERICAN WATER COMPANY.
11. MUST BE SUFFICIENT TO CLEAR BREAK IN PIPING W/DRESSER COUPLING RING.
12. TIE RODS TO BE EMBEDDED IN CONCRETE OR BOLTED TO STEEL ON PLATES ON EXTERIOR WALLS. WATER COMPANY TO INSPECT BEFORE BACKFILLING. AS AN ALTERNATE, A MEGA-LUG MAY BE UTILIZED ON THE INSIDE OF THE PIT AS RESTRAINT.

PENNSYLVANIA CENTRAL REGION SPECIFIC NOTES:

a. INTERIOR SHALL HAVE A COATING OF COOPER'S CREEK BREATHABLE WHITE ENAMEL EPOXY.
b. ALL METER PITS SHALL HAVE AT LEAST A 12" RISER FOR THE DOOR.
c. PROVIDE A MINIMUM OF 12" BETWEEN THE TOP OF THE RISER AND THE FIRST STEP.
d. OMNI-SLEEVES SHALL BE INSTALLED WHERE PIPE PENETRATES THE VAULT WALL.
e. A SEPARATE DOMESTIC LINE CAN BE SPLIT OFF AFTER THE BYPASS LINE AND BEFORE THE BACKFLOW PREVENTER. A SEPARATE BACKFLOW PREVENTER MUST BE INSTALLED ON THE DOMESTIC LINE.
f. VAULT MANUFACTURER WILL DETERMINE THE FINAL SIZE OF THE METER VAULT. 10" METER VAULTS REQUIRE 6'-6" INSIDE HEIGHT.

NOTE:

a. VAULT DESIGN TO BE BY REGISTERED PROFESSIONAL ENGINEER. IF TRAFFIC LOADS ARE EXPECTED, DESIGN FOR AASHO H20 LOADING. DESIGN MUST PROVIDE FOR ALL EXPECTED FIELD CONDITIONS, INCLUDING SAFE WORKING ENVIRONMENT FOR WATER COMPANY PERSONNEL.
b. PA. AMERICAN WATER CO. MAY REQUIRE (IF THE VAULT TELEPHONE AND/OR POWER (120 VAC, 15 AMP) FOR "AMR" INSTALLATION OR SUMP PUMP FOR DRAINAGE.
c. IF PIT IS PROVIDED WITH ELECTRICAL SUPPLY PLEASE SUPPLY OUTSIDE DISCONNECT AND PROVISIONS FOR SUMP PUMP (FUTURE).
d. PRE-CAST VAULTS ARE AVAILABLE AND CUSTOMERS SHOULD VERIFY DESIGN BY THEIR ENGINEER.
e. VAULT AND METER INSTALLATION IS PA. AMERICAN WATER CO. STANDARD FOR OPTIMUM PERFORMACE AND DESIGN FOR INSTALLATION AND SERVICING. ALTERNATE DESIGNS MAY BE REQUIRED. PLEASE CONTACT PA. AMERICAN WATER CO. PERSONAL FOR REVIEW AND APPROVAL.

REVISIONS

MASTER METERING FOR COMBINED SERVICES (WITH BACKFLOW DEVICE IN PIT) SHOWN USING NEPTUNE PROTECTUS III FIRE ASSY

PENNSYLVANIA-AMERICAN WATER COMPANY
SE REGION OPERATIONS

PENNSYLVANIA-AMERICAN WATER COMPANY
SE REGION ENGINEERING
4 WELLINGTON BLVD. WYOMISSING, PA 19610

REV. BY: CHD
PROJECT CHK'R:
APPROVED:
DATE: 6/05/02
PROJECT:
USE DIMENSIONS ON SCALE; NOT TO SCA

USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

APPLICATION FEE WORKSHEET

Project Sponsor: PPL Bell Bend, LLC

Facility: Bell Bend Nuclear Power Plant

County: Luzerne **Municipality: Salem Township** **State: PA**

Table[1]	Project Category[2]	Source Location[3]	Requested Quantity (gpd)[4]	Municipal Fee (Yes/No)	Fee from Table
A	Approval by Rule	Pa. American Water Co-Berwick Canal Street Pumping Station	363,000	Yes	$ 2,875

[1] Application or modification. Use "A" for Application Fee Table and "M" for Modification Application Fee Table.
[2] Consumptive Water Use, Approval by Rule, Withdrawal, Diversion, etc.
[3] Name of withdrawal point (not applicable for Consumptive Water Use); e.g., Well 2A, Trout Creek, etc.
[4] Requested amount of water in gallons per day (gpd) based on peak 24-hour period (maximum 30-day average for groundwater withdrawals).

Amount Due	$ 2,875
Amount Paid	$ 2,875
Check Number	0035600241

T. L. Harpster
VP- Bell Bend Project-Development

PPL Bell Bend, LLC
38 Bomboy Lane, Suite2
Berwick, PA 18603
Tel. 570.802.8111 FAX 570.802.8119
tlharpster@pplweb.com

March 3, 2011

Mr. Bernard J. Grundusky
Pennsylvania American Water Company
852 Wesley Drive
Mechanicsburg, PA 17055

BELL BEND NUCLEAR POWER PLANT
WATER SERVICE APPLICATION
BNP-2011-047

Reference: 1) Joseph Woodward, PAWC, to Terry Harpster, "Water Availability Bell Bend Site, Salem Township, Luzerne County, PA", November 1, 2010

Per the above Reference, PPL Bell Bend, LLC is providing the requested Pennsylvania American Water Company (PAWC) Water Service Application and PAWC Water Connection Form. In addition, we are forwarding two project drawings:

1) Conceptual Layout Main Header Potable Water System and
2) Conceptual Piping & Instrument Diagram Potable Water System.

These drawings provide the detail of service and the site plan showing the water service including meter house. There are no sprinkler plans because this potable water service will not be supplying the fire protection water system. At this time we do not have a specific design of the backflow prevention devices. PPL does understand that you will want to know the manufacture and model number once selected.

We thank you for your cooperation to date in supporting delivery of potable water in support of the Bell Bend Nuclear Power Plant Project. If you should have any questions, require additional information or desire to have a site walkdown, please feel free to contact Mike Detamore [610.774.6385 or mbdetamore@pplweb.com] of our office.

Respectfully,

Terry L. Harpster

TLH/kw

Enclosures: 1) Water Service Application
2) Water Connection Form
3) Conceptual Layout Main Header Potable Water System
4) Conceptual Piping & Instrument Diagram Potable Water System

cc: (w/o Enclosures)

Ms. Judy Boudman
Township Manager, Salem Township
38 Bomboy Lane
P.O. Box 405
Berwick, PA 18603

Enclosure 1

Water Service Application

Office Use Only
Premise # _____

NSI Account #

PENNSYLVANIA AMERICAN WATER

WATER SERVICE APPLICATION

Please complete Property, Applicant and Signatures boxes below to apply for water service. Thank you for the opportunity to be YOUR water utility.

[redacted]	HOUSE#	STREET PREFIX	STREET NAME & SUFFIX From Berwick, PA north on Route 11 about 4.5 miles, left onto Conifers Lane for about 3,600 feet.		
	MUNICIPALITY Salem	APT/LOT#	CITY	STATE	ZIP CODE
	SEWAGE AUTHORITY Berwick Area Joint	TYPE OF SERVICE: ( ) Residential ( ) Commercial ( ) Industrial ( ) Other _____ TYPE OF HEAT: ( ) Hot Water ( ) Forced Air ( ) Other			
	NAME (First, Middle, Last) Terry L. Harpster		PHONE# 570-802-8111	CELL#	
	NAME (First, Middle, Last)		PHONE#	CELL#	
	MAILING ADDRESS (if different than service address) 38 Bomboy Lane, Suite 2 Berwick, PA 18603				

(I) (We), the Applicant(s) for water service from Pennsylvania-American Water have read and understood the above application. (I) (We) will be jointly and severally bound by this application to:

1. Pay a one-time fee of $30.00 to cover the cost of setting up (MY) (OUR) account which will be added to your first bill. DO NOT SEND.

READ ABOVE STATEMENTS BEFORE SIGNING

[redacted]	APPLICANT FOR SERVICE x	APPLICANT FOR SERVICE x
	DATE	DATE

FOR OFFICE USE ONLY PWSID:

USAGE DATA	WORK ZONE	AW AREA	DISTRICT CODE	CREW	WORK ORDER
SERVICE TAP DATE	TAP SIZE	SERVICE SIZE	SERVICE TYPE		
METER ROUTE	METER STOP	METER NUMBER	METER SIZE	# DIALS	
METER SET DATE	METER SET READING	METER LOCATION			
METER READ INSTRUCTIONS					
ADDITIONAL NOTES					

Rate Code _____ Sewage Code _____ Distribution Zone _____ Engineering Area _____

Copy To: ( ) Dispatch ( ) Call Center ( ) ( ) ( ) ( ) WO File ( ) Other

Enclosure 2

Water Connection Form

PENNSYLVANIA-AMERICAN WATER COMPANY
WATER SERVICE CONNECTION FORMS
Page one of two

GENTLEMEN:

To review your request for a water service connection in Pennsylvania, the following information must be submitted. Please complete both copies of this form. All questions must be answered. Return the completed form, along with one copy of the site plan showing the water service diagram, to Pennsylvania-American Water Company, 852 Wesley Drive, Mechanicsburg, PA 17055-4475.

1. Owner's Name: PPL Bell Bend, LLC Phone No. 570-802-8111
   Service Address: From Berwick, PA north on Route 11 about 4.5 miles, left onto Confers Lane for about 3,000 feet
   Billing Address: 38 Bombay Lane, Suite 2
   Berwick, PA 18603

2. Designer's Name: Vince Kelly Phone No. 610 774-7611
   Address: Two North 9th Street, GENPL4
   Allentown, PA 18101

3. Plumber's Name: Vince Kelly Phone No. 610 774-7611
   Address: Two North 9th Street, GENPL4
   Allentown, PA 18101

4. Information Furnished On This Form By:
   Name: Michael B. Delamore Phone No. 610 774-6385
   Address: Two North 9th Street, GENPL4
   Allentown, PA 18101

5. Comments: Service is for construction and operation of the Bell Bend Nuclear Power Plant

Continued on Next Page

PENNSYLVANIA-AMERICAN WATER COMPANY
WATER SERVICE CONNECTION FORMS
Page two of two

6. Type of Building: _____

7. Service Required and Size:	Yes	No	Size	Comments
Domestic:	✓			
Irrigation:		✓		
Fire Protection:		✓		
Combined Service:		✓		

8. Domestic Service Requirements: (At Point of Connection)
Maximum Service Demand in GPM: 240

Detail of Service:	Quantity	Fixtures or Equipment (describe)	GPM
See attached two drawings.			

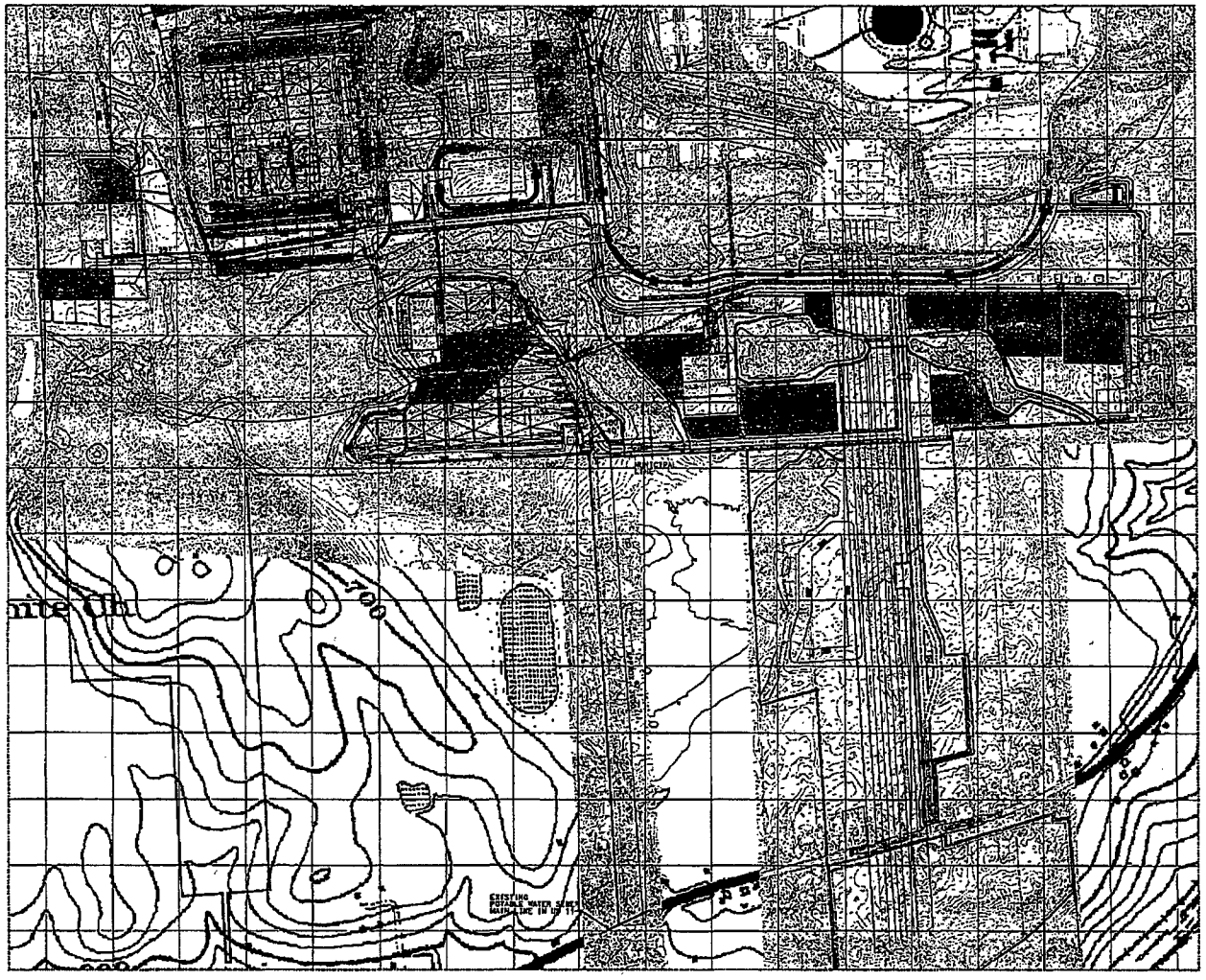
9. Irrigation Service Requirements: (Residual at Point of Connection)
Maximum Flow Requested: _____ GPM at _____ PSI
Minimum Flow Requested: _____ GPM at _____ PSI

10. Fire Protection Service Requirements: (Residual at Point of Connection)
Fire Flow Requested: _____ GPM at _____ PSI
Number of Fire Hydrants: _____ and Capacity Each in GPM _____
Number of Hose Cabinets: _____ and Capacity Each in GPM _____
Number of Sprinklers: _____ and Capacity Each in GPM _____
Maximum Height of Sprinklers Above Ground Elevation: _____
Anti-Freeze Solution Being Planned into Fire ystem: Yes: _____ No: _____

11. Schedule for Service: April 2013
Installation of Meter: Inside: ✓ Outside (Pit): _____
Is There Access T (a) 115 VAC Power Yes: ✓ No: _____
(b) Telephone Line Yes: ✓ No: _____

Enclosure 3

Conceptual Layout Main Header Potable Water System



LEGEND

——— POTABLE WATER LINE

NOT FOR CONSTRUCTION

NON-SAFETY RELATED

NOTES

1. THE BACKGROUND OF THIS DRAWING IS DRAWING NO. SK-12198-400-001 REV. 4, REDUCED SCALE SITE UTILIZATION PLAN.
2. THE LOCATION OF BUILDING CONNECTIONS IS APPROXIMATE. THE LOCATION OF THE CONNECTIONS WILL BE SET DURING FINAL DESIGN.
3. FOR BUILDING TYPES, REFER TO THE TABLE ON DRAWING SK-12198-400-001.

REFERENCE DRAWINGS

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTORS(S)) PERFORMING THE WORK.

DRAWING RELEASE RECORD														DRAWING RELEASE RECORD					
REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE					REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE				
										0	06/15/2010	P.MATHUR	L.ANDERSON		ISSUED FOR OAR				
										0	09/03/2010	S.B.MOORE	L.ANDERSON		FOR USE				

SCALE	1"=300'
PROJECT NUMBER	12198-415

CONCEPTUAL LAYOUT
MAIN HEADER
POTABLE WATER SYSTEM

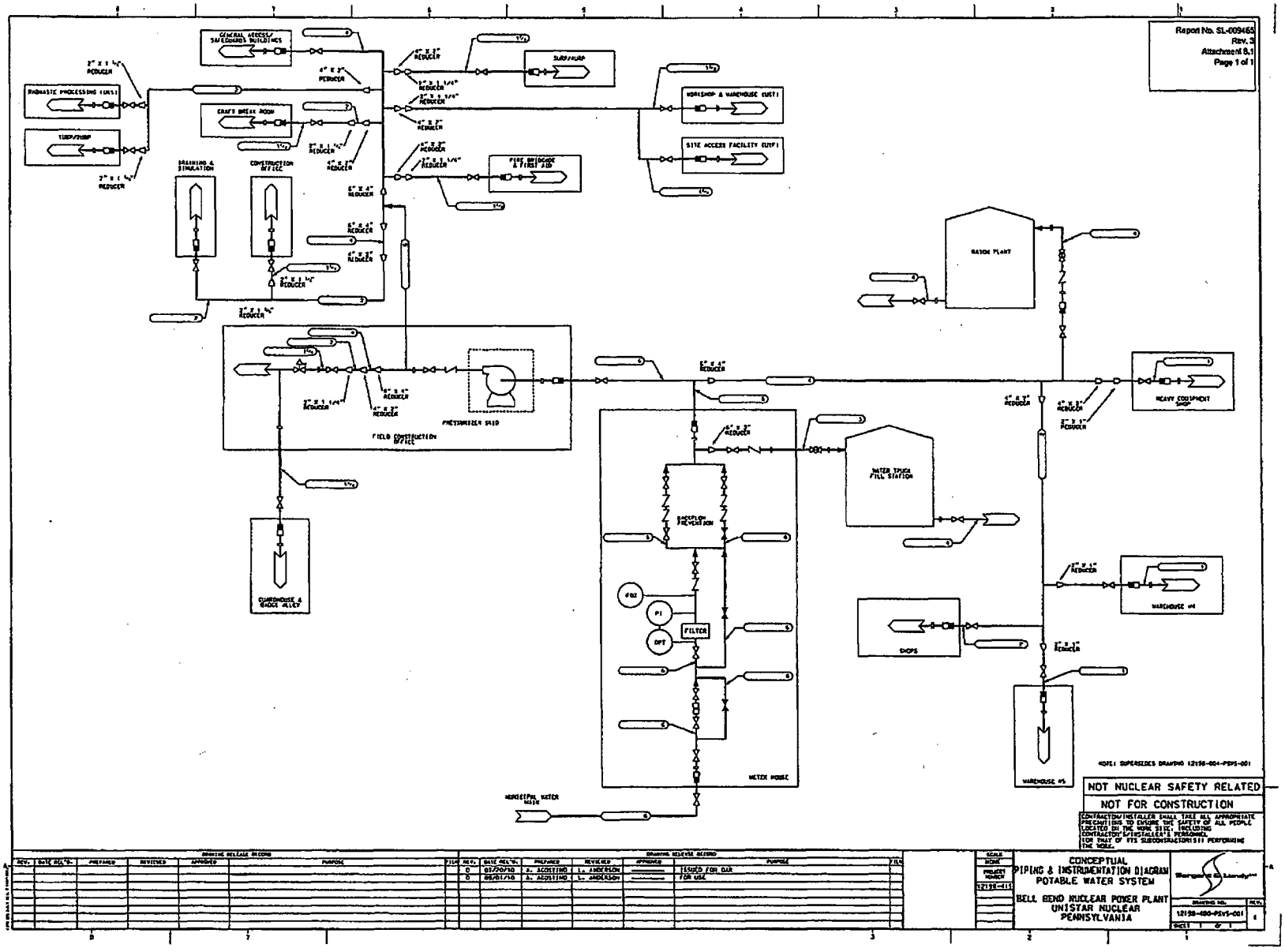
BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Bechtel & Burns

DRAWING NO.	REV.
12198-400-PSW5-002	0
SHEET 1 OF 1	

Enclosure 4

Conceptual Piping & Instrument Diagram Potable Water System


Report No. SL-009465
Rev. 2
Attachment 8.1
Page 1 of 1
GENERAL ACCESS/ SAFEGUARDS BUILDINGS
RADIASTIC PROCESSING UNIT
TURB/PUMP
CRAFT BREAK ROOM
SUMP/PUMP
WORKSHOP & WAREHOUSE (UNIT)
SITE ACCESS FACILITY (UNIT)
FIRE BRIGADE & FIRST AID
TRAINING & SIMULATION
CONSTRUCTION OFFICE
FIELD CONSTRUCTION OFFICE
PRETREATER SKID
WATER PLANT
HEAVY EQUIPMENT SHOP
WATER TRUCK FILL STATION
BACKFLOW PREVENTION
FIT
PI
DPT
FILTER
METER HOUSE
SHOPS
WAREHOUSE #5
WAREHOUSE #4
WAREHOUSE & RADIO ALLEY
MUNICIPAL WATER MAIN
NOT NUCLEAR SAFETY RELATED
NOT FOR CONSTRUCTION
CONCEPTUAL
PIPING & INSTRUMENTATION DIAGRAM
POTABLE WATER SYSTEM
BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA
12198-480-PSYS-001

Enclosure 6

Project Application Fee

APPLICATION FEE WORKSHEET

Project Sponsor: PPL Bell Bend, LLC

Facility: Bell Bend Nuclear Power Plant

County: Luzerne **Municipality: Salem Township** **State: PA**

Table[1]	Project Category[2]	Source Location[3]	Requested Quantity (gpd)[4]	Municipal Fee (Yes/No)	Fee from Table
A	Approval by Rule	Pa. American Water Co-Berwick Canal Street Pumping Station	363,000	Yes	$ 2,875

[1] Application or modification. Use "A" for Application Fee Table and "M" for Modification Application Fee Table.
[2] Consumptive Water Use, Approval by Rule, Withdrawal, Diversion, etc.
[3] Name of withdrawal point (not applicable for Consumptive Water Use); e.g., Well 2A, Trout Creek, etc.
[4] Requested amount of water in gallons per day (gpd) based on peak 24-hour period (maximum 30-day average for groundwater withdrawals).

Amount Due	$ 2,875
Amount Paid	$ 2,875
Check Number	0035600241

SUSQUEHANNA RIVER BASIN COMMISSION
SRBC
GENERAL FUND
PO BOX 4582
HARRISBURG PA 17111-4582

PPL Nuclear Development, LLC
Two North Ninth Street
Allentown PA 18101

Date: **03/08/2012** Check No.: **0035600241**
Vendor Code: **0000024063** Print No.: 78512000111
Total: **$********2,875.00**

Invoice Date	Invoice Reference	Message Code	Net Amount
02/28/2012	ConsumUseApprbyRule		2875.00

Message Code Key

If you would like to receive future payments electronically, or if you have any other inquiries regarding this remittance please contact Corporate Disbursements at 2 North 9th Street GENTW13, Allentown, PA 18101 or call (610) 774-4209. SH

THIS IS WATERMARKED PAPER - DO NOT ACCEPT WITHOUT NOTING WATERMARK - HOLD TO LIGHT TO VERIFY WATERMARK

PPL
Two North Ninth Street
Allentown, PA 18101

PPL Nuclear Development, LLC

No. **0035600241**

62-4 311

Void after 180 days

Date **03/08/2012**

$******2,875.00**

******Two Thousand Eight Hundred Seventy-Five and 00/100 US Dollars******

PAY TO THE ORDER OF:
SUSQUEHANNA RIVER BASIN COMMISSION
SRBC
GENERAL FUND
PO BOX 4582
HARRISBURG PA 17111-4582

The Bank of New York Mellon
Philadelphia, PA

Authorized Signature
78512000111

Dennis J. Murphy
Vice President

Pennsylvania Mines, LLC
Two North Ninth Street
Allentown, PA 18101-1179
Tel. 610.774.4316
djmurphy@pplweb.com

November 21, 2011

Andrew D. Dehoff, P.E.
Manager – Project Review
Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102-2391

PENNSYLVANIA MINES, LLC
RUSHTON MINE
APPLICATION FOR AQUIFER TEST PLAN WAIVER

Dear Mr. Dehoff:

Pennsylvania Mines, LLC submits the enclosed application for waiver of an aquifer test for the proposed operation of Rushton Mine as a groundwater withdrawal to provide flow augmentation for the mitigation of consumptive water use by PPL generating assets. Pennsylvania Mines is owner and operator of Rushton Mine and is a wholly-owned subsidiary of PPL Corporation.

Rushton Mine is an underground bituminous coal mine located in Centre and Clearfield counties, PA. Active mining ceased at Rushton Mine in 1991, and there are no plans to resume mining. The mine is currently operated solely to (a) pump water from the mine to control the mine pool in order to prevent undesirable breakout of untreated mine water and (b) treat the pumped mine water prior to discharging it to Moshannon Creek, all in accordance with permits issued by PA DEP.

PPL representatives presented the concepts of the proposed operation of Rushton Mine at a meeting with you and other Commission representatives on July 15, 2011; at that meeting, the Commission representatives encouraged submittal of the proposal to the Commission for its review and approval.

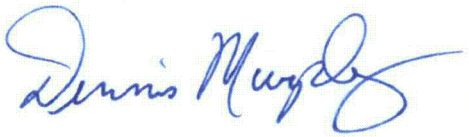
The proposed operation of Rushton Mine for flow augmentation will not require the project to be operated outside of the current discharge/treatment rates or pool levels, will not require any significant modification of facilities, and can be accomplished without

modification of the PA DEP permits. Nevertheless, PPL accepts the Commission's view that the change of purpose of operations justifies the Commission's review and approval. Consequently, PPL intends subsequently to submit an application for groundwater withdrawal at Rushton Mine.

For the specific reasons stated in the enclosed application, PPL believes that an aquifer test at Rushton is not necessary to allow the Commission to determine that Rushton Mine can be utilized for flow augmentation, within the proposed limits, without a significant adverse effect on the local or regional water table or groundwater users in the area, or on the water resources of the basin. Indeed, PPL expects to demonstrate that the proposal unquestionably will be beneficial to basin water resources.

PPL requests the Commission's prompt review and approval of this application for waiver of an aquifer test plan. Please contact Mr. Gary Petrewski at (610) 774-5996 or e-mail him at gpetrewski@pplweb.com if you have any questions.

Sincerely,



Dennis Murphy, Vice President
Pennsylvania Mines, LLC

Enclosure: Application to SRBC for Aquifer Test Plan Waiver for Use of Rushton Mine for Consumptive Water Use Mitigation, November 2011

Form #72
Revised 11/09

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed

PROJECT INFORMATION

1. Project Owner's Name, Registered Fictitious Name or Trade Name* Pennsylvania Mines, LLC

Address 2 North Ninth St.

City Allentown State PA Zip 18101

Type of Organization (Owner):

- ☐ Sole Proprietorship
- ☐ Corporation
- ☐ General Partnership
- ☐ Limited Partnership
- ☒ Limited Liability Company
- ☐ Limited Liability Partnership
- ☐ Government Agency
- ☐ Other

Authorized Contact Person Gary Petrewski Title Environmental Manager

Address (if different) 2 North Ninth St.

GENPL4

City Allentown State PA Zip 18101

Telephone (610) 774-5996 Fax (610) 774-2618 E-Mail gpetrewski@pplweb.com

2. Project Operator's Name or Registered Fictitious or Trade Name* (if different from No. 1) Same as No. 1

Address

City State Zip

Type of Organization (Operator):

- ☐ Sole Proprietorship
- ☐ Corporation
- ☐ General Partnership
- ☐ Limited Partnership
- ☐ Limited Liability Company
- ☐ Limited Liability Partnership
- ☐ Government Agency
- ☐ Other

3. Authorized Contact Person Same as above Title

Address (if different)

City State Zip

Telephone ( ) Fax ( ) E-Mail

4. Parent Corporation Name, and Registered Fictitious or Trade Name* (if different from No. 1): (Use additional sheets, if necessary, to describe the corporate hierarchy.) PPL Generation, LLC

Corporate Registration: Entity No. 23-3056813 State PA

Address (if different) 2 North Ninth St.

City Allentown State PA Zip 18101

* Please attach a copy of your Department of State, Division of Corporations, State Records and UCC (New York), Division of Corporations (Pennsylvania), or Department of Assessments and Taxation (Maryland) **approved** name registration or trade name registration.

5. All Proprietors, Corporate Officers and Directors, or Partners: (add as many lines as needed)

Name	Title	Address	Telephone	Fax	E-mail
William H. Spence	President	2 North Ninth St, Allentown, PA 18101	(610) 774-3683	(610) 774-5019	whspence@pplweb.com
Dennis J. Murphy	Vice President	Same	(610) 774-4316	(610) 774-4121	djmurphy@pplweb.com
James E. Abel	Treasurer	Same	(610) 774-5987	(610) 774-5235	jeabel@pplweb.com
Elizabeth Stevens Duane	Secretary	Same	(610) 774-4107	(610) 774-4177	esduane@pplweb.com

6. Corporate Contact:

Name Gary Petrewski

Title Environmental Manager

Address 2 North Ninth St.

GENPL4

City Allentown State PA Zip 18101

Telephone (610) 774-5996 Fax (610) 774-2618 E-Mail gpetrewski@pplweb.com

7. Project Hydrogeologist:

Name David M. Anderson, P.G. Title Senior Geologist

Company Moody and Associates, Inc

Address 11548 Cotton Road

Meadville, PA 16335

Telephone (814) 724-4970 Fax (814) 724-4973 E-Mail danderson@moody-s.com

P.G. License No. PG1435G State PA Expiration Date 09/30/2013

8. Project Engineer:

Name Jan C. Phillips, P.E. Title NA

Company Jan C. Phillips, P.E.

Address 2611 Walnut Street

Allentown, PA 18104-6230

Telephone (610) 821-0160 Fax (610) 821-0160 E-Mail jcphllps@enter.net

P.E. License No. PE017909E State PA Expiration Date 9/20/2013

9. Representing Attorney, if applicable:

Name

Firm

Address

Telephone ( ) Fax ( ) E-Mail

10. Name(s) and Signature(s) of Preparer and Project Owner:

The undersigned representatives of the project sponsor certify, under penalty of law (or perjury), as provided by 18 Pa. C.S.A. §4904; Section 210.45, of the New York Penal Law; Section 9-101 Maryland Crimes Code and 28 U.S.C. §1746, attest that the information for all parts contained herein and all information accompanying this application(s) is true and correct, and that they are authorized to act as representatives on behalf of their respective corporate entities.

Preparer Name Jan C. Phillips, P.E. Date 11-4-2011

Signature

Title Consultant

Company Jan C. Phillips, P.E.

Preparer Name David M. Anderson, P.G. Date 11-4-2011

Signature

Title Senior Geologist

Company Moody and Associates, Inc.

Project Owner Name Dennis J. Murphy Date 11-4-2011

Signature

Title Vice President

Company Pennsylvania Mines, LLC

(P.G. Seal)

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
PROFESSIONAL
DAVID M. ANDERSON
GEOLOGIST
PG

(P.E. Seal)

Notes:

1. Mark any information on the application that is considered confidential or proprietary.
2. Items 1 through 6 and 10 are required, and items 7 through 9 are project specific.

PENNSYLVANIA MINES, LLC

APPLICATION TO SRBC FOR AQUIFER TEST PLAN WAIVER FOR USE OF RUSHTON MINE FOR CONSUMPTIVE WATER USE MITIGATION

NOVEMBER 2011

PENNSYLVANIA MINES, LLC

APPLICATION TO SRBC FOR AQUIFER TEST PLAN WAIVER
FOR
USE OF RUSHTON MINE FOR CONSUMPTIVE WATER USE MITIGATION

NOVEMBER 2011

TABLE OF CONTENTS

APPLICATION TO SRBC FOR AQUIFER TEST PLAN WAIVER
FOR
USE OF RUSHTON MINE FOR CONSUMPTIVE WATER USE MITIGATION

NOVEMBER 2011

Section 1. Background Information

Rushton Mine is owned and operated by Pennsylvania Mines, LLC, a wholly-owned subsidiary of PPL Corporation. Rushton Mine is located in Centre and Clearfield counties, Pennsylvania, in the townships of Decatur (Clearfield) and Rush (Centre) and the boroughs of Osceola Mills (Clearfield) and South Philipsburg (Centre). The mine opened in 1963. Mining ceased in 1991. There are no plans to resume mining at Rushton.

Figure 1 is a map of the Rushton Mine property and surface facilities. The location of the mine's underground workings is shown in Figure 2 of APPENDIX B. (APPENDIX B is the report of a drawdown test of Rushton Mine conducted in the fall of 2005.)

Rushton Mine is operated under PA DEP Bituminous Coal Mining Activity Permit No. 14831301 (NPDES #PA0600156) initially issued in 1985. The permit was most recently renewed in March 2010 (APPENDIX C-1), and revised in January 2011 (APPENDIX C-2). The mined area under permit is approximately 5,900 acres and varies in elevation between approximately El. 1240 ft and El. 1660 ft.[1]

Rushton Mine also operates under PA DEP Coal Refuse Disposal Permit No. 14743701 (NPDES # PA008966), issued September 2008 (APPENDIX D).

Current operation consists of: pumping water from the mine; treating the water withdrawn by means of an aeration, lime slurry and settling pond system; discharging treated water to Moshannon Creek; and returning settled sludge to the mine.

A main pump and an identical spare pump are set in the main mine pool borehole. The pumps are variable-speed, high-head turbine pumps. The intake of the main pump is set at El. 1365 ft; the intake of the spare pump is slightly higher. Normally, only one pump is operated, but the two pumps can be operated in parallel, at reduced speed and load; this occurs during wet conditions as were experienced in September and October 2011. Total pumping capacity varies with mine pool level and is limited by power supply to the pumps. The nominal maximum pumping-treatment capacity is 7.6 mgd as limited by the capacity of the main mine pool pump and the treatment system. Occasional pump discharge up to approximately 8 mgd has been estimated. The nominal maximum treatment capacity is expected to be increased to approximately 8.5 mgd by the addition of pre-aeration tanks in 2012, following which more frequent two-pump operation is expected.

[1] All elevations in this application are considered to be feet mean sea level.

The two settling ponds have a combined area of approximately 4.4 acres. Sludge is collected from the settling ponds, conveyed to a sludge retention pond (area approximately 0.8 acres) and re-injected into the mine at a nominal rate of 0.7 mgd. The nominal maximum discharge to Moshannon Creek is thus approximately 6.9 mgd. The ponds act to attenuate fluctuation of discharges to the creek.

The discharge to Moshannon Creek is gravity flow. There are two return flow outfalls to Moshannon Creek (NPDES permit outfalls 001 and 005). Measuring weirs were put into use on these two outfalls in January 2011. The locations of the measuring weirs and outfalls to Moshannon Creek are shown on Figure 1.

Figure 2 is a schematic diagram showing the principal water flows at Rushton.

Good pumping discharge and mine pool elevation data are available since 1997. From January 1997 through September 2011, the average rate of pumping from the mine was approximately 5.1 mgd, and monthly average pumping rates ranged from 3.0 mgd to 8.0 mgd. Table 1 presents monthly average gross pumping rates from 1997 through September 2011.

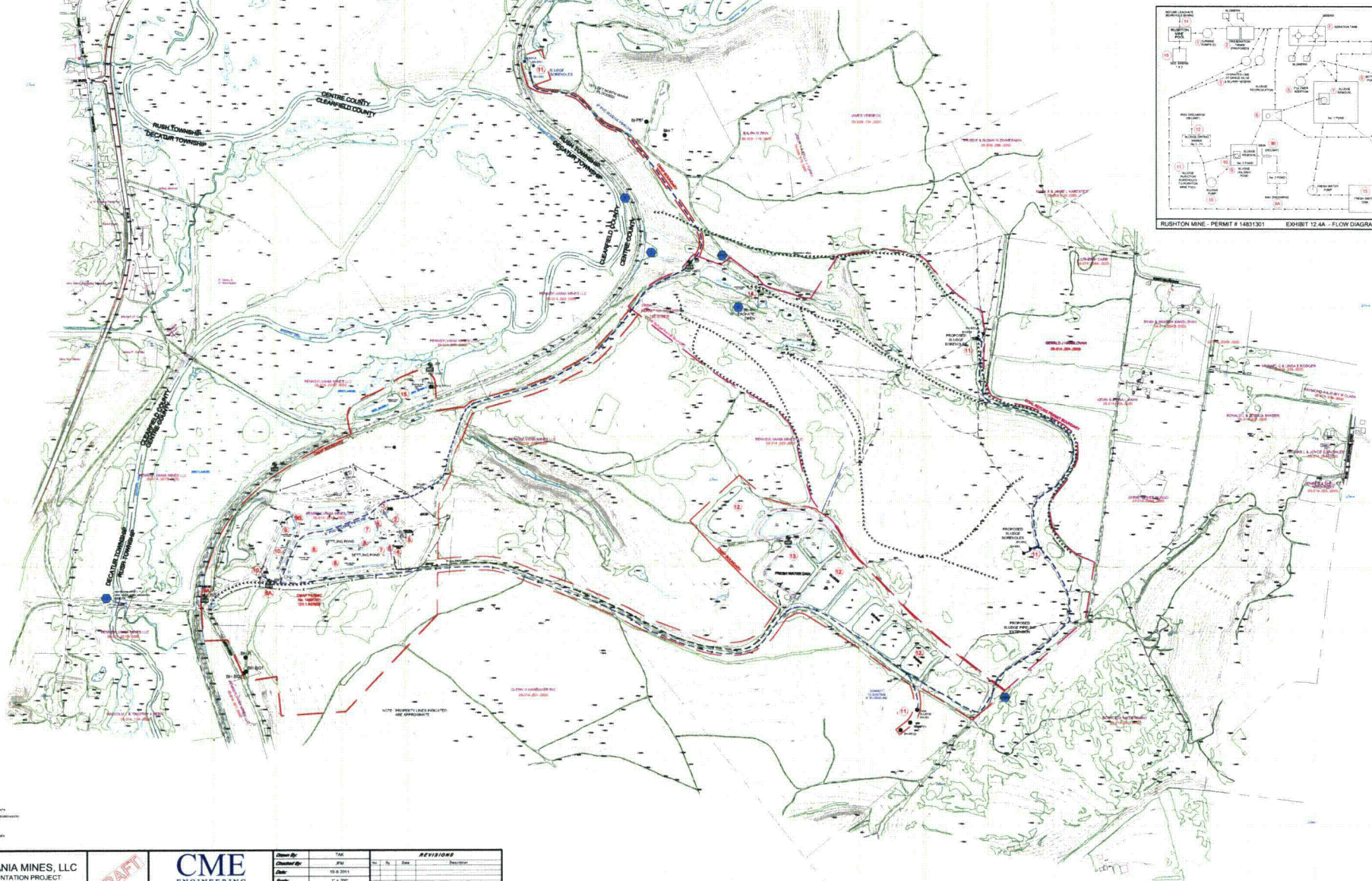
There is potential for off-site breakouts of untreated water when the mine pool level exceeds El. 1420 ft, and this is considered to be the nominal maximum pool level permitted. Consequently, Pennsylvania Mines attempts to control the mine pool level at or below approximately El. 1418.5 ft in order to provide a margin of safety in the event of loss of power or other malfunctioning of the pumps. With the present pumping equipment and configuration, the mine pool can be lowered at least to El. 1379.5 ft.

The mine pool typically rises in the winter and spring and falls through summer and fall. Daily mine pool levels are available since 1997. During 1997-2010 monthly average pool levels fluctuated between El. 1385 ft and El. 1420 ft, averaging approximately El. 1406 ft. Figure 3 depicts average monthly pool levels from January 1997 through September 2011.

PPL proposes to use the void volume in Rushton Mine as an underground storage reservoir from which to provide flow augmentation for consumptive use mitigation at PPL facilities. The operational elevation limits presently envisioned are from El. 1418.5 ft (or possibly as high as El. 1420.0 ft) to El. 1379.5 ft. Table 2 shows the estimated void volume in the Rushton Mine at 10-ft intervals below El. 1420 ft. From the table, the void volume between El. 1379.5 ft and El. 1418.5 ft is estimated as 181 million gallons (mg). The mine pool would be maintained at the maximum level at the beginning of the low flow season and drawn down as flow conditions in the Susquehanna River Basin require to provide at least 180 mg of flow augmentation. Over a 90-day flow augmentation period, this operation would provide 2.0 million gallons per day (mgd) of flow augmentation for consumptive use mitigation. Following a low flow season, the pool would be allowed to refill. Under the proposed operation, the maximum gross withdrawal rate would remain at 7.6 mgd as

limited by the capacity of the present facilities, except during unusually wet conditions when the proposed pre-aeration treatment will provide sufficient treatment capacity for two-pump operation. The area of the pool affected by fluctuation between El. 1380 ft and El. 1420 ft would be primarily within the Centre County portion of the mine.

The drawdown test conducted in 2005 indicated that the rate of recharge is not affected by the drawdown. Thus, the total amount of the withdrawal in any year would not change whether or not the mine is operated for low flow augmentation in that year.



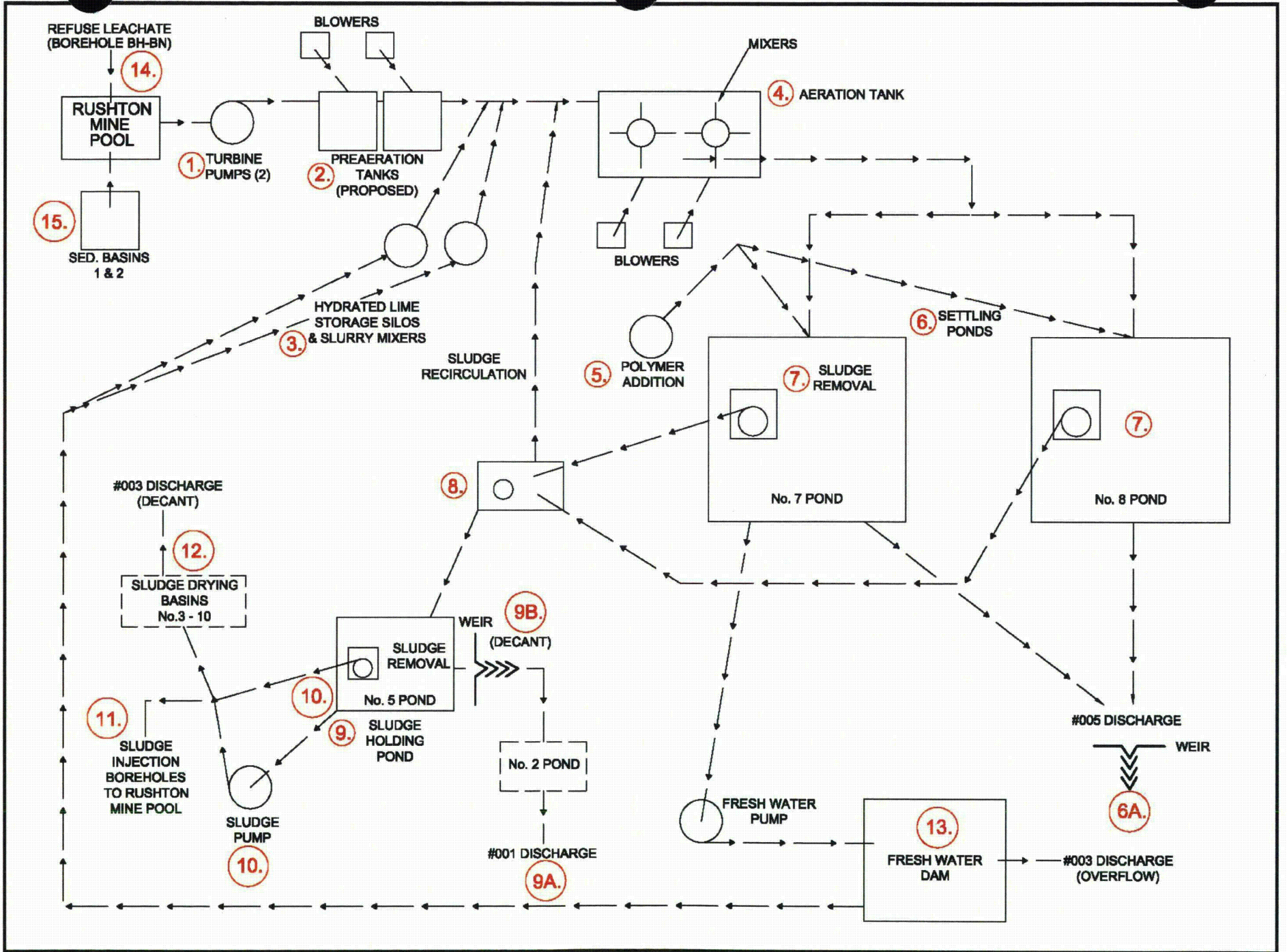
PENNSYLVANIA MINES, LLC
FLOW AUGMENTATION PROJECT
RUSHTON MINE SURFACE AREA - 2009
DECATUR & RUSH TOWNSHIP
CLEARFIELD & CENTRE COUNTY, PENNSYLVANIA

DRAFT

CME
ENGINEERING
CME ENGINEERING LP
975 Georges Station Rd, Ste 100, Greensburg, PA 15601
724-532-4800 FAX: 724-532-4801

Drawn By:	TAK
Checked By:	JFM
Date:	10-6-2011
Scale:	1" = 200'
Project No.	SR53-L010
File Name:	Rushton Flow Augmentation
Sheet No:	1 of 1

REVISIONS			
No	By	Date	Description



RUSHTON MINE - PERMIT # 14831301 EXHIBIT 12.4A - FLOW DIAGRAM AMD TREATMENT SITE

FIGURE 3

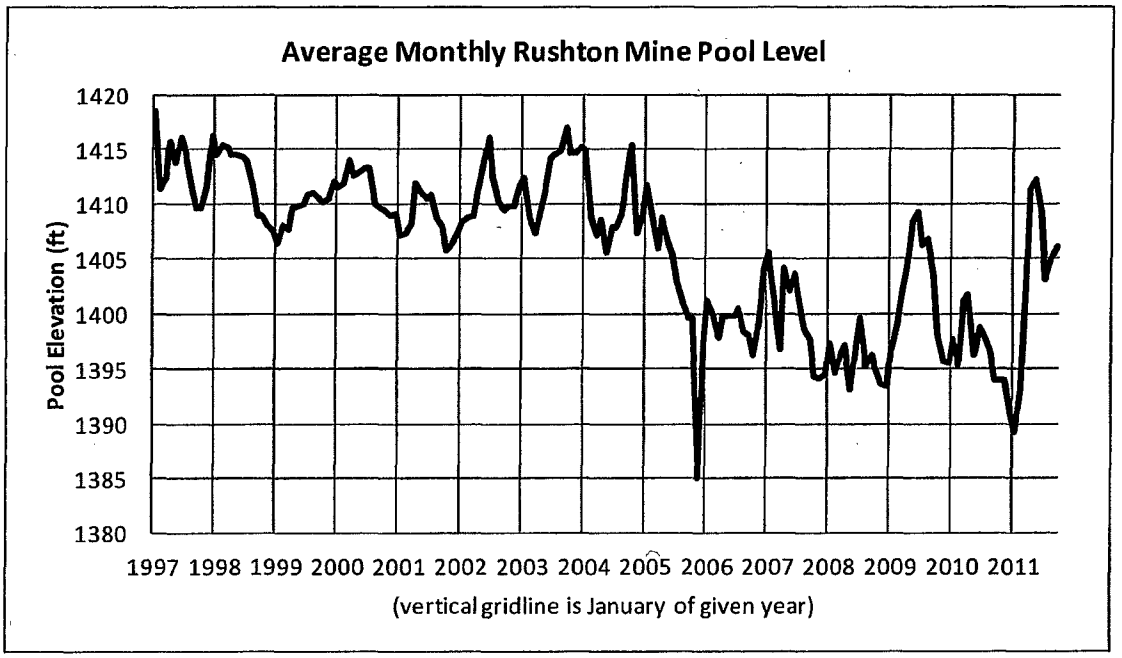

Average Monthly Rushton Mine Pool Level
Pool Elevation (ft)
1420
1415
1410
1405
1400
1395
1390
1385
1380
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
(vertical gridline is January of given year)

TABLE 1. RUSHTON - GROSS PUMPING (MGD)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1997	4.3	5.2	5.9	5.6	4.5	5.3	4.6	4.1	4.5	3.8	3.8	5.0
1998	5.4	5.6	6.8	6.2	7.0	4.9	4.3	4.3	4.3	3.4	3.1	3.9
1999	3.6	5.4	5.7	5.7	4.6	4.4	3.2	3.4	3.4	3.1	3.4	3.6
2000	4.1	4.2	5.8	6.1	5.9	4.7	4.3	4.2	3.4	3.5	3.6	4.1
2001	4.2	4.5	6.4	5.8	4.6	4.2	3.8	3.7	3.4	3.6	3.2	3.1
2002	3.7	4.1	4.6	6.3	5.6	7.0	5.6	4.2	3.3	3.8	3.8	4.0
2003	6.1	6.2	6.6	7.2	5.2	5.5	4.7	6.0	6.2	6.9	6.4	6.7
2004	7.2	6.0	6.9	7.1	6.3	4.8	4.6	5.3	5.3	6.6	5.4	6.3
2005	6.6	6.8	6.5	6.1	4.8	4.8	3.0	4.3	3.2	5.1	4.5	3.4
2006	6.1	6.9	5.3	4.2	4.7	4.7	3.9	4.6	4.1	4.4	4.1	4.2
2007	5.3	7.0	6.8	7.2	7.1	4.7	4.6	4.6	4.1	4.8	3.1	4.1
2008	5.9	6.9	7.6	7.6	6.3	4.7	4.8	4.3	4.0	3.8	3.3	5.0
2009	5.7	5.7	5.4	4.7	3.6	4.5	4.6	4.7	4.7	4.9	4.4	6.2
2010	7.0	7.7	7.7	7.6	7.2	5.2	4.7	4.7	4.8	4.2	4.7	8.0
2011	6.3	6.0	5.6	7.6	7.5	6.6	4.4	4.9	6.4			
average	5.4	5.9	6.2	6.3	5.6	5.1	4.4	4.5	4.4	4.4	4.0	4.8
max	7.2	7.7	7.7	7.6	7.5	7.0	5.6	6.0	6.4	6.9	6.4	8.0
min	3.6	4.1	4.6	4.2	3.6	4.2	3.0	3.4	3.2	3.1	3.1	3.1

Prior to 2011, the gross amount of water pumped from the mine each day was determined by multiplying the pump run time by the estimated pumping rate. Beginning with the installation and operation of the measuring weirs on the two outflows to the creek early in 2011, the amount of water pumped has been estimated as the total outflow measured by the weirs less the estimated volume of sludge returned to the mine. During months of continuous or near-continuous pumping, the average pumping rate determined by the methods used can exceed the nominal pumping capacity (7.6 mgd).

TABLE 2. Estimated Rushton Mine Void Space below Elevation 1420 [Note 1]

Interval Elevations (feet)	Interval Area Mined (acres)	Interval Mine Void Volume (million gallons) [Note 2]	Cumulative Mine Void Volume (million gallons)
1420-1410	46	45	45
1410-1400	43	42	87
1400-1390	45	44	131
1390-1380	54	53	184
1380-1370	74	72	256
1370-1360	118	115	371
1360-1350	169	165	536
1350-1340	179	175	711
1340-1330	162	159	870
1330-1320	187	182	1,053
1320-1310	205	200	1,253
<1310	795	777	2,030
Total interval area mined	2077		

Notes: [1] Table from Moody Report, APPENDIX B to this application
[2] Coal seam assumed five feet thick with 60 percent of coal removed.

Section 2. Hydrogeologic Description

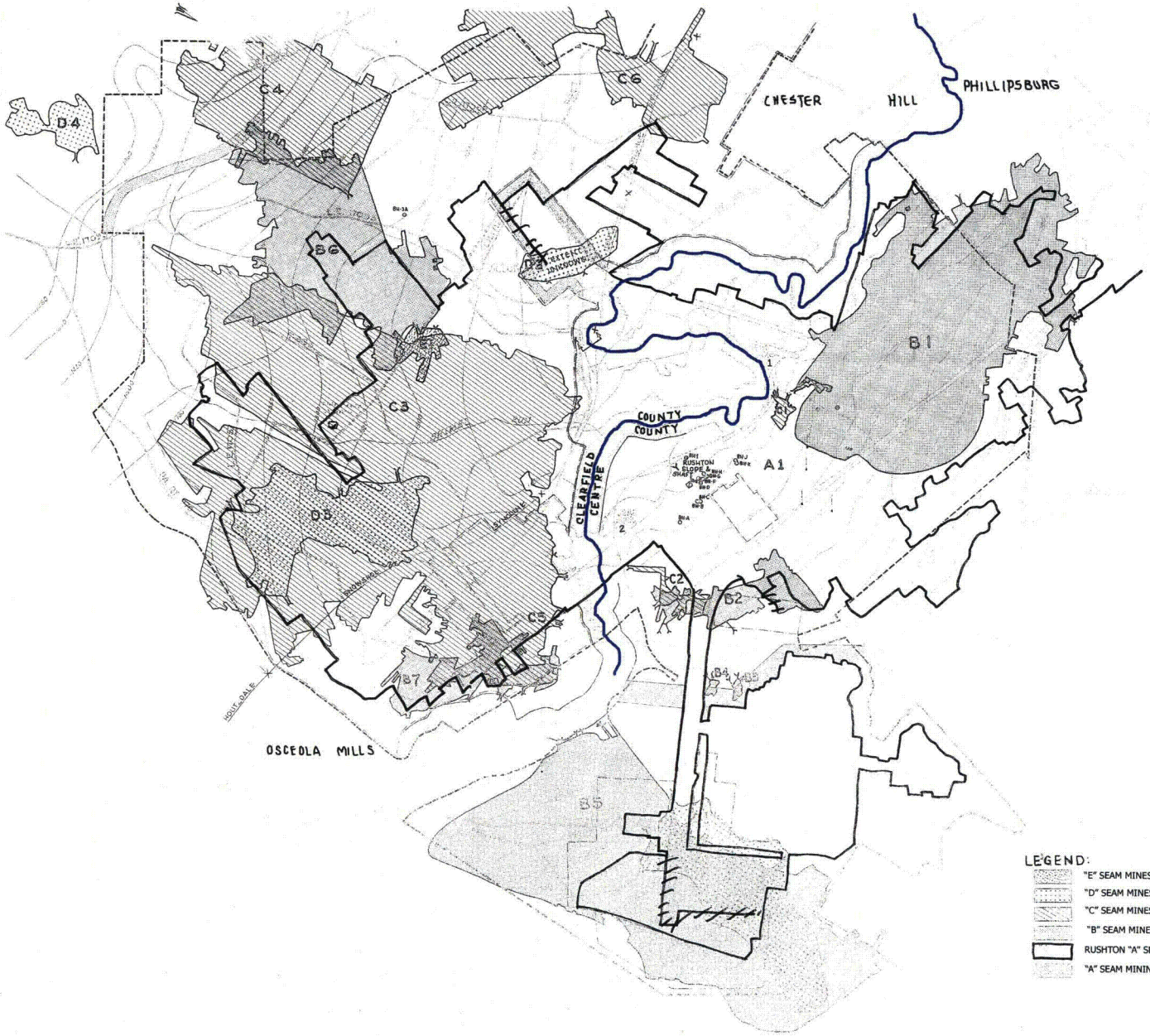
Rushton Mine is located on the eastern boundary of the bituminous coal field, in the Clarion or "A seam" coal seam which is the base of the Pennsylvanian-aged Allegheny Group. The A seam is nominally 5 ft thick in the area of Rushton Mine. The mine is located along the axis of the Houtzdale – Snowshoe Syncline. The syncline plunges towards the northeast. Moshannon Creek flows through the center of the mine area and roughly follows the syncline axis. Figure 2 in the pump test report (APPENDIX B) is a topographic map which shows the extent of mining, coal seam contours and the syncline axis. Coal elevations in Rushton Mine range from approximately El. 1240 ft to El. 1660 ft.

Moshannon Creek meanders generally south to north in the vicinity of Rushton, between Osceola Mills on the south and Philipsburg and South Philipsburg on the north. The creek elevation above Rushton Mine varies approximately from El. 1440 ft at the south (upstream) end to El. 1400 ft at the north (downstream) end.

Rushton Mine is overlain by several coal strata (seams) and approximately 18 abandoned mines in those strata. Figure 4 is a map of the overlying mines. These mines form individual pools with their own discharges at the elevations shown in the legend on the mines map.

The pumping test of 2005 indicated no effect at any monitoring point, including Moshannon Creek, indicating that the Rushton Mine is relatively isolated hydraulically from the surface or overlying strata. Overlying surficial features and water table are of no consequence.

Estimated inflow (recharge) rates to the mine are presented in Section 3.



Abandoned Mines on East Flank of Moshannon Creek

Key	Mine Name	Seam Name	Total Openings
A1	Rushton Mine	A Seam	2
B1	Moshannon 11 Mine	B Seam	6
B2	Beaver No. 1 Mine	B Seam	3
B3	Beaver No. 2 Mine	B Seam	2
B4	Beaver No. 3 Mine	B Seam	1
B5	Moshannon 10 Mine	B Seam	7
C1	Pauline Mine	C Seam	3
C2	Brighton Mine	C Seam	2
D1	Eureka	D Seam	11

Abandoned Mines on West Flank of Moshannon Creek

Key	Mine Name	Seam Name	Total Openings
B6	Monarch Nine	B Seam	2
B7	Columbia No. 1 Mine	B Seam	5
C3	Associated Drilling	C Seam	2
C4	El-Coal Mine	C Seam	4
C5	Spark Plug Mine	C Seam	10
C6	Baltic Mine	C Seam	2
D2	Passmore Mine	D Seam	2
D3	Mapleton Mine	D Seam	4
D4	Coaldale No. 4 Mine	D Seam	1
E1	Roading No. 2 Mine	E seam	4

* - Stripped through portion of mine
** - Sealed at entry - Mine pool elevation greater than discharge elevation

Section 3. Groundwater Availability

Precipitation falling within contributing groundwater basin is the source of recharge to the Rushton Mine. The contributing groundwater basin for the Rushton Mine has been defined as the Moshannon Creek water shed and the area of the Clarion coal seam up dip of the mine. Figure 5 is a topographic map showing the basin boundaries. Figure 6 is a geologic map showing the extent of the Clarion coal seam and the basin boundaries. On Figure 6, the base of the Allegheny Group is assumed to be the extent of the Clarion coal seam.

The area of the contributing groundwater basin shown on Figures 5 and 6 is 150 square miles.

An annual recharge rate of 17.2 inches for the Moshannon Creek water shed was utilized in the groundwater availability determination. The recharge rate was obtained from "Estimates of Ground-Water Recharge Based on Streamflow-Hydrograph Methods: Pennsylvania" (Risser, et al, 2005). The estimated annual recharge for Moshannon Creek at Osceola Mills, determined using the PART method, was 17.2 inches.

The SRBC – Aquifer Testing Guidance specifies that the recharge rate during a 1-in-10 year drought or 60 percent be used in calculating the groundwater availability. The estimated groundwater availability for the Rushton Mine is 73.7 mgd during a 1-in-10 year drought. A summary of the groundwater availability calculation is presented in Table 3.

Data from 1997 to the present indicate that the average actual recharge rate to Rushton Mine is approximately 4.6 mgd. Dry-season recharge is approximately 2.9 mgd; this is the estimated recharge rate for the lowest three-month period (August-October 1999). The proposed operation of Rushton Mine for flow augmentation considers that if the recharge were 2.9 mgd for the entire augmentation season, average pumping at 4.9 mgd would provide 2.0 mgd of flow augmentation while essentially utilizing the full amount of void space in approximately 90 days. If the recharge rate were greater than 2.9 mgd, the average pumping rate during the augmentation season would be increased accordingly. The existing facilities could accommodate a recharge rate of up to approximately 4.9 mgd and provide 2.0 mgd of flow augmentation for a 90-day period. A recharge rate as high as 4.9 mgd would not be expected to occur during a period when flow augmentation would be required.

The 2005 test indicated no effect on stream flows or overlying water table; it is therefore concluded that the amount of groundwater available at Rushton is adequate to support the proposed operation without interfering with near-surface water table. The test was conducted in three (4) phases:

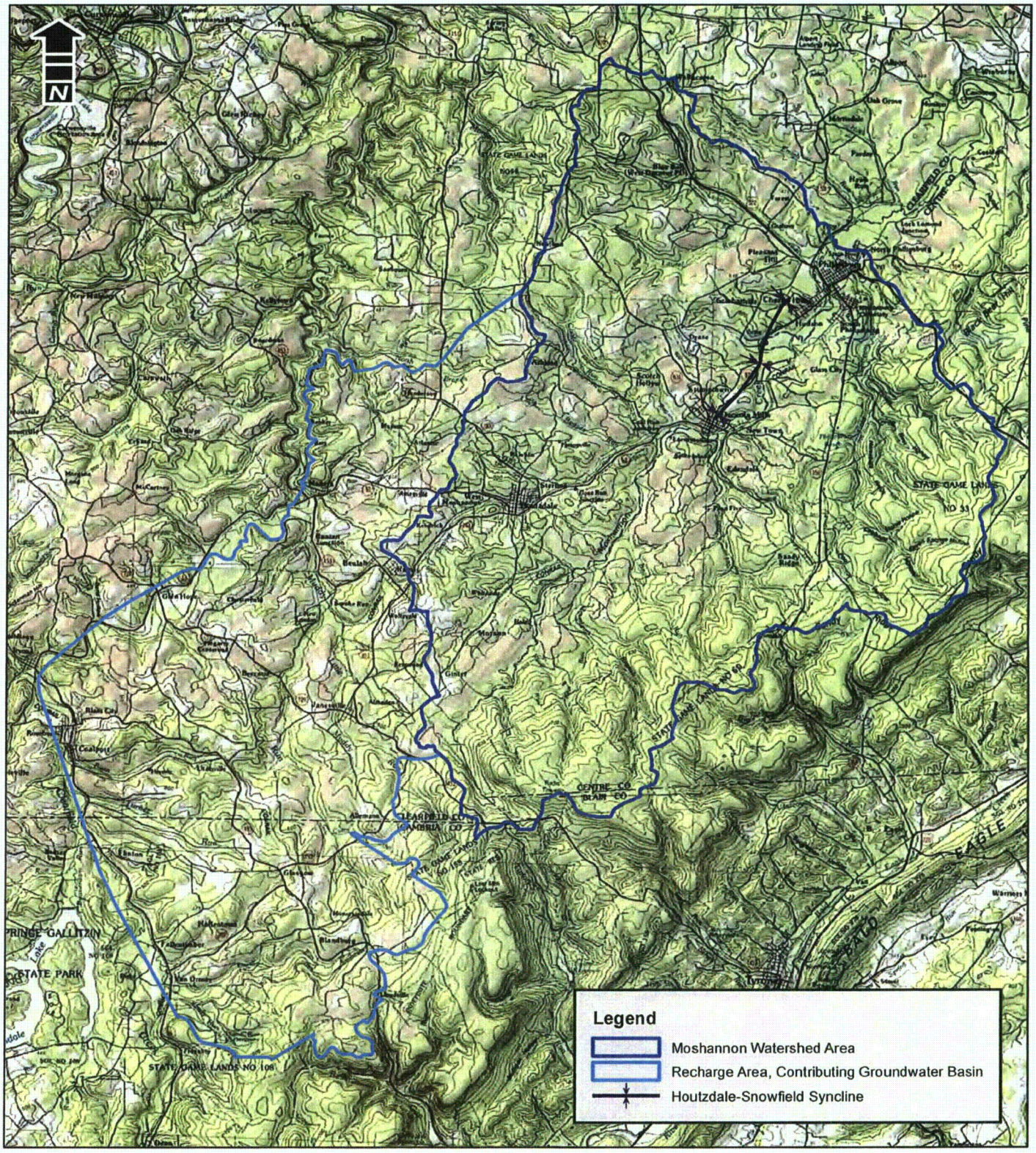
1. September 27-October 10: pumping ceased, and the pool rose from El. 1397.95 to El. 1409.20. During this period the estimated average recharge rate was 4.0 mgd, allowing for the re-injection of sludge into the mine.
2. October 11-November 18: the pump was operated at maximum capacity, lowering the pool from El. 1409.20 to El. 1379.78. During this period the estimated average recharge rate was 2.9 mgd.
3. November 19-December 5: pumping ceased and the pool rose from El. 1379.78 to El. 1396.51. During this period the estimated average recharge rate was 3.6 mgd.
4. December 6: normal operation resumed. From December 14-December 24, the pool was steady and pumped at a rate of 4.75 mgd. During this period, the estimated average recharge rate was 4.5 mgd.

Estimated monthly inflow (recharge) rates are depicted in Figure 7 as determined from pumping and pool level data. The annual cycle of recharge rate is evident from Figure 7. The proposed operation is not expected to cause any change in the recharge rates.

To attempt to delineate the groundwater basin contributing to recharge to the mine if operated between El. 1380 ft and El. 1420 ft would be highly speculative. There are no known withdrawals in the vicinity of Rushton that would be affected by fluctuation of the mine pool between El. 1380 ft and El. 1420 ft.

On an annual basis, the withdrawal of water from Rushton Mine is equal to the groundwater recharge to the mine.

FIGURE 5



1 inch = 15,000 feet

Base Map: http://services.arcgisonline.com/v92
USA_Topo_Maps

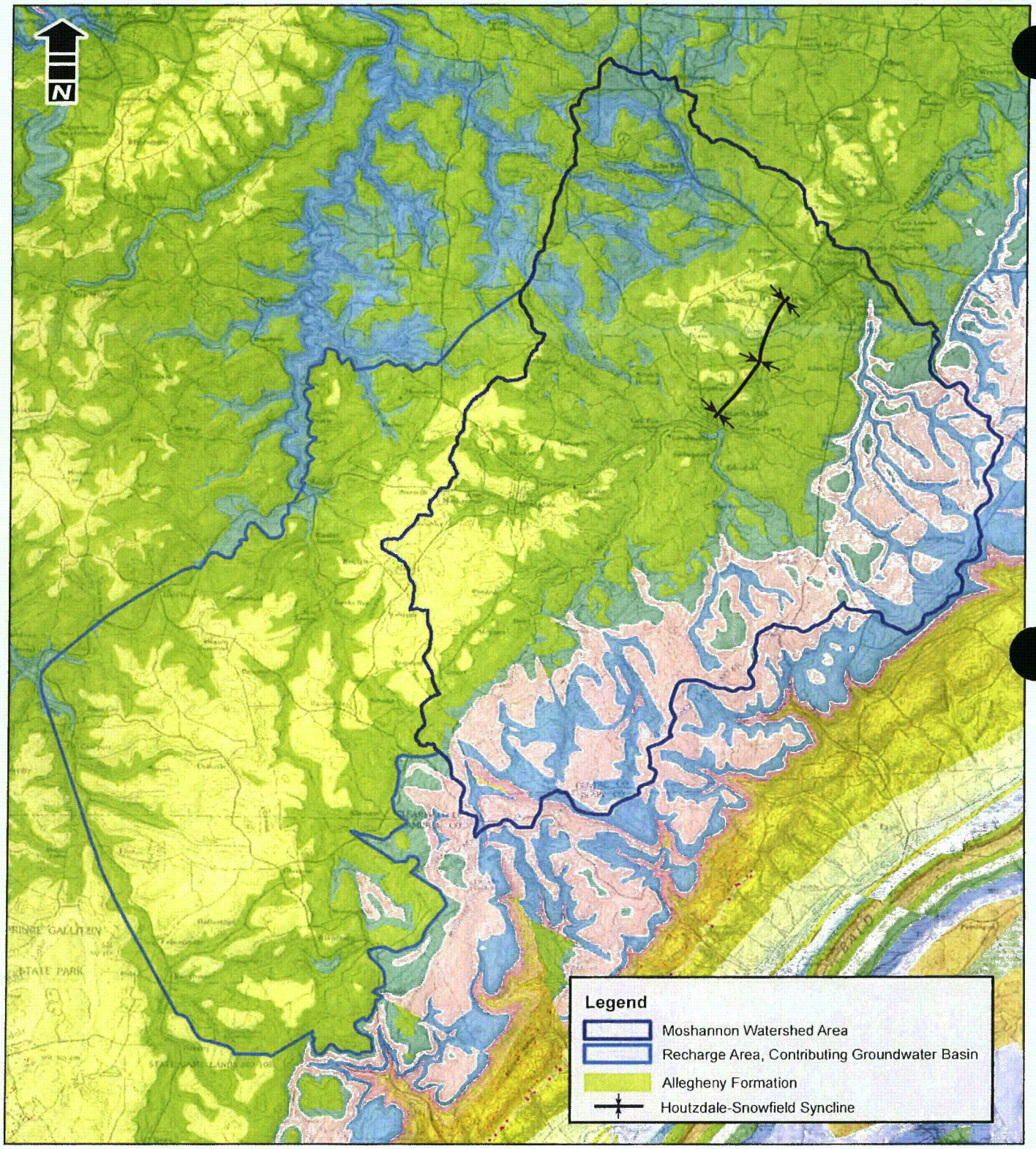
Rushton Mine - Recharge Basin Map

Clearfield and Centre County, Pennsylvania

Drawn by: AMH
Date: 03 NOV 11
Job No: 11-286 DA

Prepared by Moody and Associates | 11548 Cotton Road | Meadville, Pa 16335

FIGURE 6



Rushton Mine - Recharge Basin Map

Clearfield and Centre County, Pennsylvania

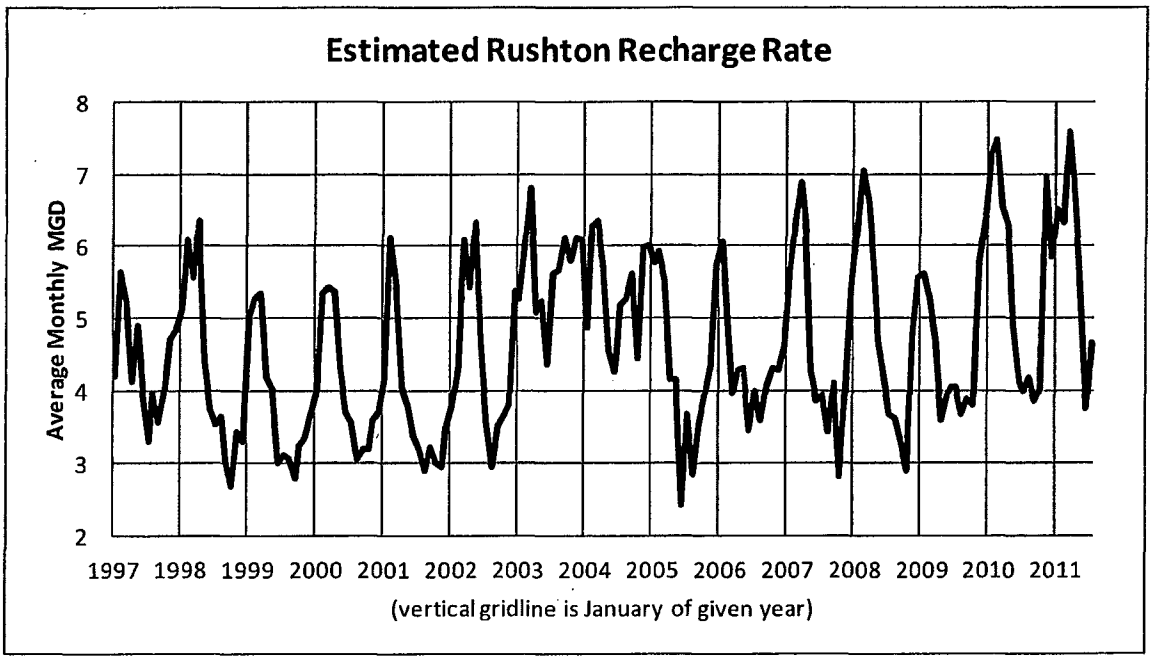
Drawn by: AMH
Date: 03 NOV 11
Job No: 11-286 DA

Prepared by Moody and Associates | 11548 Cotton Road | Meadville, Pa 16335

TABLE 3. Rushton Mine – Groundwater availability calculation

Annual recharge rate	17.20	Inches	*from Risser, et al, 2005*
Recharge 1-10 year drought	10.32	Inches	60 % of annual recharge rate, per SRBC Aquifer Testing Guidance
Contributing ground water basin	150	square miles	See attached map
Annual recharge / square mile	298,933,578	gallons/year/sq mile	based on 1 inch precipitation equals 17,379,859 gallons/sq mile
Basin annual recharge	44,840,036,736	gallons/year	
Basin daily recharge	122,849,416	Gpd	
Basin annual recharge 1-in-10 yr drought	26,904,022,042	gallons/year	
Basin daily recharge 1-in -10 yr drought	73,709,649	Gpd	
Proposed withdrawal	8,500,000	Gpd	
% of daily recharge 1-in-10 yr drought	11.53%		

FIGURE 7


Estimated Rushton Recharge Rate
Average Monthly MGD
8
7
6
5
4
3
2
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
(vertical gridline is January of given year)

Section 4. Justification for Waiver Request

An aquifer test for the use of Rushton as a component of the PPL Consumptive Use Asset Pool should not be required, for the reasons presented below (numbered for convenience). Accordingly, PPL hereby requests a waiver from the requirement to submit an aquifer test plan in consideration of a subsequent application for Ground-Water Withdrawal.

1. On an annual basis, the amount of water to be withdrawn will equal the recharge to the mine. Lowering the mine pool level to El. 1379.5 ft during operation for low flow augmentation will not induce significant incremental recharge, if any, compared to current operation. Thus, the proposed operation will have no significant effect upon groundwater resources outside of the mine.
2. Drawdown of the mine pool to El. 1379.5 ft under the proposed operation will be far less than the historical drawdown during mining at Rushton. The Rushton Mine opened in 1963. Coal has been mined between approximately El. 1240 ft and El. 1660 ft. Hence, water levels in the mine have been at least as low as El. 1240 ft during the period since 1963.
3. Average pumping rates under the proposed operation will not exceed pumping rates under current operation. The current nominal pump-and-treat capacity of the existing facility is approximately 7.6 mgd. With a return of approximately 0.7 mgd of sludge to the mine pool, as currently occurs, the maximum net withdrawal is not expected to exceed 6.9 mgd on a thirty-day average basis. The proposed increase in treatment capacity to 8.6 mgd by the addition of pre-aeration tanks will allow higher pumping and treatment for short periods.
4. The total amount of the withdrawal on an annual basis will not change as a result of the proposed operation.
5. Neither the proposed operation nor the inclusion of Rushton Mine in the PPL Asset Pool will violate or cause a need to amend the current PA DEP permits. Specifically:
   a. The permits contain no restriction or requirement concerning the level of the mine pool or the fluctuation of the level.
   b. The permits contain no restriction or requirement concerning the rate of pumping from the mine or the rate of discharge from the mine to Moshannon Creek.
   c. The permits require monitoring of a network of discharge points and reporting to PA DEP. This monitoring and reporting will be continued.

6. The drawdown test conducted in fall of 2005 fully satisfies the objectives of an aquifer test that otherwise might be required by the SRBC. APPENDIX A is the report of that test.
    a. As noted in Section 3, the test was conducted in three (4) phases:
        1. September 27-October 10: pumping ceased, and the pool rose from El. 1397.95 to El. 1409.20.
        2. October 11-November 18: the pump was operated at maximum capacity, lowering the pool from El. 1409.20 to El. 1379.78.
        3. November 19-December 5: pumping ceased and the pool rose from El. 1379.78 to El. 1396.51. (This 18-day period was the longest non-pumping interval at Rushton.) This phase was halted due to the onset of cold weather and the attendant need to resume pumping to prevent freeze-up of the ponds and equipment.
        4. December 6 - normal operation resumed. From December 14-December 24, the pool was steady and pumped at a rate of 4.75 mgd.
    b. The minimum test elevation (El. 1379.5 ft) approximates the minimum level (El. 1379.5 ft) to which approval is sought for operation of Rushton in the PPL Asset Pool.
    c. PA DEP was consulted prior to the test and participated in the test.
    d. Water levels, flows and water quality were extensively monitored during the test; no effects on water quantity or quality were evident. The monitoring network consisted of eleven monitoring points as located and identified in the 2005 test report (APPENDIX B) Figure 3 and Table 1:
        1. Moshannon Creek: five monitoring points, two upstream and three downstream of the mine discharge point
        2. Surface water table: two monitoring wells at the Rushton Mine refuse area.
        3. Overlying mine pools: two locations
        4. Rushton Mine pool: two shafts

APPLICATION TO SRBC FOR AQUIFER TEST PLAN WAIVER
FOR
USE OF RUSHTON MINE FOR CONSUMPTIVE WATER USE MITIGATION

NOVEMBER 2011

APPENDIX A

AQUIFER TEST PLAN (CHECKLIST)

APPLICATION FOR AQUIFER TEST PLAN APPROVAL

Directions

The aquifer test plan should consist of the following items, in the order presented below:

1. Title page (with the signature of the project hydrogeologist and seal, when applicable).
2. A completed copy of the Project Information form (SRBC Form #72; Attachment 1) and required plan review fee.
3. A completed (checked) copy of the Application for Aquifer Test Plan Approval, signed by the project hydrogeologist and sealed, when appropriate.
4. All of the completed items in the Application for Aquifer Test Plan Approval, labeled, and in the order shown.
5. Any additional information may be attached as an appendix.

Submit two bound copies and a .pdf version on compact disc of the aquifer test plan for review to the Susquehanna River Basin Commission (Commission). Aquifer test plans are reviewed in the order of receipt. Due to workload and scheduling, an aquifer test plan should be received by the Commission at least sixty (60) days prior to the proposed test date to assure adequate time for Commission staff's review.

SECTION 1. BACKGROUND INFORMATION

[X] General description of the proposed project. Describe the project, including but not limited to, information on the following:

1. Anticipated long-term owner and operator, if different;
2. Use;
3. Current water need (million gallons per day [mgd]);
4. Anticipated future water need (mgd);
5. Planned water storage (million gallons); and
6. Location of return flow outfall.

SECTION 2. HYDROGEOLOGIC DESCRIPTION

[X] Description of contributing aquifer(s); use the Aquifer Description Sheet for Items 1 and 2 (Attachment 2), and use Table 1 (Hydrogeologic Boundaries) for Item 3:

1. For the geologic formations/aquifers within the contributing groundwater basin, provide generalized lithologic descriptions and the dominant permeability types.
2. For the aquifer(s) that the water-bearing zones are located in, determine and describe the dominant type(s) of permeability (fractures, joints, faults, bedding planes, etc.), the spatial characteristics (spacing and orientation) of the features, and how these features relate to the area of influence. Site-specific information and structural data (that is, information obtained or measured in the field) will be needed in most cases to satisfy this requirement.

3. List and describe (Table 1) any potential boundary conditions, both restricting geologic features or aquitards (for example, diabase dikes, confining impervious beds) and sources of recharge (for example, streams, lakes, wetlands), referencing Figure 2 for locations.
4. Describe the geologic and hydrologic properties of and classify the overburden (for example, alluvium, colluvium, flood plain fines, glacial outwash, stratified drift, till, residuum, saprolite, etc.). This information may require examination of shallow road cuts, stream channel banks, drainage ditches, well logs, and geotechnical boring logs.

Table 1. Hydrogeologic Boundaries

Boundary Type	Feature	Figure 2 Designation
No Flow	Clarion Coal outcrop	Shown on Fig 5 & 6

[NA] **Figure 1. Construction and Hydrogeologic Well Log**

Pumps are installed in old Rushton Mine shaft

Provide a scaled diagram of the well to be tested, showing well construction and geology. The geologic description must include lithology, lithologic contacts, and the depth, yield, and lithologic characterization of water-bearing zones (fractures, conduits, clay seams, gravel beds, etc.). A textural and mineralogic description of the unconsolidated and weathered materials must be included. A driller's log is not acceptable. The driller and the project hydrogeologist should work together closely in the field so that the information in the well log is a synthesis of the data collected by each. The log must include the ground surface elevation (reported as feet above mean sea level).

[X] **Figure 2. Topographic Map with Contributing Geology**

Clearly identify the following on a map:

1. Saturated lithified and unconsolidated materials within the area of contribution of the proposed well.
2. Location(s) of recorded field measurements (water elevations, structural geologic features, lithologic changes, etc.).
3. Locations of surface water features.
4. Fracture traces.
5. Contributing aquifer(s) and the presence of any aquitards.
6. Potential boundary conditions that may be encountered during testing.
7. Location of hydrogeologic cross sections.

☐ **Figure 3a. Hydrogeologic Cross Section (strike-perpendicular)**
☐ **Figure 3b. Hydrogeologic Cross Section (strike-parallel)**

Provide strike-perpendicular and strike-parallel hydrogeologic cross sections at a scale ranging from 1:1 to 5:1. For wells sited in valley-fill sediments, the cross sections should be parallel and perpendicular to the trend of the main valley. For wells sited in horizontally bedded rocks or massive crystalline rocks, the cross sections should be oriented approximately parallel and perpendicular to the dominant direction of natural groundwater flow. Additional cross sections at vertical scales up to 5:1 exaggeration may be submitted as needed. The location of the cross sections should be indicated on Figure 2. The cross section must pass through the well to be tested, cover 1,000 to 5,000 feet of length, and also include any significant hydrogeologic boundaries (surface water features, dikes, etc.). The cross section should include the following:

1. Water table or piezometric surface;
2. Surface water bodies and wetlands;
3. Geologic structure (confirmed by on-site field measurements);
4. Aquifers, aquitards, and hydrogeologic boundaries;
5. Top of rock;
6. Unconsolidated deposits – thickness and extent;
7. Well bore, casing, pump intake, and water-bearing zones, or screened intervals;
8. Surficial materials that are a saturated part of the flow system; and
9. Key scale(s).

☒ **Figure 4. Estimated Area of Influence**

Provide a topographic map at an appropriate scale ranging from 1 inch = 1,000 feet to 1 inch = 2,000 feet delineating the estimated area of influence of the proposed production well. The area of influence should be based on the best available information regarding the aquifer properties (dominant types of permeability and their spatial characteristics such as bedding and fracture orientations, anisotropy, etc. and their approximate values), topography, hydraulic gradient, groundwater flow direction(s), recharge boundaries, confining boundaries, etc. The map must include the aquifer properties (bedding strike, fracture traces, joints, etc.) used in determining the area of influence.

☒ **Figure 5. Groundwater Contour Map** Not Applicable

Using the "Topographic Map with Contributing Geology" (Figure 2), provide a groundwater contour map of adequate scale (1 inch = 1,000 feet to 1 inch = 2,000 feet) using recent water level data (measured by project personnel) from on-site wells and proposed monitoring points (observation wells and surface water features). Indicate the approximate hydraulic gradient, direction(s) of groundwater flow, and date of measurements. Clearly indicate the estimated area of influence for the proposed well (Figure 4), at the proposed pumping rate, on the groundwater contour map.

SECTION 3. PHASE I GROUNDWATER AVAILABILITY ANALYSIS

☒ **Figure 6. Groundwater Basin Map (Phase I Groundwater Availability)**

Provide a topographic map with a delineation of the groundwater basin. The following must be included: The groundwater basin is shown on FIGURES 5 and 6

1. Useable scale (1 inch = 2,000 feet). At a minimum, maps must occupy an entire 8.5-by-11-inch sheet with margins. (Note, it is oftentimes necessary to use sheets that are larger than 8.5 by 11 inches to provide the necessary information on a useable figure.)
2. Compass (north arrow); topographic map names (source map identification); map scale bar.
3. Potential hydrogeologic boundaries (divides, discharge areas or points [springs], dikes, sharp permeability changes).
4. Production wells within the contributing recharge area of the proposed pumping well (residential, municipal, industrial, irrigation, etc.).
5. Permitted surface water withdrawals.

☒ **Table 2. Phase I Groundwater Recharge Estimate**

Using the delineated recharge area (Figure 6), complete the provided table (Table 2), which includes the following:

1. Name of aquifer.
2. Contributing groundwater recharge area, in square miles, per formation.
3. Recharge rates for the 1-in-2-year and 1-in-10-year drought return intervals. In the event that a published 1-in-10-year rate is not available, 60 percent of the 1-in-2-year rate may be used.
4. Estimated groundwater availability for the proposed groundwater withdrawal point (well). (Recharge rate[s] multiplied by the proposed contributing recharge area.) (Table 2)

Table 2. Phase I Groundwater Recharge Estimate

(a) Aquifer (Formation)	(b) Contributing Area from the Identified Formation (mi^2)	(c) 1-in-2-year Recharge Rate (mgd/mi^2)	(c) 1-in-10-year Drought Recharge Rate (mgd/mi^2)	(d) Available 1-in-10-year Drought Recharge (gpd)
Coal mine void and adjacent coal seam	150	1.99	0.49	73.71
				Total 73.71 mgd

mi^2 – square miles
mgd – million gallons per day
gpd – gallons per day

☒ **Recharge Rate Rationale and Reference (source)**

See Section 3 of Waiver request

Provide the rationale for selecting the applied recharge rate(s), along with the referenced source. Why is the chosen rate applicable to the project area?

☒ **Table 3. Existing Groundwater Withdrawals**

Identify withdrawals (groundwater or surface water users) within the identified groundwater basin for the proposed production well.

Table 3. Existing Groundwater Withdrawals

Owner	Withdrawal Identification on Figure 6	Withdrawal Quantity (mgd)	
		Existing or Registered	Permitted or Approved
No existing groundwater withdrawals have been identified with in area impacted by flucuation of mine pool levels			
		Subtotal mgd	Subtotal mgd
Total Groundwater Withdrawal			mgd
mgd – million gallons per day			

☒ **Table 4. Phase I Groundwater Availability**

Calculate the available groundwater by subtracting the existing withdrawals (sum of Table 3) from the estimated availability (sum of Table 2). Provide a final estimation of the groundwater that is presumed to be available for withdrawal from the proposed production well.

Table 4. Phase I Groundwater Availability

Line		Total (mgd)
1	Groundwater Recharge (Table 2, total)	73.71
2	Groundwater Withdrawals (Table 3, total)	0.0
3	Phase I Groundwater Availability (Line 1 minus Line 2)	73.71
4	Proposed Withdrawal (well being tested)	8.5
5	Remaining Groundwater	65.21
6	Percent Utilization of 1-in-10-year Drought Recharge (100 - [Line 5/Line 1])	11.53%
mgd – million gallons per day		

If Line 6 (Table 4) is greater than 50 percent, then the Phase II Groundwater Availability Analysis must be completed.

SECTION 4. PHASE II GROUNDWATER AVAILABILITY ANALYSIS

The Phase II groundwater availability analysis is required if the water budget indicates that greater than 50 percent of the available resources will be allocated with the addition of the new well. A Phase II groundwater availability analysis refines the Phase I groundwater availability analysis by including significant water returns (National Pollutant Discharge Elimination System [NPDES] discharges greater than or equal to 0.100 mgd) and recharge losses due to impervious cover.

☐ **Table 5. NPDES Discharges (0.100 mgd or greater)**

Table 5 is a listing of all NPDES permitted discharges greater than or equal to 0.100 mgd that are located within the delineated recharge area. These potentially add to the available water if the proposed production well draws water from the stream to which they discharge, as demonstrated by aquifer testing results.

Table 5. NPDES Discharges (0.100 mgd or greater)

NPDES #	Permit Holder	Permitted Discharge (mgd)
		Total **mgd**
Note: Water imported from outside the area of contribution must be documented by a note in Table 5.		

☐ **Figure 7. Map of Zoning and Impervious Cover**

Provide a map delineating existing zoning of the land within the contributing recharge area, as well as any proposed changes in land use.

☐ **Table 6. Impervious Cover Recharge Loss**

For each aquifer, list zoning/land use types, their area, percent impervious cover, and their area of impervious cover.

Table 6. Impervious Cover Recharge Loss

Aquifer	Land Use/ Zoning Type	Percent Impervious Cover	Area (mi^2)	1-in-10-year Drought Recharge Rate (mgd/mi^2)	Recharge Loss (mgd)
		Total Impervious Cover Recharge Loss			**mgd**
mi^2 – square miles mgd – million gallons per day					

☐ Table 7. Surface Water Withdrawals

List the surface water withdrawals exceeding 100,000 gallons per day (gpd) during any 30-day period annually, and calculate a total. This should include any seasonal agricultural and recreational withdrawals.

Table 7. Surface Water Withdrawals

Owner	Identification on Figure 6 (map)	Withdrawal Quantity (mgd)
Total Surface Water Withdrawals		**mgd**
mgd – million gallons per day		

☐ Table 8. Phase II Groundwater Availability Analysis

The Phase I groundwater availability estimate is refined by subtracting out impervious cover recharge losses. For the wells being tested that demonstratably draw water from a stream, the withdrawals returned within the area of contribution (NPDES discharges >0.100 mgd) are added to the water resources available to the well, and the surface water withdrawals within the area of contribution are subtracted from the water resources available to the well being tested.

Table 8. Phase II Groundwater Availability Analysis

Line	Water Budget Component	Quantity (mgd)
1	Phase I Groundwater Availability (Table 4, Line 3)	
2	Impervious Cover Recharge Loss (Table 6, total)	
3	Phase II Groundwater Recharge (difference of Lines 1 and 2; see Note 1)	
4	Return Flows (Table 5, total)	
5	Sum of Lines 3 and 4	
6	Surface Water Withdrawals (Table 7, total)	
7	Total Water Available to the Well Being Tested (difference of Lines 5 and 6; see Note 2)	

mgd – million gallons per day

Notes:

1. The total water resources available to wells demonstrably drawing only upon groundwater is given on Line 3.
2. The total water resources available to wells demonstrably drawing some water from a stream is given on Line 7.

SECTION 5. AQUIFER TEST PROCEDURES

☐ **General Plan Description**

Provide short, concise answers to the following:

1. Estimated/desired rate of withdrawal;
2. Proposed pump setting (depth below ground surface);
3. Describe the flow control valving and metering;
4. Describe the proposed monitoring of water chemistry, including parameters measured, monitoring devices, and where samples will be taken (proposed pumping well, nearby streams, ponds, springs, and wetlands); and
5. Describe how precipitation will be monitored during the testing.

☐ **Figure 8. Map of Proposed Monitoring Locations**

On a topographic base map, indicate the locations of all of the proposed features to be monitored (wells, wetlands, ponds, streams, piezometers, weirs, etc.). All proposed locations should be identified on the map with a symbol for each type of monitoring point accompanied with a unique identification for each point. Surface water levels of all proposed monitoring points must be included on this map.

☐ **Table 9. Groundwater Monitoring Locations**

Provide as much of the following information as possible for each well or piezometer: well identification (property owner name, address, etc.), total depth, estimated yield, casing lengths, diameter, well construction (screened or open bedrock), depth to water/date , location (GPS latitude/longitude), wellhead elevation (feet above mean sea level), aquifer, and distance from proposed production well.

Table 9. Groundwater Monitoring Locations

Parameter	Description
Well Identification (property owner name, address, etc.)	
Total Depth (feet)	
Estimated Yield (gpm)	
Casing Lengths (feet)	
Diameter (inches)	
Well Construction (screened or open bedrock)	
Depth to Water (feet)/Date	
Location (GPS latitude/ longitude[1])	
Wellhead Elevation (feet amsl)	
Aquifer (geologic formation)	
Distance from Proposed Production Well (feet)	

[1]GPS coordinates should be based on NaD 1983 (in decimal degrees).
gpm – gallons per minute
amsl – above mean sea level

☐ **Table 10. Surface Water Locations**

Provide the following information: monitoring point identification, monitoring point construction (piezometers, stilling wells, weirs, flumes, etc.), estimated flow during test (when applicable), location (GPS latitude/longitude), elevation of monitoring device (wellhead for piezometers, top of weir, etc.), and distance from proposed production well.

Table 10. Surface Water Locations

Parameter	Description
Monitoring Point Identification	
Monitoring Point Construction (piezometers, stilling wells, weirs, flumes, etc.)	
Estimated Flow During Test (when applicable) (gpm)	
Location (GPS latitude/ longitude[1])	
Distance from Proposed Production Well (feet)	
[1]GPS coordinates should be based on NaD 1983 (in decimal degrees). gpm – gallons per minute	

Proposed Start of Testing: Not Applicable – Waiver Request
(Date)

Project Hydrogeologist:

David M Anderson
Print Name

David M Anderson
Signature

November 7th, 2011
Date

Seal
(when applicable)