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PPRP

Environmental Review of the Air Pollution Control Project at the Morgantown Generating Station

June 2008

MARYLAND POWER PLANT RESEARCH PROGRAM

Martin O'Malley, Governor ♦ Anthony G. Brown, Lt. Governor

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Environmental Review of the Air Pollution Control Project at the Morgantown Generating Station

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Maryland Department of Natural Resources
Power Plant Research Program
Annapolis, MD

June 2008

FOREWORD

This report was prepared under the direction of John Sherwell and Susan Gray at the Maryland Department of Natural Resources, Power Plant Research Program (PPRP). Under the contract to PPRP, the following individuals were responsible for conducting the work associated with this environmental review:

- Robert Keating, Connie Faustini, Joseph Giacinto, Diane Mountain, and Gary Walters, Environmental Resources Management, Inc., Annapolis, MD, under Contract # K00B0200092;

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- Peter Hall, Metametrics, Inc., Charlottesville, VA, under Contract #PR97-056-001.

ABSTRACT

The Maryland Public Service Commission (PSC) has granted a Certificate of Public Convenience and Necessity (CPCN) to Mirant Mid-Atlantic, LLC to modify the Morgantown Generating Station in Charles County, Maryland. The modifications include the installation of flue gas desulfurization systems on the coal-fired Units 1 and 2 at Morgantown, new pulverizers, a steam turbine upgrade for Unit 2, sulfuric acid mist controls, and associated enhancements. The project was proposed in response to Maryland's Healthy Air Act legislation and will help the Morgantown facility achieve required reductions in sulfur dioxide and mercury.

The Department of Natural Resources Power Plant Research Program (PPRP) performed this environmental review of the Morgantown Air Pollution Control (APC) project as part of the PSC licensing process. PPRP used the analysis of potential impacts to establish recommended licensing conditions for constructing and operating the proposed APC systems. PPRP's recommendations were made in concert with six additional State agencies.

This report describes PPRP's evaluation of the environmental and socioeconomic impacts of the APC project, summarizes the results of this evaluation, and presents licensing conditions, which have been incorporated into the CPCN for the facility. This report was provided as an exhibit in Case 9085 and formed the basis for the recommendations made by the State agencies in the case. This document includes the following:

- The project description;
- A discussion of existing environmental and socioeconomic conditions at the site and nearby; and
- An analysis of the potential air quality, surface and ground water, biological, socioeconomic, and noise impacts resulting from the project.

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Mirant Mid-Atlantic, LLC. (Mirant) submitted an application for a Certificate of Public Convenience and Necessity (CPCN) to the Maryland Public Service Commission (PSC) on November 2, 2006 to authorize the modification of the Morgantown Generating Station (Morgantown) in Charles County, Maryland. The proposed modification would enable Mirant to install air quality control systems on the coal-fired steam units at Morgantown (Units 1 and 2), promising significant environmental benefit in the form of reduced air emissions. The project is in response to Maryland's Healthy Air Act legislation, which requires steep reductions in sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury emissions for all coal-fired electric generating units in the state.

The proposed air pollution control (APC) systems include a wet flue gas desulfurization system, new coal pulverizers for Unit 2, a steam turbine upgrade for Unit 2, sulfuric acid mist controls, and associated enhancements. Additionally, with the modification of the pulverizers, Mirant is seeking the ability to burn different coals that could not previously be accommodated.

The APC project will result in substantial reductions in SO_2 emissions; decreases in mercury and particulate matter (PM, PM_{10}, $PM_{2.5}$) emissions; and small increases in CO and SAM emissions. Particulate matter emissions are projected to decrease slightly, even when accounting for an increase in PM from material handling sources (i.e., limestone and gypsum handling) and the previously approved coal barge unloading project. Switching to lower sulfur coals, such as those from Central Appalachia and South America, will not affect emissions substantively.

PPRP and ARMA conclude that changes to criteria pollutant emissions and the boiler exhaust characteristics (i.e., lower temperature and lower stack height) from Morgantown's APC project will not adversely affect the NAAQS or PSD increments. PPRP and ARMA also believe that it can be reasonably concluded that the Morgantown facility impacts on $PM_{2.5}$ concentrations in the nonattainment area and nutrient loading onto the Chesapeake Bay will be reduced.

The proposed project site at the Morgantown power plant is within an area that has been disturbed for many years by anthropogenic activities (i.e., clearing, construction, soil disturbance, mowing, etc.); therefore, significant natural communities are not present and are not expected in

the future. Given these factors, construction and operation of the Morgantown APC project would likely not pose any negative impacts to biological resources.

Few effects on population and housing are anticipated from construction activities since most construction jobs are expected to be filled by construction workers living within daily commuting distance of the project. No adverse population or housing effects from in-migrating labor are expected from the permanent employment gain at Morgantown.

The APC facility would be contiguous to existing generation assets at Morgantown. Because the project area is already zoned IH – Heavy Industrial and is in an Employment and Industrial Park District, no rezoning or change of land use would result from construction activities or operation of the APC system. No portions of the area designated for the project would lie within the 100 year floodplain, but some would lie within the Critical Area. Modifications to the Morgantown Generating Station within the IDA would have to be accompanied by practices to reduce water quality impacts associated with storm water runoff in compliance with the 10% Rule.

Up to 429,000 tons of limestone would be required to operate the scrubbers. The primary limestone delivery system would be barge utilizing the planned coal barge unloader, with rail as a secondary option and trucks as a backup option. If limestone is delivered by barge, Mirant projects that between 36 and 48 20-ton barges would deliver limestone to Morgantown each year, including limestone for the Chalk Point FGD. At most, one additional round-trip barge passage per week would be added to Potomac River traffic. Approximately 45 rail cars of limestone per week would be hauled from Morgantown to Chalk Point.

From a visual perspective, construction activities could create temporary visual disturbances from wind-blown dust during earth moving activities, but these events would be minimized by good construction practices. The most visible element during construction is likely to be truck traffic entering or exiting the site. APC system structures would increase the industrial character of the Morgantown site, but most of the new elements would be adjacent to existing structures and difficult to distinguish from other generation components. As a result, structural project elements would have no adverse effect upon the visual quality of the Morgantown site, itself.

The predominant visual externality from wet scrubber operations would be the vapor plume from the 400 foot stack. On average, the plume is

expected to be less than 200 meters high and 800 meters long. Plume dimensions would vary by season, with higher and longer plumes in the fall and winter, and by direction, with plumes of greater heights and lengths when the wind is blowing from the east.

Depending on the temperature and moisture content of the air, the vapor plume from Mirant's scrubbers at Morgantown could produce fog or ice. PPRP estimated that the concentration of water due to scrubber emissions would be high enough to induce fog on the Governor Harry W. Nice Memorial Bridge for 99 hours over a five year period based on 1991-1995 data. Currently, there is no fog sensor on the Governor Harry W. Nice Memorial Bridge to automatically warn motorists of hazardous driving conditions on the bridge. PPRP has recommended a licensing condition requiring Mirant to cooperate with the Maryland Transportation Authority and the Maryland State Highway Administration in the design, funding and installation of a fog monitoring system prior to the initial operation of the APC system at Morgantown.

Scenic quality in the vicinity of Morgantown could be compromised by the vapor plume, particularly when the plume exhibits an extended horizontal and/or vertical drift. But the extent to which cultural resources in Southern Maryland and the Northern Neck of Virginia would be adversely affected is uncertain, partly because scenic quality is somewhat degraded within the areas upon which various cultural and recreational designations have been overlaid. Although scenic quality is part of the cultural experience, few relationships between tourism and power plant externalities have been quantified. Furthermore, significantly reduced pollutant loadings into the atmosphere from Morgantown could potentially offset the negative visual effects of the vapor plume on cultural heritage tourism in Southern Maryland.

The State's analysis showed that operating the APC system, as proposed, could potentially cause an exceedance of the Charles County noise ordinance, particularly during nighttime hours. The exceedances shown in the State's calculations are partly a result of a number of conservative assumptions built into the analytical methods. Mirant will have to provide additional information, when it becomes available, to address the uncertainty surrounding actual noise characteristics of the booster fans in particular.

The State recommends in the license conditions that treated effluent from the Town of LaPlata Wastewater Treatment Plant (WWTP) be the primary source of water for the scrubber operation. This is consistent with MDE WMA policy giving priority to public water supply users of high-quality

ground water, with lower priority given to industrial uses. There are concerns surrounding the potential for excessive drawdowns in southern Maryland aquifers associated with long-term pumping for industrial uses, which would limit the ability of public water supply systems to support community growth.

The proposed air pollution control system will generate gypsum by-product as well as solid waste. Mirant is planning to provide the gypsum by-product to a third party who will be responsible for recycling the material as a replacement for natural gypsum. The license conditions will require Mirant to obtain a separate permit if the company decides to directly dispose of any solid wastes, and to comply with all applicable state and local disposal regulations in that case. On-site storage of gypsum by-product and solid wastes will occur within enclosures to protect materials from the elements, thus preventing runoff and associated environmental impacts.

As a result of the consolidated review, the conditions in Appendix A of this Environmental Review Document were recommended by PPRP for consideration by the Maryland PSC as conditions of the CPCN Order for the Morgantown APC project. A final order adopting these conditions was issued by the PSC in October 2007.

1.0 INTRODUCTION

1.1 BACKGROUND

Mirant Mid-Atlantic, LLC. has submitted an application to the Maryland Public Service Commission (PSC) to authorize the modification of the Morgantown Generating Station (Morgantown) in Charles County, Maryland (see general location in Figure 1-1). The proposed modification would enable Mirant to install air quality control systems on the coal-fired steam units at Morgantown (Units 1 and 2), promising significant environmental benefit in the form of reduced air emissions. The project is in response to Maryland's Healthy Air Act legislation, which requires steep reductions in sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury emissions for all coal-fired electric generating units in the state.

The proposed air pollution control (APC) systems include a wet flue gas desulfurization system, new coal pulverizers for Unit 2, a steam turbine upgrade for Unit 2, sulfuric acid mist controls, and associated enhancements. Additionally, with the modification of the pulverizers, Mirant is seeking the ability to burn different coals that could not previously be accommodated.

The Department of Natural Resources (DNR) Power Plant Research Program (PPRP), in coordination with other state agencies, performed this environmental review of the Morgantown project as part of the PSC licensing process. Before modifications of the facility can be undertaken, the PSC must grant a Certificate of Public Convenience and Necessity (CPCN). PPRP's review is being conducted to evaluate the potential impacts of the proposed modification on environmental and cultural resources, pursuant to Section 3-304 of the Natural Resources Article of the Annotated Code of Maryland.

PPRP used the analysis of potential impacts as the basis for establishing initial recommended licensing conditions for operating the facility with the proposed modifications, pursuant to Section 3-306 of the Natural Resources Article. PPRP's recommendations are made in collaboration with other programs within DNR as well as the Departments of Agriculture, Business and Economic Development, Environment, Planning, and Transportation, and the Maryland Energy Administration. The initial recommended licensing conditions are included as Appendix A to this report.

Figure 1-1
Site Location

Morgantown Generatiing Station

SITE LOCATION

LEGEND

Property Boundary

200 0 200
Meters

REFERENCE

CPCN Application, Environmental Analysis (Mirant, 2006)

1.2 HEALTHY AIR ACT

1.2.1 Background on HAA and Federal Multi-pollutant Reduction Programs

The Maryland Healthy Air Act (HAA) was signed into law in the spring of 2006. The HAA is a sweeping multi-pollutant air pollution control program requiring substantial reductions in emissions of NO_x, SO_2, and mercury from 15 coal-fired generating units at seven power plants in Maryland, including Morgantown Units 1 and 2. The HAA also requires Maryland to participate in a multi-state program known as the Regional Greenhouse Gas Initiative (RGGI) to reduce emissions of pollutants, including carbon dioxide, that contribute to climate change.

The HAA regulates NO_x and SO_2 emissions based on a pollutant "cap-and-trade" program in which the State establishes annual, state-wide total tonnage emissions caps separately for NO_x and SO_2 and then allocates a portion of the annual state-wide caps to each of the 15 individual coal-fired power plant generating units subject to the HAA. Power plant owners can comply by reducing emissions at each unit to meet the unit's cap, or can comply with the caps on a system-wide basis, by over-controlling emissions at some plants and trading the excess allowances to other HAA plants that the company owns and operates in Maryland. Table 1-1 identifies the HAA caps and reduction requirements in Maryland Department of the Environment (MDE) Air and Radiation Management Administration's (ARMA's) regulations implementing the HAA (COMAR 26.11.27).

Instead of a cap-and-trade program, the mercury provisions of the HAA require affected power plants to achieve percentage reductions in emissions of mercury from a baseline year. Plants may comply by a number of methods, but must achieve overall unit-by-unit reductions in mercury emissions of at least 80 percent for Phase 1 and 90 percent beginning in Phase 2 and thereafter.

Table 1-1 Emissions Caps and Reduction Requirements in MDE's HAA Enabling Regulations (COMAR 26.11.27) in Tons

Generating Unit	NO_x (2009) Annual (tpy)	NO_x (2012) Annual (tpy)	NO_x (2009) Ozone Season (t/O_3)	NO_x (2012) Ozone Season (t/O_3)	SO_2 (2010) Annual (tpy)	SO_2 (2013) Annual (tpy)
CONSTELLATION						
Brandon Shores Unit 1	2,927	2,414	1,363	1,124	7,041	5,392
Brandon Shores Unit 2	3,055	2,519	1,449	1,195	7,347	5,627
C.P. Crane Unit 1	832	686	345	284	2,000	1,532
C.P. Crane Unit 2	894	737	385	317	2,149	1,646
Wagner Unit 2	673	555	278	229	1,618	1,239
Wagner Unit 3	1,352	1,115	583	481	3,252	2,490
CONSTELLATION TOTAL	**9,733**	**8,026**	**4,403**	**3,630**	**23,407**	**17,926**
MIRANT						
Chalk Point Unit 1	1,415	1,166	611	503	3,403	2,606
Chalk Point Unit 2	1,484	1,223	655	542	3,568	2,733
Dickerson Unit 1	672	554	311	257	1,616	1,238
Dickerson Unit 2	736	607	333	274	1,770	1,355
Dickerson Unit 3	698	575	314	259	1,678	1,285
Morgantown Unit 1	2,540	2,094	1,053	868	6,108	4,678
Morgantown Unit 2	2,522	2,079	1,048	864	6,066	4,646
MIRANT TOTAL	**10,067**	**8,298**	**4,327**	**3,567**	**24,209**	**18,541**
ALLEGHENY						
R. P. Smith Unit 3	67	55	27	22	161	124
R. P. Smith Unit 4	349	288	143	118	841	644
ALLEGHENY TOTAL	**416**	**343**	**196**	**162**	**1002**	**768**

Note: tpy = tons per year; t/O_3 = tons during ozone season.

The U.S. Environmental Protection Agency (EPA) recently passed its own multi-pollutant regulations affecting power plants: the Clean Air Interstate Rule (CAIR), which regulates NO_x and SO_2 emissions, and the Clean Air Mercury Rule (CAMR), which regulates mercury emissions. Like the HAA, the federal rules for NO_x and SO_2 are based on a cap-and-trade program, although the caps established for Maryland power plants by CAIR and CAMR are less stringent than those set by the HAA. In fact, the HAA is more stringent than the federal regulations in several key ways:

- HAA requires greater pollutant reductions than CAIR.

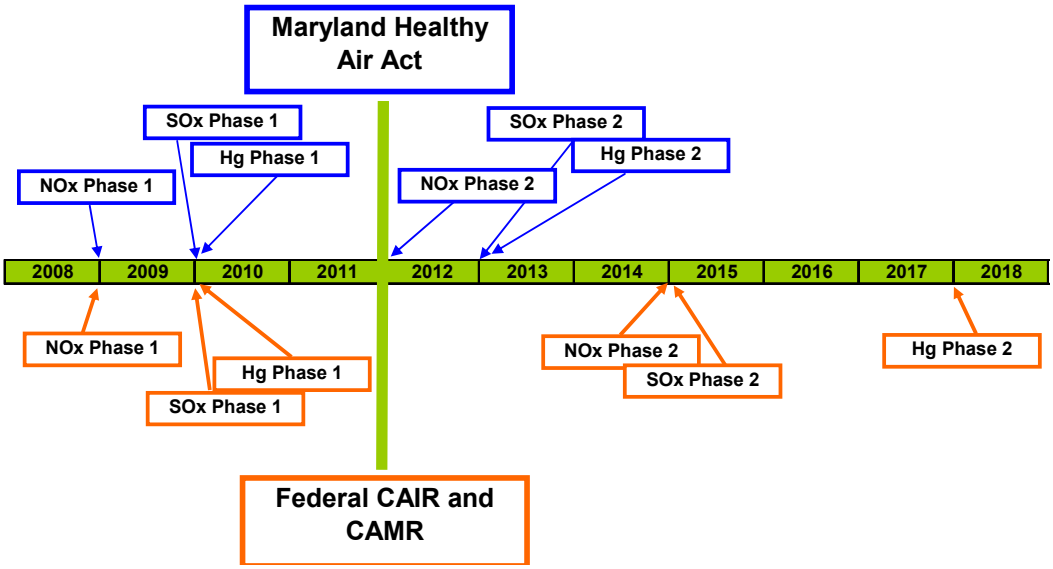
- HAA reductions schedules are more aggressive than the federal schedule.

- HAA prohibits the affected power plant from acquiring allowances from outside the State of Maryland.

- To date, there are no federal programs regulating greenhouse gas emissions from power plants or other sources, while the HAA requires Maryland to participate in RGGI.

The coal-fired generating units in Maryland are subject to the HAA and the federal CAIR/CAMR programs. Figure 1-2 illustrates the schedules for the state and federal pollution control regulations.

Figure 1-2 Maryland HAA and Federal CAIR/CAMR Program Deadlines



Note: Hg = mercury

1.2.2 HAA Project Schedules

The FGD system installation involves a substantial construction project. The Unit 2 pulverizer and turbine upgrades require construction activities, as well; however, the construction is much less extensive than that required for the FGD system installation. Mirant indicates in its CPCN application for the Morgantown APC Project that it will need to initiate

construction by August 1, 2007 to complete the design, purchase, and installation of the FGD system by November 1, 2009. This will enable Mirant to meet the HAA Phase 1 SO_x deadline on January 1, 2010.

In addition to the APC project being addressed here under Case 9085, Mirant has requested approval to conduct several projects at Morgantown as part of the company's HAA compliance plans.

Barge Unloading Project (Case 9031)— In September 2004, Mirant proposed to construct a new coal barge unloading facility at Morgantown to enable the facility the flexibility to bring in different (specifically, lower sulfur) coals from different suppliers. During 2004 and 2005, PPRP, coordinating with other State agencies, performed a thorough environmental review of the proposed facility and recommended to the PSC approval of the barge unloading project in Case 9031, subject to a series of conditions. On September 19, 2005, the PSC issued a Final Order in the case.

Subsequent to the Order, in May 2006, Mirant requested approval to change part of the design of the project from a fixed to a traveling unloader, which necessitated modifying the pier design, and installing an additional coal transfer point. PPRP, again in coordination with other State agencies, reviewed the project amendment and recommended approval of the amendment request to the PSC in December 2006. On July 20, 2007, the PSC issued a Final Order granting the amendment request.

SCR Unit 1— In September 2004, Mirant entered into a Consent Decree with the U.S. EPA, the State of Maryland, and the Commonwealth of Virginia (*United States, et al. v. Mirant Potomac River, LLC*; Civil Action No: 1:04CV1136) which requires Mirant to install and operate selective catalytic reduction (SCR) NO_x control systems on Morgantown Units 1 and 2. The Consent Decree requires the first of the SCR devices to be installed and operating on Unit 1 no later than May 1, 2007.

Operation of the SCR would reduce NO_x emissions substantially, but has the potential to increase emissions of particulate matter, sulfuric acid mist (SAM), and ammonia. Because of the potential for emissions increases, the project would have required a CPCN prior to construction. Alternatively, Mirant entered into an enforceable agreement with MDE to construct the SCR on Unit 1 under the conditions that there would be no increase in PM emissions and that ammonia "slip" emissions would not exceed 3 parts per million (ppm).

The SCR on Unit 1 was constructed during the spring of 2007 and Mirant plans to construct the SCR on Unit 2 during the planned outage in March 2008.

Unit 1 Pulverizer— Some of the lower sulfur coals Mirant is considering burning at Morgantown are "harder" than the current design (Northern Appalachian) coal in use at Morgantown. Therefore, to enable Mirant to burn certain different coals, Mirant must upgrade the existing, 1960s vintage pulverizers at Units 1 and 2 which were designed for softer coals. Mirant wishes to begin burning lower sulfur, harder coals as early as 2008.

Mirant had previously requested permission to conduct the Unit 1 pulverizer upgrade during the February 2007 scheduled outage for the Unit 1 SCR installation. MDE and PPRP reviewed the request and agreed, in a letter dated December 13, 2006 to Mr. Ray Bourland, PSC, that the project could proceed subject to conditions to ensure that there would be no emissions increases or other substantive impacts (i.e., Mirant was prohibited from burning coals that could not previously be accommodated by the pulverizers). As part of Case 9085, Mirant has requested approval to complete the pulverizer upgrade at Unit 2, and to burn coals (e.g., Central Appalachian or South American) that the original pulverizers could not previously accommodate.

1.3 LICENSING STATUS

The State of Maryland presented testimony before the PSC as part of the licensing process for the Morgantown APC project. The draft version of this document was filed as supporting documentation for that testimony. Other parties involved in the PSC proceedings were the applicant (Mirant), the state's Office of People's Counsel, the PSC staff, and Swan Point Property Owners Association as an intervener. After extensive negotiations, a Non-unanimous Agreement of Stipulation Settlement was reached by all parties with the exception of Swan Point. This agreement was filed with the PSC in August 2007, stating that a CPCN should be issued subject to PPRP's recommended licensing conditions, including revisions made during the agreement process.

One of these revisions to the conditions allowed for the inclusion of an emergency fire pump as part of the APC project. At the time of introduction, PPRP reviewed the new source of emissions and determined it to be a minor source of insignificant emissions. Subsequently, it was included in the licensing conditions to ensure proper operation. A proposed order was issued by the PSC on August 21, 2007 adopting all of

the recommended conditions in the agreement. This order was appealed by Swan Point on August 28, 2007.

After additional negotiation, briefing, and oral argument, the PSC issued a final order (No. 81667) granting the CPCN with all recommended licensing conditions found in the Non-unanimous Agreement as well as an additional condition regarding sediment sampling. The new condition is as follows:

> Mirant shall conduct sediment sampling for coal and limestone in the vicinity of the proposed barge unloader facility to determine whether there is a measurable increase in deposits of harmful constituents attributable to coal and limestone sediment buildup caused by the operation of the unloading of coal and limestone at the facility. Mirant shall prepare a sampling plan in cooperation with the Power Plant Research Program (PPRP) of the Department of Natural Resources. The PPRP shall review and approve the plan and the proposed sampling sites. Sampling results will be used to determine if construction and operation of the proposed project is impacting existing sediment habitat characteristics. The sampling shall include, but is not limited to the following elements:
>
> a) Sampling shall be conducted within a 100 yard radius of the proposed pier, at several stations prior to operation of the facility, and annually for 5 years at those same stations after the start of operation of the unloader facility.
>
> b) Sediment shall be analyzed for percent composition of coal and limestone, and for pH, PAHs, mercury and arsenic.
>
> c) The sampling plans and results shall be filed with Maryland Department of Natural Resources (DNR) PPRP for review.
>
> d) If sampling results show a significant increase (as defined in the sampling plan) in the coal or limestone content, or analytes (pH, PAHs, mercury or arsenic) in the sampled sediment, Mirant shall work closely with PPRP and MDE to prepare and execute a plan that will ensure that adverse impacts caused by the operation of the proposed barge unloading facility are avoided or mitigated.
>
> If no changes in sediment characteristics due to coal or limestone deposition are found after 5 years of facility operation, annual sediment sampling may be discontinued. An additional sampling event shall be conducted during the 10th year after the start of the operation of the barge

facility. If no changes in the sediment characteristics are found after 10 years of operation, sediment sampling may be discontinued.

The order became effective on October 22, 2007 and is attached as Appendix E. Following the order, Mirant requested and was granted an extension to April 22, 2008 on the deadline to finalize an agreement with Charles County to redirect treated wastewater effluent to Morgantown, as set forth by Condition 29.

1.4 REPORT ORGANIZATION

This report details the evaluations that PPRP has conducted related to Mirant's application for a CPCN for the proposed modifications. The information is organized into the following sections:

- Section 2 provides a description of the site, the existing facility, and the proposed project.
- Section 3 describes the existing site conditions, including geology and water resources, climatology, biological resources, the regional socioeconomic setting, and noise.
- Section 4 discusses the project's impacts on air quality and associated regulatory requirements.
- Section 5 examines other environmental impacts that the project may have on the surrounding area, in particular to ecological, socioeconomic, and cultural resources, as well as the acoustic environment.
- Section 6 discusses the project's water supply needs and sources, and associated impacts.
- Section 7 describes FGD by-product management, off-site disposition, and an evaluation of impacts.
- Sections 8 and 9 provide, respectively, a summary of issues and a list of references.

2.0 PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The site of the proposed modification is the existing Morgantown Generating Station (Morgantown) on the Potomac River in the southwestern portion of Charles County, Maryland (see Figure 1-1). Morgantown is located on a 427-acre site, of which approximately 166 acres are owned by PEPCO and are used for electric substations and transmission lines. The existing Morgantown facility consists of two nominal 624 MW (net output) coal-fired steam generating units (Units 1 and 2), four nominal 48 MW (net output) oil-fired peaking turbines and two nominal 16 MW (net output) black-start and peaking turbines.

2.2 EXISTING FACILITY

Morgantown's two coal-fired steam units, designated as Units 1 and 2, each have a generating capacity of 624 MW. The units are base-loaded, supercritical steam electric units, which were constructed in the 1960s and went into operation in 1967. The units are primarily fired with coal or No. 6 fuel oil as a secondary fuel. No. 2 fuel oil is used for ignition, warm-up, and flame stabilization. The four simple cycle No. 2 oil-fired peaking combustion turbines (CT), designated as CT3 through CT6, are General Electric Frame 7 and were installed in 1973. The two simple cycle No. 2 oil-fired black-start and peaking turbines, designated as CT1 and CT2, are General Electric Frame 5 and were installed in 1970 and 1971, respectively. In addition, there are two No. 2 oil-fired auxiliary boilers used to supply start-up steam and building heat.

Coal is currently delivered to Morgantown by CSX Transportation Corporation (CSXT) unit trains. Fuel oil is delivered by truck, barge, or pipeline. A coal barge unloading system was approved in 2005; however, a design change is currently under review by the PSC.

Exhaust gases leave each unit through a 700-foot stack. Current air quality control systems at Morgantown, as mandated by prior legislation, consist of a hot-side electrostatic precipitator (ESP) to control particulate emissions, and low-NO_x burners (LNBs) and separated overfire air (SOFA) to control NO_x emissions. An SCR system is scheduled to be installed on each unit to provide additional NO_x control, becoming

operational in 2007 (for Unit 1) and 2008 (for Unit 2); this system was also the subject of a previous CPCN proceeding. Condenser cooling is accomplished using once-through cooling from the Potomac River.

2.3 PROPOSED PROJECT

The proposed modification of Morgantown consists of installation of air quality control systems including wet FGD systems and sulfuric acid mist (SAM) controls, and associated enhancements of the facility necessary for the operation of the systems. This will substantially decrease the emissions of primary air pollutants emitted from Morgantown, including SO_2, particulate matter (PM) with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and other air emissions including mercury (Hg). Furthermore, components of this project will allow Mirant to upgrade the pulverizers on Morgantown Unit 2 to provide Mirant greater flexibility to utilize a wider variety of coals. The project also has allocated space for the future installation of activated carbon injection equipment and fabric filter baghouses for additional control of mercury emissions, if needed.

The existing flue gas handling systems will be upgraded to link to the new control system by means of new ductwork. Existing induced-draft fans will be upgraded from their current design, new booster fans will be installed, and a new stack will be built. The stack will contain the majority of the continuous emissions monitoring systems. The existing stacks will be utilized as boiler protection devices to prevent high vacuum excursion to the existing furnaces.

The proposed project involves installation of the following components:

- An air quality control system for each boiler consisting of a wet FGD scrubber and associated process systems, sorbent injection equipment for removal of SAM, and a single dual-flue 400-foot stack to serve the FGD systems of both units. Space will be allocated for the future installation of fabric filter baghouses and activated carbon injection equipment if needed for additional control of mercury;

- Material handling and storage equipment for process input (limestone and other air quality control system reagents) and output (gypsum) materials, created by the installation of the FGD system;

- By-product management system components including water and wastewater treatment facilities, handling and storage systems for reagents and solid wastes generated from water and wastewater treatment, and a fabric filter;

- Upgrades to the Unit 2 coal pulverizers to handle a wider range of coals and will consist of an additional motor and the replacement of grinding zone compartments; and

- Turbine upgrades at Unit 2 to improve the heat rate/efficiency.

Construction is expected to last about 28 months. Construction is set to begin August 1, 2007 and the project is expected to be completed in November of 2009.

2.3.1 Air Quality Control System Components for Each Steam Turbine

From the boiler to the stack, the first component of the APC project will be the SAM sorbent injection system. Here calcium hydroxide ($Ca(OH)_2$) sorbent will be injected into the ductwork upstream of the wet scrubbers to reduce emissions of SAM. Mirant has also requested approval for an interim SAM sorbent injection system to control SAM emissions prior to the operation of the scrubbers. During this interim period, an alkaline SAM sorbent, magnesium hydroxide ($Mg(OH)_2$), will be injected directly into the furnace to remove SAM formed during combustion. Reacted and excess sorbent will be removed by the ESP (during the interim period) and by the FGD scrubber (for the long-term operations).

The design of the project will allow for the flexibility to use powdered activated carbon (PAC) to control mercury emissions in the future, and sufficient space will be allocated to accommodate receiving and storage facilities for PAC. The project design also allows for the future installation of a fabric filter baghouse to capture the PAC and PM (e.g., fly ash particles) from the treated flue gas, if needed. Space is also allocated for temporary on-site storage of by-products prior to off-site disposal or beneficial use in the future.

A wet FGD scrubber will remove SO_2 from the flue gas of each steam-generating units. The design includes a single 100 percent capacity SO_2 absorber for each unit. A slurry of pulverized limestone and water is sprayed into the flue gas that enters the FGD scrubber. The calcium in the slurry chemically reacts with SO_2 to form calcium sulfite. With the introduction of additional air in the scrubber system, the calcium sulfite oxidizes to form calcium sulfate, or gypsum. The limestone slurry

necessary for operation of the FGD system is prepared in ball mills by mixing limestone with water and grinding it to small particles to form limestone slurry. This is stored in a slurry storage tank prior to input into the FGD system. Figure 2-1 shows the limestone handling system process flow diagram.

Once used in the FGD system, the reactant is pumped to hydroclone classifiers which will separate the slurry into low-density fines and high-density coarse crystals, corresponding respectively to unreacted limestone and gypsum by-product. Belt filters will be used to dewater a side stream of re-circulating slurry from the FGD absorbers. Any unreacted limestone will be recycled back to the FGD system, and the gypsum by-product will be removed from the belt filters. The gypsum will be temporarily stored on-site before being sent off-site for reuse or disposal. Gypsum is suitable for being used in making wallboard, cement manufacturing and other alternative uses. To control the accumulation of chloride salts within the water phase of the FGD system, a chloride purge stream (CPS) is extracted from the FGD system and sent to the wastewater treatment system.

The flue gas that passes through the FGD scrubber is then emitted to the environment through a dual-flue 400-foot stack that will also be constructed as part of the proposed project. It will consist of a concrete or steel frame shell that surrounds and supports the flues from each of the steam turbines. Each flue will be fabricated with a fiberglass-reinforced plastic (FRP) lining and have an approximate diameter of 26.9 feet. The stack will contain the majority of the continuous emissions monitoring systems (CEMS).

Inputs to the FGD system include water and limestone for the limestone slurry. Additional outputs besides gypsum include wastewater. The necessary subsystems for material preparation, handling and storage will be constructed as part of the proposed project.

Wet vs. Dry FGD Scrubbing

There are two primary types of FGD scrubbers capable for retrofitting to coal-fired boilers: "wet" FGD and "dry" FGD systems. Table 2-1 summarizes some general characteristics of wet and dry FGD systems. Both wet and dry FGD technologies require substantial volumes of relatively high purity water to scrub SO_2 out of the boiler exhaust stream. The terms "wet" and "dry" describe the relative moisture contents of by-product ("scrubber sludge"), not the media used to conduct the gas scrubbing. The wet scrubber uses a continuously circulating scrubbing solution to remove SO_2 and the by-product is created in and filtered from

the solution. The dry scrubber sprays a mixture of water and reagent into the hot flue gas where the reagent reacts with the SO_2 and the water evaporates into the flue gas. The resulting dry by-product is removed in a fabric filter, along with fly ash still remaining in the flue gas.

The two types of FGD scrubbers have different operating characteristics and degrees of effectiveness in reducing SO_2. For example, dry FGD systems are generally limited to boilers with a maximum rated capacity of about 300 MW; wet FGD systems are effective for the largest boilers. Dry FGD systems require somewhat less water on a per-megawatt basis; on the other hand, wet FGD systems generate a high proportion of useable by-product—synthetic gypsum—while by-product from the dry FGD systems has fewer re-use applications, due to its fly ash content. Wet FGD systems generate a near-continuous water vapor plume; the vapor plume from dry FGD systems is visible much less frequently.

Under the Maryland Healthy Air Act, coal-fired power plants in Maryland have annual caps on SO_2 emissions. The regulations do not dictate specific technologies that plants must use to reduce SO_2; instead, plants may choose any reduction technologies, or combination of technologies, to meet HAA emissions caps.

Table 2-1 Characteristics of Wet and Dry FGD Technologies

Characteristic	Generic Wet FGD	Generic Dry FGD	Morgantown FGD System
Common type of technology	Limestone Forced Oxidation (LFO)	Lime Spray Dry	LFO
Boiler size limitation	No limits	Generally limited to 200-300 MW	624 MW each or 1,248 MW for 2 units
Coal sulfur content limitation	No limits	Low to medium sulfur coals	1.6% sulfur (current) to 2.8% sulfur
Maximum SO_2 control efficiency	Up to 95%-98%	Up to 90%-94%	92%-98%
Water requirements	~1.6 mgd-2.3 mgd depending on coal and level of SO_2 control (assuming 1,248 MW)	~1.1 mgd-1.4 mgd depending on coal and level of SO_2 control (assuming 1,248 MW)	1.7 mgd
Mercury co-control	Up to 98% with fabric filters for PM	Up to 98% with fabric filters for PM	Level to be determined
Visible plume	Near-continuous	Intermittent	Near-continuous
By-product re-use potential	Synthetic gypsum for wallboard; cement industry	Cement industry or needs to be landfilled	Seeking gypsum buyer; may need to landfill

2.3.2 *Material Handling and Storage Equipment for Raw Materials and By-products and Output Materials*

2.3.2.1 *Limestone Receiving, Handling, Storage and Off-site Transfer*

Approximately 429,000 tons of limestone will be delivered to the site annually for use at Morgantown, primarily in 20,000-ton barges (36 to 48 barges per year). A coal barge unloading system, shown in Figure 2-2, has been licensed (under Case 9031) and could also be used for unloading limestone. It is expected that three to four barge deliveries of limestone will be made per month, each taking approximately 12 hours to unload, and each occurring primarily during daylight hours. However, lighting for night operations will also be provided.

The secondary and backup limestone delivery systems will be rail cars and trucks, respectively. The incoming rail cars will have a 100-ton capacity, with a covered top and bottom discharge, and will dump into below grade hoppers. The system will be designed to unload a maximum of 20, 100-ton rail cars in an eight-hour shift. It is expected that a maximum of 83 rail cars of limestone will be unloaded each week. If

limestone is not available by barge or rail, then 20-ton trucks will be used. It is expected that a maximum of 412 trucks per week will be required to deliver the necessary limestone.

For barge unloading, a new 54-inch limestone stackout conveyor, depicted in Figure 2-1, will be built to receive limestone from the Case 9031 barge unloader coal conveyor system at the existing transfer tower. The limestone will be transported into the limestone storage enclosure at a maximum rate of 1,750 tons per hour (TPH). For rail car and truck unloading, limestone will be reclaimed by a feeder(s) that will feed a 36-inch conveyor with a rated capacity of 500 TPH, to transport the limestone to the storage enclosure.

Limestone will be stored in a 30,000 ton-capacity, covered enclosure. A single point of discharge from a single point stacker will form the storage pile, where a live reclaiming system will transfer the limestone onto a 24-inch reclaim conveyor at a rate of 260 TPH. The reclaim system will then transfer the limestone onto another 24-inch conveyor that will feed three mill silos. An emergency reclaim hopper will be provided so that in the event of a reclaim system problem, limestone can be fed to the reclaim conveyor system using front-end loaders.

Limestone will also be reclaimed and conveyed to the rail and truck loading building for transport to the Chalk Point Facility. A 36-inch reclaim conveyor with a transfer capacity of 500 TPH will be used to fill 20 rail cars in an eight-hour shift. It is expected that a maximum of 58 rail cars or 230 trucks will be used per week to transport limestone to Chalk Point.

The three mill silos, each with a capacity equivalent to 16-hours of plant operation, feed limestone to the limestone slurry preparation system. These have to be filled twice a day if the power generating units are operating at full capacity. The limestone reclaiming equipment is designed to fill the limestone day silos in an eight-hour shift. Silo ventilation is equipped with a pulse jet fabric filter for dust emissions control. All conveyors in the limestone handling system are fully covered and all transfer towers are enclosed.

2.3.2.2 Gypsum Handling, Storage and Off-site Transfer

It is expected that a maximum of 703,000 tons of commercial-grade gypsum will be generated and removed annually from the site. As shown in Figure 2-3, three, 50-percent capacity vacuum belt filters (two operating and one spare) in the FGD dewatering facility will be used to collect the

gypsum by-product. A 24-inch conveyor will transport the gypsum by-product collected from the belt filters to an enclosed storage area at a maximum rate of 100 TPH. The gypsum storage pile is equivalent to the output of about seven days of plant operation.

Gypsum will be reclaimed from the storage area at a rate of 500 TPH, by means of a 36-inch loadout belt conveyor which transports the gypsum to the rail and truck loading building. Gypsum will be transported off-site primarily by rail. The gypsum off-site rail transport system has a capacity to load 20, 100-ton rail cars in one eight-hour shift. It is expected that at maximum plant operating capacity, up to 135 rail cars will be used per week for gypsum transport. Gypsum can be transported off-site by 20-ton truck only under emergency conditions, and it is expected, if needed, that 676 trucks would be used per week. Any off-specification gypsum can be loaded onto trucks by a front-end loader and trucked from the gypsum storage area to an off-site disposal area.

2.3.2.3 Receipt and Storage of Other Reagents

Lime for use in the wastewater treatment system and reagent for SAM control will be delivered to the site by bulk-carrier truck. Each will be pneumatically transported to its own storage silo, which will be equipped with dust collection devices to capture reagent dust expelled with the transport air.

2.3.3 Water Supply, By-products, and Waste Management System Components

2.3.3.1 Water Supply

The project as proposed will utilize well water as the makeup water source. A new filtration system will be installed to treat the well water prior to utilization in the FGD system. The waste stream from the filters will be disposed of in the facility's existing wastewater treatment system.

2.3.3.2 Wastewater Treatment

The new Morgantown FGD Wastewater Treatment System will treat the wastewater released from the FGD system, through physical/chemical unit processes for the removal of suspended solids and metals, and biological unit processes for the removal of biochemical oxygen demand (BOD) and nitrogen.

2.3.3.3 Handling and Storage of Water and Wastewater Treatment Sludge Cake

The sludges from the well water filtration system and the Morgantown FGD Wastewater Treatment System will be transferred to a sludge thickener for concentration. All sludge dewatering operations will be conducted in a fully enclosed building. Thickened sludge will be pumped to filter presses for dewatering. Sludge will be dewatered to greater than 50 percent solids dry weight by the filter presses and collected in sludge storage hoppers located inside the building. The sludge hoppers will be filled and trucked off-site for disposal at a landfill. It is expected that the average weight of sludge produced from the wastewater treatment system and associated with operations of the FGD system will be 48,800 lbs per day. At a sludge density of 70 pounds per cubic feet, the volume of sludge produced will be 700 cubic feet per day. Based on a truck capacity of six tons, this represents approximately four truck loads of solid waste produced per day.

2.3.4 Storm Water Management

The Morgantown facility currently discharges site storm water runoff to the Potomac River and to Pasquahanza Creek under the facility's existing NPDES Permit. The existing Storm Water Pollution Prevention Plan (SWPPP) minimizes discharges of potential contaminants from facility storm water runoff. All storm water runoff from industrial areas is collected and treated in storm water detention basins prior to discharge. Storm water from all new permanent project areas will be collected and routed to that system for treatment prior to discharge. The existing SWPPP employs "Best Management Practices" (BMPs) to minimize potential pollutant loading. This Plan will be modified to reflect the new project facilities and storm water management infrastructure.

3.0 EXISTING SITE CONDITIONS

3.1 GEOLOGY AND GROUND WATER RESOURCES

3.1.1 Geology

The Morgantown Generating Station is located in the Atlantic Coastal Plain Physiographic province of Maryland. Approximately 1,800 feet of unconsolidated sedimentary deposits consisting of clay, silt, sand, and gravel underlie this region. Table 3-1 summarizes the Morgantown geology and hydrogeology. Figure 3-1 shows a geologic cross-section of the area based on Andreasen (1999) and supplemented with information obtained from Mirant's test well (GAI, 2007).

The surficial aquifer system consists of major and minor aquifer and confining units of upper Cretaceous to Tertiary age. Beneath these surficial aquifers, aquifers of lower Cretaceous age form the Potomac Group — the primary water source for industrial and municipal users in Charles County. The sediments of the Coastal Plain range in age from Triassic to Quaternary with the younger formations outcropping successively towards the southeast across southern Maryland and the Eastern Shore.

Beneath the surficial aquifers are the unconsolidated sediments of the Patapsco and Patuxent formations, which are underlain by crystalline basement rock. The geologic units of interest in the project area are the Patuxent Formation, Arundel Clay, and Patapsco Formation. Collectively, these formations form the Potomac Group. The contact between the basement rock and the Patuxent formation sediment is marked by a 10 to 20 foot thickness of weathered rock (clayey saprolite).

3.1.2 Hydrogeology

The cross section in Figure 3-1 illustrates the hydrogeology of the Morgantown site. At Morgantown, four Coastal Plain aquifers are lumped together as undifferentiated: Chesapeake Group, Nanjemoy, Aquia and Brightseat aquifers (Andreasen, 1999). These units are underlain by the Patapsco, and Patuxent aquifers, which are the aquifers of interest for Mirant and this water supply evaluation.

Figure 3-1

Morgantown Generating Station
Geohydrologic Cross-Section

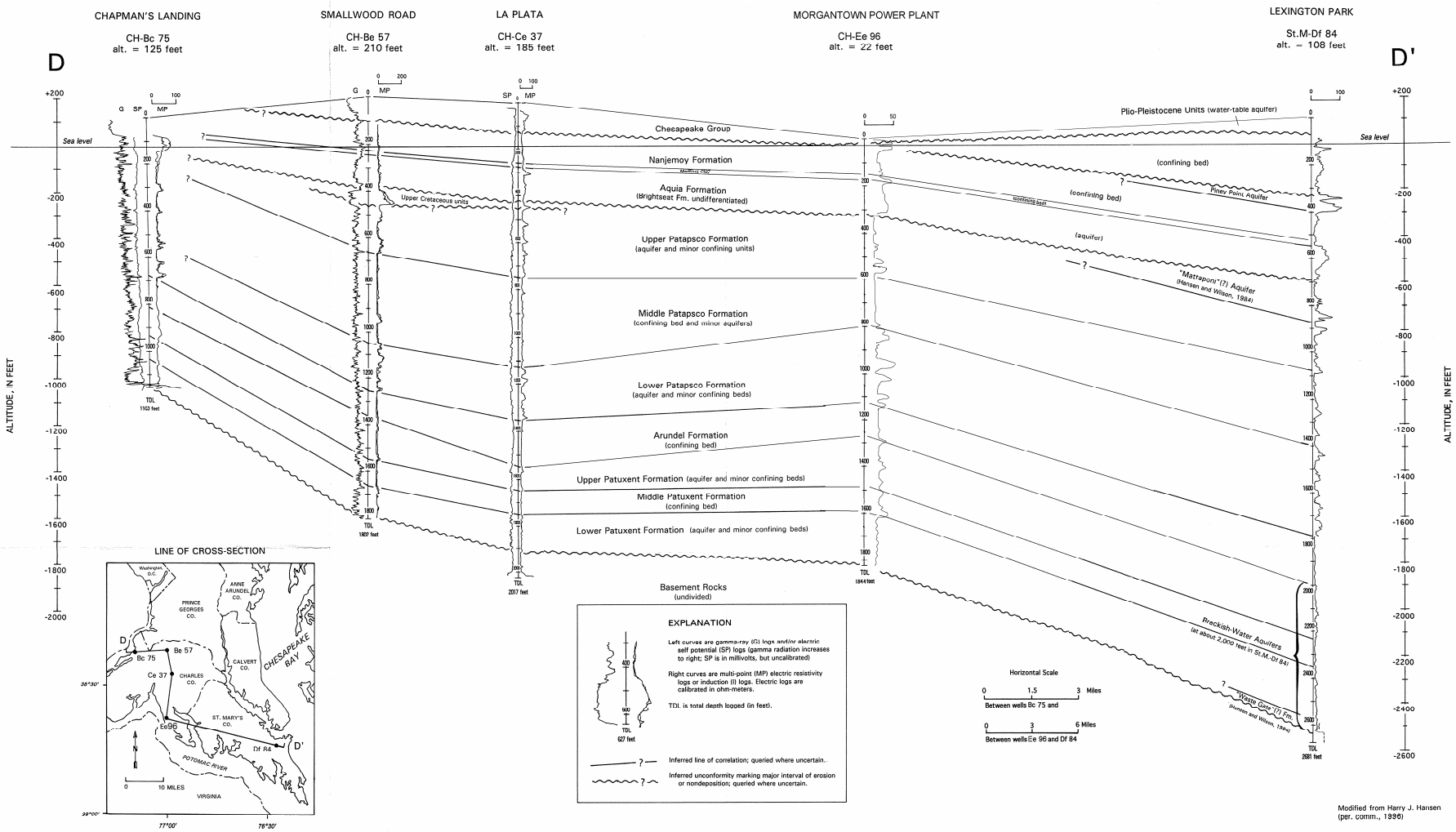


Table 3-1 Hydrogeologic Units at Morgantown

System	Series	Approximate thickness (ft)	Unit	Lithology
Tertiary	Pliocene	175	Surficial aquifers; Chesapeake Group, Najemoy, Aquia and Brightseat (undifferentiated) aquifers	Sand, gravel, silt, and clay; yellow and brown
	Paleocene	150		Sand, silt, and clay; glauconitic; dark gray
Cretaceous	Lower Cretaceous	275	upper Patapsco aquifer	Sand, interbedded with multi-colored clay
		200	Confining bed	Clay and silt
		325	lower Patapsco aquifer	Alternating beds of fine to coarse sand, interbedded with thicker layers od dense clay
		125	Arundel confining bed	Clay, dense; red, purple, and brown with relatively thin beds of fine-grained sand
		200	upper Patuxent aquifer	Sand, medium to coarse; clean; light gray; quartzose; with some small gravel
		100	Confining bed	Clay and silt
		200	lower Patuxent aquifer	Sand with intergranular silt and clay

3.1.2.1 *Patapsco Formation*

The Patapsco Formation consists of thick clay and silt beds interbedded with sand units of varying lateral and vertical extent (Mack, 1988). The top of the Patapsco occurs at a depth of approximately -295 feet mean sea level (msl) in the Morgantown area, and has an approximate thickness of 800 feet extending to -1,278 feet msl. The Patapsco Formation in the Morgantown area has been divided into the Upper and Lower Patapsco aquifers, and is separated by a middle unit that contains interlayered minor aquifers and confining beds (Figure 3-1). Mirant is currently using ground water extracted from the Lower Patapsco aquifer at Morgantown.

Ground water monitoring data indicate that there is little hydraulic connection between the Patapsco and the overlying aquifers (Mack, 1983). Therefore, future withdrawals from the Patapsco are not anticipated to adversely impact the overlying surficial aquifers.

Two key aquifer characteristics that describe an aquifer's ability to yield water are transmissivity and storativity. Transmissivity is a measure of the amount of water that can be transmitted horizontally through a unit width by the full saturated thickness of the aquifer. The higher the transmissivity value, the higher the rate of ground water flow. Storativity, or the storage coefficient, is the volume of water an aquifer will release from storage per unit surface area of the aquifer per unit change in hydraulic head. It is used to determine whether a given aquifer occurs under confined, semi-confined, or unconfined conditions. Generally, the value of storativity of confined aquifers is 0.005 or less.

Analysis of a single-well pumping test conducted by Mirant (Shultes, 2002) at Morgantown provided a transmissivity value for the Lower Patapsco of about 560 ft^2/day. This value is in agreement with a value of 633 ft^2/day determined at well Ch Ee 91 approximately two miles northeast of Morgantown for the Lower Patapsco (Andreasen, 1999). Storativity values could not be derived from the pumping test data because an observation well in the same aquifer is required to calculate an accurate value. Storativity values for the Lower Patapsco in southern Maryland have been reported to range from 3×10^{-5} to 5×10^{-3} (Mack, 1962; Fleck and Vroblesky, 1996).

Long term ground water monitoring of the Lower Patapsco aquifer indicates a steady decline in water levels to about -80 feet msl at Morgantown prior to 1997 (Andreasen, 1999). Since 1997, water levels in the vicinity of Morgantown have remained relatively constant with a total drawdown of over 30 feet between 1990 and 2003 (PPRP, 2006). The historic pre-pumping 1970 ground water elevation in the Lower Patapsco has been estimated by Andreasen (2007, electronic mail communication) as approximately 16 feet msl.

COMAR 26.17.06.05.D(4) indicates that an appropriation of ground water cannot be issued if the proposed withdrawal will exceed the sustained yield of the aquifer. This regulation provides the tool to determine whether the regional sustained yield potentiometric surface of a confined aquifer is being exceeded, by requiring that the regional sustained yield potentiometric surface not be lowered below 80 percent of the total drawdown available between the top of the aquifer and the historical pre-pumping level of the potentiometric surface. The method used to

calculate the 80 percent management level for the Lower Patapsco aquifer at Morgantown is described below.

- The top of the Lower Patapsco aquifer is estimated at an elevation of -778 feet msl.
- The Lower Patapsco aquifer has an 80 percent management level of -619 feet msl (i.e., 0.80*(778 feet plus 16 feet) plus 16 feet).
- At the Morgantown plant, a static water level of 118 feet (-96 feet msl) was measured during the recovery period of the 2006 pumping test in the well 3RR.
- Therefore, the remaining available drawdown in the Lower Patapsco aquifer at the Morgantown plant is 523 feet (619 feet – 96 feet).

3.1.2.2 Patuxent Formation

The Patuxent Formation contains the deepest aquifer in Charles County, lying below the Lower Patapsco aquifer. Mirant is proposing to use ground water withdrawn from the Patuxent aquifer within the Patuxent Formation to supply the water required for scrubbers. Andreasen (1999) divided the Patuxent Formation into upper and lower aquifers.

Since the Lower Patapsco and Patuxent aquifers are separated by confining layers of the Arundel Clay limiting leakage between them, it is likely that increased pumping from the Patuxent aquifer is not likely to affect individual wells in the overlying Patapsco aquifers.

Mirant drilled and installed a test well in the Patuxent Formation between October 2006 and January 2007 to support its request to appropriate ground water for use in the scrubber (GAI, 2007). The geophysical logs indicate that the Patuxent Formation extends from 1,300 feet below ground surface (bgs) to 1,830 feet bgs (-1,278 feet msl to -1,808 feet msl). Top of rock was encountered at a depth of -1,808 feet msl. The drilling and geophysical logs indicate that the Patuxent is inter-layered with sand and clay layers. In general, the sand layers in the Upper Patuxent identified in geophysical logs vary from ten to twenty feet thick. The Lower Patuxent appears to consist primarily of clay with few intervening sand layers. Consequently, the Patuxent aquifer at Morgantown consists primarily of the interspersed sand layers within the unit defined by Andreasen (1999) as the Upper Patuxent aquifer.

Mirant installed a six-inch diameter steel test well in the 12-inch diameter borehole. Ten individual sand layers were screened between -1,280 feet msl and -1,709 feet msl. Mirant conducted a 72-hour constant-rate

pumping test in the test well at a discharge rate of 299 gallons per minute. Pumping test analyses by GAI (2007) resulted in transmissivity values ranging from 290 ft^2/day (pumping test) to 300 ft^2/day (recovery test).

A storativity value was not determined from the pumping test because an observation well in the same aquifer is recommended to accurately calculate a storativity value. For the Patuxent aquifer, Andreasen (1999) reported storativity values ranging from 1×10^{-3} to 1×10^{-5} with a median value of 1.5×10^{-4} and an average value of 2.6×10^{-4}.

During the Mirant pumping test, water levels were monitored in well 3RR screened in the Patapsco aquifer. Water levels fluctuated between 118 and 122 feet below a reference point and no consistent downward trend was observed in the test. The pattern of water level fluctuations in 3RR during the test suggests limited to no hydraulic connection between the Patapsco and the Patuxent aquifer during the 72-hour test.

The method used to calculate the 80 percent management level for the Patuxent aquifer at Morgantown is described below.

- Prior to the GAI pump test, the water level in the pumping well was 45 feet below ground surface (bgs). The land surface elevation at the test well is approximately 22 feet msl, thus the current water level is -23 feet msl.
- Andreasen (2007, electronic mail communication) reported that the modeled historical pre-pumping water level elevation in the Patuxent aquifer at Morgantown is 7 feet msl.
- The top of the Patuxent aquifer is estimated to occur at -1,278 msl at Morgantown based on the geophysical log from Mirant's test well (GAI, 2007).
- The difference between the top of the Patuxent aquifer and the historic, pre-pumping water level is 1,285 feet (1,278 feet plus 7 feet).
- Eighty percent of 1,285 feet is 1,028 feet; subtracting 1,028 feet from 7 feet msl results in an 80 percent management level of -1,021 feet msl.
- Remaining available drawdown is the difference between the current water level of -23 feet msl and the 80 percent management level of -1,021 feet msl, which leaves 998 feet of remaining available drawdown.

The maximum drawdown calculated by GAI (2007) at a distance of 2,500 feet, or about one-half mile, is approximately 489 feet, or approximately 49

percent of the available drawdown. Impacts associated with this proposed withdrawal are discussed in more detail in Section 6.0.

3.1.3 Ground Water Quality

Although it is understood that the ground water quality of the Patapsco and those aquifers above the Patapsco is good, PPRP does not have access to ground water quality data for the Lower Patapsco aquifer at Morgantown.

Mirant collected a ground water sample from the test well completed in the Patuxent Formation. The results were compared to the USEPA drinking water standards maximum contaminant levels (MCLs). Although MCLs were promulgated to determine drinking water limits, they are used herein to discuss the water quality. The water quality results indicate that concentrations all of the constituents are below the MCLs.

The water quality results were also compared to the USEPA secondary drinking water regulations. The water quality results were also compared to the USEPA secondary drinking water regulations. The water quality results indicate that concentrations of chloride, dissolved solids, and iron concentrations of 410, 1,100 and 0.53 mg/L, respectively exceed the secondary standards of 250, 500 and 0.30 mg/L, respectively. A key water quality parameter that needs to be present at low concentrations in the scrubber influent is chloride, which needs to be less than 10 mg/L. Mirant indicated that the water quality in the Patuxent aquifer will require pretreatment using a reverse osmosis system to reduce the dissolved solids to acceptable levels prior to use in the scrubber (23 February 2007 electronic mail transmittal from Mr. Byers Rogan of Mirant).

3.1.4 Ground Water Use

3.1.4.1 On-Site Ground Water Use

Morgantown is currently authorized by MDE to withdraw ground water from four wells completed in the Lower Patapsco aquifer (permit CH1967G011(10). The current appropriation limit for the Morgantown Power Station for ground water withdrawal from the Lower Patapsco aquifer is 0.70 million gallons per day (mgd). Since 1975 the average daily ground water withdrawal has varied from approximately 0.80 mgd in the mid to late 1970s (the original appropriation amount was 0.82 mgd) to less than 0.58 mgd in 2004.

3.1.4.2 *Off-Site Ground Water Use*

Local off-site ground water uses include small volume withdrawals by individual private wells screened in the surficial aquifer and the Aquia formations in the communities of Newburg, Clifton-on-the-Potomac, and the Town of Morgantown, which neighbor the power plant. Withdrawals from the Aquia aquifer will not be adversely impacted from withdrawals from the Lower Patapsco and Patuxent aquifers because of the presence of numerous confining beds.

The Lower Patapsco aquifer is pumped heavily by public users in central Charles County (Waldorf, LaPlata and Indian Head), and the Morgantown power plant. A cone-of-depression of nearly 200 feet below sea level has formed in the Waldorf and LaPlata area from the pumping (Drummond, 2005) while a cone of depression approximately 92 feet below mean sea level was apparent around the Morgantown plant (Curtain et al. 2005) during 2003.

Two proximal users of the Lower Patapsco aquifer are:

- **Town of LaPlata**. The Town has a ground water appropriations permit that allows them to withdraw a daily average of 1,144,000 gallons of ground water, and 1,236,000 gpd in the month of maximum use, from four wells completed in the Lower Patapsco aquifer. The permit was issued in February 1998 and was to run until February 2010. Additionally, the Town has notified MDE Water Management Administration that it wants 1.5 mgd average and 2.1 mgd in the month of maximum use from five wells. The Town is in the process of locating the new well and putting it out for bid.
- **Swan Point**. MDE WMA has indicated that a permit application for 500,000 gpd average and 750,000 gpd in the month of maximum use from two existing wells and a third proposed well in the Patapsco formation has been received from the Commissioners of Charles County for the Swan Point Community. A public informational hearing was held in February and a final decision will be made in early April. Their existing permit was for 60,000 gpd average and 100,000 gpd month of maximum use. One of their two existing wells is completed in the Middle Patapsco and the other is completed in both the Middle/Lower Patapsco.

To date, the Patuxent Formation has been used sparingly in southern Maryland for water supply due to the great depth of the aquifer and the cost associated with drilling and maintaining wells at this depth. Additionally, there is limited information that suggests that the aquifer is

saline in parts of southern Maryland, such as Lexington Park (Hansen and Wilson, 1984). However, the Patuxent Formation is a current and potential future water source in eastern Charles County where the formation is shallower in depth. The Patuxent aquifer in the Patuxent Formation is currently approved for high volume use in three locations in the Indian Head-Bryans Road area.

- Charles County has two production wells in the Bryans Road well field completed in the Patuxent (CH Bc 78 and CH Bd 58). Withdrawal from well CH Bc 78 averaged 0.12 mgd between 1997 and 2002 (Andreasen, 2004). Well Ch Bd 58 was installed in 2004. The pumpage from well CH Bc 78 is the first confirmed use of the upper Patuxent aquifer in Charles County (Andreasen, 1999). The design pumping rate for well CH Bd 78 is 1.0 mgd and the design pumping rate for well CH Bd 58 is 0.72 mgd (Andreasen, 2004).
- Hunter's Brook is an approximately 525 home residential development that has been permitted by MDE WMA for a withdrawal of 118,000 gpd from one well (CH Ce 36). Hunter's Brook is located approximately two miles south of Potomac Heights.
- The Naval Surface Warfare Center at Indian Head was required in 2006 by MDE WMA to transfer ground water withdrawals from the Patapsco Formation to the Patuxent Formation to mitigate saltwater intrusion into the Patapsco aquifers. As of May 2006, the Naval Surface Warfare Center is permitted to withdrawal an annual average of 1.0 mgd from the Patuxent aquifer from multiple wells.

These three locations are approximately 20 miles north-northeast from the Morgantown power plant. Additionally, MDE WMA expects there to be future users of the Patuxent aquifer in the Bryans Road area in the near term. For example, Charles County is interested in using two production wells completed at the former Chapman's Landing residential development site for public supply. The former Chapman's Landing property, which is located about two miles southwest of Bryans Road, is being developed into a state park. The wells are not currently being used because the residential development was stopped.

3.1.5 Surface Water

The Morgantown facility is located on the banks of the Potomac River, at a point where the river is approximately 1.5 miles wide. In 2006, the Potomac River was designated as an American Heritage River (Charles County, 2006). The Potomac River has been subdivided into upper, middle and lower basins. The 60-mile stretch of the Lower Potomac, from the mouth of the river at Chesapeake Bay to the U.S. 301 Bridge near

Morgantown, is a broad tidal estuary. The area of Charles County along the River is mainly considered part of the Lower Tidal Potomac River Basin watershed. In the vicinity of the site, the river's salinity rises and there is an increased presence of blue crabs and oysters, accordingly (Mirant, 2006). According to the U.S. Geological Survey (USGS) a stream flow measurement station has been monitoring the tidal height of the Lower Potomac River in Charles County near Newburg, which is within a short distance from the facility, since July 2006 (USGS, 2006).

The average annual freshwater discharge is approximately 13,400 cubic feet per second (cfs), with a spring tidal flow of 220,000 cfs downstream during the ebb stage and upstream during the flood stage.

Over the past two decades, the multi-state Chesapeake Bay Program has been focusing on reducing pollution caused by excess levels of nitrogen and phosphorus, which are problems facing the Chesapeake Bay in general. The 1987 Chesapeake Bay Agreement, as amended in 1992, set a goal to permanently reduce levels of nitrogen and phosphorus 40 percent by 2000. Since the Potomac River is a major tributary to the Bay, it is affected by this program.

According to the MDE (2006), the Potomac River Lower Tidal basin in St. Mary's County (just downstream of Charles County) was identified as "impaired by nutrients and sediment" on the state's list of water quality-limited segments (WQLSs). Listings of toxics in the tidal portions were added in 2002, and listings of fecal coliform in the tidal portion and biological impacts in non-tidal portions were added in 2004. According to Mirant's CPCN application, the nutrient, sediment, toxic, biological, and any remaining bacteria impairments within the basin will be addressed at a future date.

Since 1985, continuous monitoring of selected water quality parameters has taken place in the Lower Potomac River at the Governor Harry W. Nice Memorial Bridge. Table 3-2 lists water quality data for clarity, dissolved oxygen, salinity, temperature and pH in the Lower Potomac River at Nice Bridge for 2006, with the mean, minimum, and maximum values from the period 1985 to 2005 (http://mddnr.chesapeakebay.net). Water quality parameters for 2006, as shown in the last column of Table 3-2, were within the minimum and maximum range for 1985 to 2005, and were for the most part similar to the mean value for 1985 to 2005. Water clarity decreases in the summer months, most likely from increased algae abundance. Dissolved oxygen also decreases in the summer months due to the warmer temperatures decreasing the amount of oxygen that can be dissolved and an increased abundance of algal blooms. Salinity decreases

in the spring months (April to June) due to increased freshwater flow. Water temperature is higher in the summer months due to higher air temperature and pH is consistent through the year.

Maryland DNR (http://www.dnr.state.md.us/bay/tribstrat/low_pot/lp_status) states that total nitrogen in the Lower Potomac River has a poor status, but has been improving overall, while water clarity has a poor status and a degrading trend. Abundance of algae has a fair status but a degrading trend, and total phosphorus has a poor status. Total suspended solids and summer dissolved oxygen both have a fair status.

Table 3-2 Water Quality Parameters for the Lower Potomac River at the Governor Harry W. Nice Memorial Bridge (Rte 301)

Water Clarity (Secchi Depth) (meters)				
Month	**Minimum**	**Mean**	**Maximum**	**2006 Status**
January	0.10	0.72	1.50	0.40
February	0.30	0.74	1.10	0.30
March	0.30	0.61	1.00	0.40
April	0.20	0.45	0.85	0.55
May	0.40	0.58	0.80	0.70
June	0.35	0.67	1.15	0.60
July	0.50	0.77	1.15	0.70
August	0.65	0.85	1.10	0.60
September	0.35	0.93	1.30	0.55
October	0.50	1.09	1.70	1.10
November	0.21	1.11	2.60	0.70
December	0.20	0.79	1.20	0.50
Bottom Water Dissolved Oxygen (mg/l)				
January	9.30	11.10	12.70	10.60
February	7.60	10.94	14.30	9.80
March	6.10	9.57	12.00	10.40
April	4.85	7.73	9.80	7.65
May	2.16	4.93	7.15	1.95
June	0.35	2.62	3.85	3.15
July	1.70	2.66	4.75	1.85
August	1.45	3.17	4.50	4.75
September	2.02	4.72	6.50	5.65
October	4.25	6.32	7.90	6.30
November	4.97	8.16	10.30	8.70
December	7.50	9.44	12.20	10.60
Surface Water Salinity (ppt)				
January	0.00	7.03	13.33	3.10
February	0.32	6.79	13.99	2.00
March	0.00	4.57	8.76	6.40
April	0.04	3.66	10.98	8.10
May	0.34	3.80	7.71	6.45
June	0.49	4.76	8.32	8.25
July	1.98	6.66	10.11	7.60
August	2.37	7.36	11.57	9.35
September	1.09	7.90	11.41	7.10
October	2.74	8.18	11.11	6.80
November	1.51	8.03	12.86	3.40
December	0.26	7.26	13.39	4.10

Surface Water Temperature (°F)				
January	34.70	38.26	42.80	40.28
February	33.44	38.22	41.90	42.44
March	36.50	44.11	49.73	43.70
April	48.56	54.23	58.46	55.13
May	60.71	65.15	71.24	64.13
June	67.64	74.42	78.89	73.94
July	78.26	80.51	83.21	80.69
August	77.72	80.66	84.92	83.21
September	72.86	75.79	79.07	74.12
October	57.20	64.11	68.90	66.20
November	47.84	54.05	60.26	54.14
December	39.02	45.09	53.78	44.24
Surface Water pH				
January	7.60	8.01	8.40	7.80
February	7.70	8.08	8.50	8.00
March	7.50	7.93	8.40	7.55
April	7.40	7.77	8.30	7.95
May	7.30	7.75	8.20	7.85
June	7.40	7.59	7.85	7.70
July	7.15	7.57	7.75	7.75
August	7.20	7.52	7.95	7.90
September	7.15	7.58	7.90	7.65
October	7.45	7.68	7.95	7.80
November	7.00	7.73	8.10	8.10
December	6.90	7.90	8.40	7.90

Two units at Morgantown use once-through cooling, in which cooling water is continuously drawn from the Potomac River, used, and then continuously returned to the river. Morgantown has a surface water appropriations permit (CH1956S003(08)) from MDE Water Management Administration that allows for the withdrawal of 1,500 million gallons per day (mgd) from the Potomac River. In 2004, an average of 1,094 mgd was withdrawn from the river for the once-through cooling system.

The facility operates under NPDES Permit No. MD000674. This permit regulates the discharge of biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, total copper, total iron, oil and grease, pH, and thermal discharge. According to Mirant's CPCN Application (2006), the Morgantown facility has a good record of compliance with these permit conditions.

3.1.6 Potable Water Supply

Potable water is obtained from on-site wells. Sanitary wastewater is treated at an existing sanitary wastewater treatment plant.

3.2 CLIMATE AND AIR QUALITY

3.2.1 Weather and Climate

Since an extended meteorological data record for the Morgantown facility is not available, the discussion of climatology of the area is based primarily on data from Ronald Reagan Washington National Airport (DCA), which is the closest National Weather Service (NWS) station to the Morgantown site. The Maryland State Highway Administration does have a weather monitoring station located at the Governor Harry W. Nice Memorial Bridge, adjacent to the Morgantown property. Current and some historic weather data from this site, including temperature, relative humidity, wind speeds and precipitation are available from the Maryland Department of Transportation web site (http://www.chart.state.md.us/travInfo/weatherStationData.asp). However, upon discussions within the State, PPRP could not identify the monitoring protocol for the collection of the data, which would be used to ensure accuracy of the data. Therefore, the NWS data from DCA was deemed the most appropriate for the environmental analyses.

The closest meteorological station to the site with upper air data is the NWS station at Sterling. The Sterling Station provided the most representative upper air data for use at the Morgantown site. DCA climate data cited in this section is from "Local Climate Data Annual Summaries for 1995, Part I Eastern Region," as published by the National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, and National Climatic Data Center, unless otherwise specified. DCA is located approximately 35 miles north of the Morgantown facility, and is considered representative of the area.

The climate in the vicinity of the Morgantown site is temperate with four defined seasons. According to the Maryland State Climatology office (2006) the mean annual temperature in Maryland ranges from about 48 degrees Fahrenheit (°F) in the Charles County area to 58°F in the lower Chesapeake Bay area. The average frost penetration in Charles County is approximately five inches or less, although in extremely cold winters, maximum frost penetration may be double the average depth. Summer is characterized by considerable warm weather including at least several hot, humid periods. The average length of the freeze-free season, based on a minimum temperature higher than 32°F, is approximately 230 days. The extreme temperatures in Maryland range from minus 40 to 109°F, each extreme occurring, on average, once every 75 to 100 years.

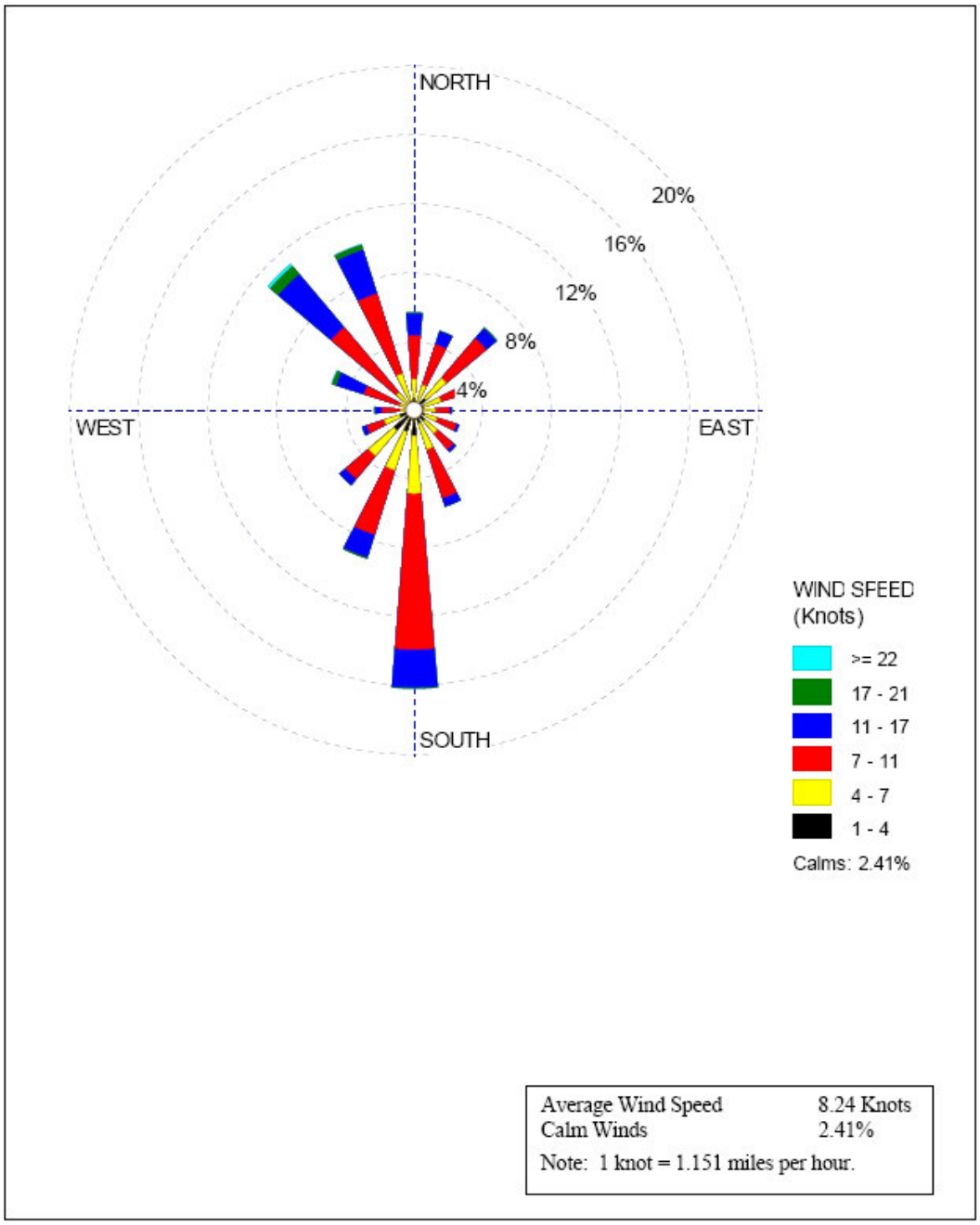
The average annual precipitation in Charles County ranges between 40 and 46 inches. Distribution is quite uniform throughout the year on a state-wide basis, averaging between 2 and 4 inches each month except for a late spring and summer maximum of 4 to 5-1/2 inches. Although the heaviest precipitation occurs in the summer, this is the season when severe droughts are most frequent. Summer precipitation is less dependable and more variable than in winter. Annual precipitation deficits of over 16 inches occurred during extreme droughts of the 1930s, 1960s, and during the 1998 to 2002 period.

Thunderstorms are relatively common, occurring about 29 days during an average year. Thunderstorms have occurred throughout the year, but about 58 percent occur from June through August. Tornadoes are much rarer. Records kept by the Maryland State Climatologist Office dating back to 1818 indicate that Charles County has experienced 21 tornados, including 12 that have occurred since September 1993. In the Morgantown vicinity, there is a two percent chance of occurrence for tropical storms of hurricane strength. Tropical storms have generally approached the area during the period of late August to late October.

The average annual wind speed at DCA is 9.4 miles per hour. Based on wind data at DCA from 1991-1995, prevailing winds are from the south. A wind rose of DCA wind measurements based on data from 1991 through 1995 is presented in Figure 3-2.

More information on the existing air quality at the Morgantown site and surrounding areas is provided in Section 4.0, which discusses the possibility of effects of the project on ambient air quality.

Figure 3-2 *5-Year Annual Wind Rose for 1991 to 1995 at Reagan National Airport (DCA), VA (Station No. 13743)*



Source: National Climatic Data Center, 1991 – 1995; Mirant, 2006.

3.2.2 Ambient Air Quality

3.2.2.1 Existing Ambient Air Quality Standards and Designations

The Maryland Department of Environment (MDE) monitors concentrations of the "criteria" pollutants (NO_x, SO_2, PM, ozone, CO, and lead) at various locations across the United States near ground level. If monitoring indicates that the concentration of a pollutant exceeds the National Ambient Air Quality Standard (NAAQS) in any area of the country, that area is labeled a "nonattainment area" for that pollutant, meaning that the area is not meeting the ambient standard. Conversely, any area in which the concentration of a criteria pollutant is below the NAAQS is labeled an "attainment area" indicating that the NAAQS is being met.

The attainment/nonattainment designation is made by states and EPA on a pollutant-by-pollutant basis. Therefore, the air quality in an area may be designated attainment for some pollutants and nonattainment for other pollutants at the same time. For example, many cities are designated nonattainment for ozone, but are in attainment for the other criteria pollutants.

Since the late 1980s, the NAAQS for PM covered "PM_{10}," which represents PM less than 10 microns in diameter. In 1997, EPA revised the NAAQS for PM and added a standard for a new form of PM known as $PM_{2.5}$, PM less than 2.5 microns in diameter. $PM_{2.5}$, or "fine particulates," are of concern because the particles' small size allows them to be inhaled deeply into the lungs. In December 2004, EPA published its final designation of $PM_{2.5}$ nonattainment areas.

EPA and states make attainment designations based on air quality surveillance programs that measure pollutants in a network of nationwide monitoring stations known as the State and Local Air Monitoring Stations (SLAMS), National Air Monitoring Stations (NAMS), and Photochemical Monitoring Stations (PAMS) (EPA, 1998). NAMS are a subset of the SLAMS focused on urban and multi-source areas. PAMS are also a subset of the SLAMS, and focus on areas of the county with ozone nonattainment issues. Appendix D of Part 58 of the Code of Federal Regulations establishes air quality monitoring network design specifications.

3.2.2.2 Local Air Quality

All of the State of Maryland, including Charles County, is in attainment of the NAAQS for all criteria pollutants with the exception of ozone and

$PM_{2.5}$. Some counties in Maryland are designated ozone attainment areas and some are nonattainment areas; however, because ozone is a regional issue, EPA treats the northeastern United States, from northern Virginia to Maine, as an ozone nonattainment area known as the Northeast Ozone Transport Region.

Charles County is a designated "moderate" ozone nonattainment area (on a scale that ranges from worst to best air quality of extreme – severe – serious – moderate – marginal).

Figure 3-3 illustrates ambient air quality monitoring stations in and adjoining to Charles County, operated under the SLAMS network. The monitoring data are maintained by EPA's AIRS database and are available from the EPA website (www.epa.gov/air/data/). Table 3-3 presents the existing ambient air concentrations for ozone and $PM_{2.5}$ near Morgantown. The existing ambient air concentrations in Charles County and Prince George's County, MD are below the NAAQS for both 24-hour and annual averages of $PM_{2.5}$. However, both counties exceed the 8-hour ozone NAAQS. King George's County, which is located just across the Potomac River from Morgantown, does not have a monitoring station.

Figure 3-3 Location of Pollutant Monitoring Stations In and Around Charles County

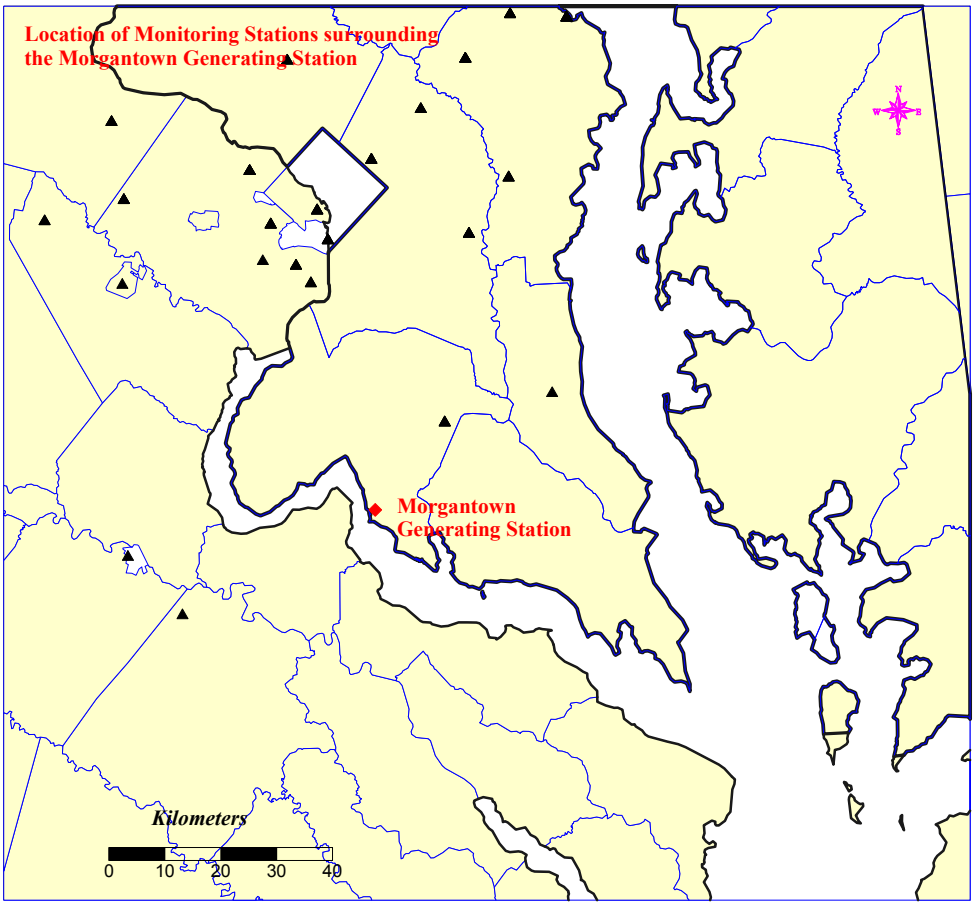


Table 3-3 Summary of Monitoring Data for Ozone and $PM_{2.5}$ near Morgantown

				Ozone (O_3) [4]	$PM_{2.5}$	
			Averaging Period	8-hr	24-hr [5]	Annual [6]
Location	Year	County	EPA Standards	0.08	65	15
A	2004	Charles		0.083	---	---
A	2005	Charles		0.089	---	---
A	2006	Charles		0.085	---	---
B	2004	Prince George's		---	17	9.8
C	2004	Prince George's		---	38	12.6
C	2005	Prince George's		0.085	32	13.4
C	2006	Prince George's		0.086	34	11.5
D	2004	Prince George's		---	28	12.4
D	2004	Prince George's		0.086	38	13.3
D	2005	Prince George's		0.092	31	13.8
D	2005	Prince George's		---	32	13.3
D	2006	Prince George's		0.095	33	12.2
D	2006	Prince George's		---	33	12.5

Notes:
1. Shaded values indicate exceedances of NAAQS.
2. Ozone concentration is in ppm; $PM_{2.5}$ concentrations are in $\mu g/m^3$.
3. Separate monitoring locations are indicated by different letters.
4. Ozone concentration represents the fourth maximum value at a particular location.
5. $PM_{2.5}$ 24-hour value represents the 98th percentile value.
6. $PM_{2.5}$ mean annual value.
7. --- indicates the data is not available.

3.3 BIOLOGICAL RESOURCES

3.3.1 Vegetation and Land Cover

Approximately half of the Morgantown site is found within the Chesapeake Bay Critical Area, which is defined as all land within 1,000 feet of mean high water (MHW) or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and its tributaries. Any development within this area is required to minimize adverse impacts on water quality and conserve fish, wildlife, and plant habitats. The proposed APC Project at Morgantown will be located within previously disturbed portions of the site immediately adjacent to the existing facilities.

The majority of the Morgantown site is already developed, with undeveloped areas, including upland and wetland habitats, comprising approximately 30 percent of the site. According to the Critical Area Inventory of the Morgantown Generating Station (PEPCO, 1991), vegetative communities on the site include submerged aquatics, tidal marsh, rip-rap community, freshwater marsh, wet meadow, mixed wetland hardwood/coniferous forest, upland mixed hardwood forest, planted pines, mowed grass uplands, and occasional areas of upland shrubs. According to Mirant's CPCN Application (Mirant, 2006), a description of each vegetative community is described below.

3.3.1.1 Upland Communities

Upland vegetative communities in the vicinity of the Morgantown site include upland mixed hardwood forest, planted pines, mowed grass uplands, and intermittent areas of upland shrubs.

- **Mixed hardwood forest**. Areas of upland mixed hardwood forest are found adjacent to the tidal marsh of Pasquahanza Creek. The canopy is dominated by southern red oak (*Quercus falcata*), with a variety of subdominant species including northern red oak (*Q. rubra*), pin oak (*Q. palustris*), black gum (*Nyssa sylvatica*), American holly (*Ilex opaca*), persimmon (*Diospyros virginianus*), black cherry (*Prunus serotina*), dogwood (*Cornus florida*), post oak (*Q. stellata*), bitternut hickory (*Carya cordiformis*), yellow poplar (*Liriodendron tulipifera*), white oak (*Q. alba*), chestnut oak (*Q. prinus*), and red maple (*Acer rubrum*). Understory species include highbush blueberry (*Vaccinium corymbosum*), devil's walking stick (*Aralia spinosa*), sassafras (*Sassafras albidum*), spicebush (*Lindera benzoin*), and wax myrtle (*Myrica cerifera*), with sparse groundcover comprised of partridge berry

(*Mitchella repens*), sedges (*Carex spp*.), and spotted wintergreen (*Chimaphila maculata*).

- **Upland planted pines**. A stand of planted Virginia pine (*Pinus virginianus*) is located directly south of the gas turbines at Morgantown. The sparse groundcover layer includes sensitive fern (*Onoclea sensibilis*), netted chain fern (*Woodwardia areolata*), marsh fern (*Thelypteris thelypteroides*), broomsedge (*Andropogon virginicus*), and partridge pea.

- **Mowed fields**. Mowed and open field areas are found throughout the Morgantown facility. These areas have been historically cleared, graded, and planted with grasses. Common species observed within the open field portions of the Site include a variety of grasses and sedges of the genera Dichanthelium, Cyperus, Panicum, Andropogon, and Setaria, as well as common weedy species.

3.3.1.2 Wetland Communities

Wetland vegetative communities include submerged aquatic vegetation, tidal marshes, Potomac River shoreline rip-rap, freshwater marshes, wet meadows, and mixed wetland hardwood/coniferous forests, typically associated with the shores of Pasquahanza Creek and the Potomac River.

- **Submerged aquatic vegetation**. Areas of submerged aquatic vegetation (SAV) dominated by the exotic species Eurasian watermilfoil (*Myriophyllum spicatum*) and Elodea (*Elodea sp*.) occur within Pasquahanza Creek. Additional species include wild celery (*Vallisneria Americana*), curly pondweed (Potamogeton crispus), and horned pondweed (*Zanichellia palustris*).

- **Tidal marsh**. Tidal marsh habitat dominated by saltmarsh cordgrass (*Spartina alterniflora*) occurs along the southern boundary of the Morgantown site adjacent to Pasquahanza Creek. Additional species associated with the tidal marsh habitat include tall cordgrass (*Spartina cynosuroides*), swamp rose mallow (*Hibiscus moscheutos*), seashore mallow (*Kosteletzkya virginica*), tidemarsh amaranth (*Acnida cannabina*), saltmarsh aster (*Aster tenuifolia*), saltmarsh camphor-weed (*Pluchea purpurascens*), saltgrass (*Distichlis spicata*), saltmeadow cordgrass (*Spartina patens*), alkali bulrush (*Scirpus robustus*), halberd-leaf saltbush (*Atriplex patula*), and common reed (*Phragmites australis*).

- **Rip-rap**. The shoreline of the Potomac River has been altered through the addition of rip-rap and bulkheads. The shoreline

vegetation is dominated by false indigo bush (*Amporpha fruticosa*) with additional species including groundsel tree (*Baccharis halimifolia*), low-tide bush (*Iva frutescens*), spanish needles (*Bidens bipinnata*), bearded beggar-ticks (*Bidens artistosa*), goldenrods (*Solidago spp*.), trailing wild bean (*Strophostyles helvola*), morning glory (*Ipomea lacunosa*), coastal searocket (*Cakile edentula*), rough cocklebur (*Xanthium strumarium*), clematis (*Clematis dioscoreifolia*), Korean bushclover (*Lespedeza stipulacea*), common reed (*Phragmites australis*), goose-foot (*Chenopodium polyspermum*), jimson-weed (*Datura stramonium*), eastern gama grass (*Tripsacum dactyloides*), and Virginia wild rye (*Elymus virginicus*).

- **Freshwater marsh**. The ditch system that bisects the site is classified as a freshwater marsh, vegetated with common reed (*Phragmites australis*), cattails (*Typha angustifolia* and *T. latifolia*), wood reed-grass (*Cinna arundinacea*), sedges (*Cyperus spp*.), swamp spikerush (*Eleocharis palustris*), Canada rush (*Juncus canadensis*), soft rush (*J. effusus*), white cutgrass (*Leersia virginica*), green bulrush (*Scirpus atrovirens*), red wool-grass (*Scirpus rubricosus*), soft-stem bulrush (*Scirpus validus*), and several species of smartweed (*Polygonum spp*.).

- **Wet meadow**. Areas of wet meadow occur southwest of the gas turbines, in low areas of the transmission line right-of-way (ROW), and between the coal pile and gas turbine areas. Vegetation is dominated by various grasses and asters, as well as common reed (*Phragmites australis*), beggar-ticks (*Bidens spp*.), Elliott's goldenrod (*Solidago elliottii*), grass-leaf goldenrod (*Solidago graminifolia*), sedges (*Cyperus spp*.), and rushes (*Juncus spp*.).

- **Mixed wetland hardwood/coniferous forest**. Areas of mixed wetland hardwood/coniferous forest are located adjacent to Pasquahanza Creek between the U.S. Route 301 and the settling ponds. Canopy species include red maple, sweetgum (*Liquidambar styraciflua*), black willow (*Salix nigra)*, southern red oak (*Quercus falcata*), black gum (*Nyssa sylvatica*), Virginia pine (*Pinus virginianus*), red cedar (*Juniperus virginiana*), and sycamore (*Platanus occidentalis*). Understory species include wax myrtle (*Myrica cerifera*), groundsel tree (*Baccharis halimifolia*), blueberry (*Vaccinium sp*.), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), marsh fern (*Thelypteris thelypteroides*), common reed (*Phragmites australis*), false nettle (*Boehmeria cylindrica*), and poison ivy (*Toxicodendron radicans*).

3.3.2 Wildlife

From field surveys conducted in association with the Critical Area Intensively Developed Overlay Zone Conservation Plan (PEPCO, 1991), wildlife species known to occur in the vicinity of Morgantown include a variety of species common to the deciduous forests of Maryland. The presence of riparian forests adjacent to the Potomac River and Pasquahanza Creek provides a suitable habitat for a variety of mammals and avian species.

3.3.2.1 Mammals

Mammalian species observed during previous field studies include species common to Maryland forests, including white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), and eastern cottontail rabbit (*Sylvilagus floridanus*). Additional species expected to occur in the vicinity include gray squirrel (*Sciurus carolinensis*), muskrat (*Ondatra zibethica*), opossum (*Didelphis virigniana*), woodchuck (*Marmota monax*), Eastern chipmunk (*Tamias striatus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), and a variety of moles and shrews.

3.3.2.2 Birds

Birds observed during previous field studies include belted kingfish (*Ceryle alcyon*), turkey vulture (*Cathartes aura*), comorant (*Phalacrocorax auritus*), blue heron (*Ardea herodias*), mallard (*Anas platyrynchos*), scaups (*Aythya sp.*), red-shouldered hawk (*Buteo lineatus*), and several species of gulls (*Larus sp.*). Additional species anticipated include northern mockingbird (*Mimus polyglottis*), mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), house sparrow (*Passer domesticus*), little blue heron (*Egretta caerulea*), brown thrasher (*Toxostoma rufum*), American crow (*Corvus brachyrynchos*), red-winged blackbird (*Agelaius phoeniceus*), barred owl (*Strix varia*), redbellied woodpecker (*Melanerpes carolinus*), hairy woodpecker (*Picoides villosus*), and blue jay (*Cyanocitta cristata*). An area of the Potomac River approximately two to three miles south of the site is a waterfowl staging area. Habitats for Forest Interior Dwelling (FID) species of birds are found at the site, due to the proximity of additional acreage of forest extending off of the property.

3.3.3 Threatened and Endangered Species

Threatened and endangered species of Maryland are protected by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act of

1973 and by the Maryland DNR under the Maryland Nongame and Endangered Species Conservation Act of 1975. In 1994, the Maryland Wildlife and Heritage Division, a division of DNR, published "Rare, Threatened, and Endangered Plants of Maryland", which lists both Federal and state protected plant species as well as 770 additional species that are considered candidates for state listing. These additional species, however, are not protected under Maryland State law. A County-specific list of rare, threatened, and endangered species known to occur in Charles County was obtained by Mirant from the Maryland Wildlife and Heritage Division in September 2006 and can be found in Table 2.3-4 of the CPCN Application (Mirant, 2006).

3.3.3.1 Listed Fauna Species

Nineteen listed animal species are reported to occur in Charles County, Maryland. Of these 19 species of concern, five are state endangered species, two are state threatened species, and one is an extirpated species. Two species, the bald eagle (*Haliaeetus leucocephalus*) and the dwarf wedge mussel (*Alasmidontaheterodon*) are federally listed.

Mirant requested an environmental review from the DNR Wildlife and Heritage Division (WHD) in September 2006; results will be updated by Mirant when available (Mirant, 2006). An environmental review by DNR and USFWS was previously requested in 1989 in association with the Critical Area Intensively Developed Overlay Zone Conservation Plan. The USFWS responded that, with the exception of occasional transient individuals, no federally listed species were known to exist in the project impact area. The DNR identified a peregrine falcon (Falco peregrinus) nest site within ¼ mile of the site, and also identified the open water areas adjacent to the project site as Historic Waterfowl Staging and Concentration Area.

3.3.3.2 Listed Flora Species

Listed flora species include those plant species classified as endangered, threatened, or of special concern by the USFWS or DNR. Eighty-six plant species of concern are known to occur in Charles County, and are listed in Table 2.3-4 of the CPCN Application (Mirant, 2006). Of these, 30 are listed as state endangered, 16 are listed as state threatened, and 12 are considered extirpated. The remaining 28 species are not threatened and are classified by the state according to their degree of rarity. Only one plant species found in Charles County, the sensitive joint-vetch (Aeschynomene virginica), is federally listed. No listed plant species were observed previously according to historical field surveys. The DNR and

USFWS environmental review did not identify any listed species of plants. As mentioned in Section 3.3.3.1, an environmental review was requested of the DNR in September 2006 and results will be updated when available.

3.4 REGIONAL SOCIOECONOMIC SETTING

Charles County is located in Southern Maryland, and is part of the south suburban Washington, DC metropolitan area; Washington, DC is only 18 miles north. The Morgantown site is within the Tompkinsville election district, which includes the communities of Cobb Island, Swan Point and Morgantown. The Tompkinsville district is outside the primary Development District, which is the principal center of population, services and employment for the county. The County's Comprehensive Plan designates the Morgantown site an Employment and Industrial Park District. Approximately 204 acres of the Morgantown plant are in the Chesapeake Bay Critical Area. Overlaid on this is the Critical Area Program's designation of part of the site as an Intensely Developed Area.

3.4.1 Population Trends

Charles County is Maryland's eleventh most populous county and the most populous county in Southern Maryland. In 2005 the population of Charles County was 138,050, an increase of more than 14 percent from 2000 (MDP, 2006a). Population is projected to grow at a rate of about 1.5 percent per year through 2030, to 204,200.

Population is concentrated in the northern districts of the county, near the key US 301 corridor to Washington. In 2000, the population of Waldorf was 62,532, comprising more than one-half the Charles County population (County Commissioners of Charles County, 2006a). Another one-quarter of the county population resided in Bryantown (12,603), LaPlata (11,997) and Pomonkey (11,859). In contrast, population in the Tompkinsville election district was 3,682 in 2000, an increase of 259 from 1980.

Population growth is being shaped by a concerted effort to concentrate future development in areas of the county already served or proposed to be served by public water and sewer. As a result, over the next twenty years, population growth is expected to be concentrated in the planned development districts in north, northwestern, and central Charles County. The population of Waldorf is projected to increase by 35 percent to 98,188 by 2025, while LaPlata's population is projected to increase by 64 percent, to 23,779. Pomonkey and Bryantown are projected to increase to 19,876 and 19,630, respectively. The Tomkinsville election district is projected to

grow by 34 percent to 5,408 by 2025 (County Commissioners of Charles County, 2006a).

3.4.2 Employment and Income Trends

More residents of Charles County work outside the county than inside. In 2000, nearly 37,000 residents commuted to jobs outside the county while about 11,420 commuted from other jurisdictions to jobs in the county. In contrast, 24,800 residents of Charles County worked in the county (MDP, 2007a). Net out-commuting from Charles County to other jurisdictions increased by more than 3,200 between 1990 and 2000 (MDP, 2007b). Most of the out-commuting flow is directed towards the District of Columbia, Prince George's County, and Montgomery County. However, the county was the source for nearly 50,000 jobs in 2000, and employment is projected to grow in Charles County by nearly 40 percent by 2030. Although significant, projected employment growth is only one-half the county's projected labor force growth over the same period (County Commissioners of Charles County, 2006a).

Retail trade was the largest employer in Charles County in 2004 (10,555 jobs), followed by construction (5,729), local government (5,616), accommodation and food services (5,177) and health care and social assistance (5,114) (MDP, 2006b). However, the highest rate of job growth between 2001 and 2004 was in professional/technical services (8.4%) and real estate (8.0%). The leading private sector employers in the county include Civista Medical Center, College of Southern Maryland, Facchina Construction Company, American Community Property Trust and Southern Maryland Electric Cooperative. The Naval Surface Warfare Center employs 3,100 civilians and 578 military personnel in Indian Head.

Government employment is an important source of jobs in Charles County. In addition to the Naval Surface Warfare Center and local government, including public school employment, a large number of residents are employed by the federal government or are contractors to the federal government in the District of Columbia. In 2004, nearly one in five jobs in Charles County was associated with government or government enterprises (MDP, 2006b).

In the context of economic development, the county's most critical needs are to increase the number of jobs in the county and to create higher wage jobs. Otherwise, more of the costs of projected population growth will be reliant upon residential property taxes (County Commissioners of Charles County, 2006a). To that end, the county has mapped a strategy to protect its traditional economic base, primarily agriculture and seafood

industries, while encouraging diversification by increasing the inventory of business and industrial land available for development, facilitating broadband deployment, and promoting tourism and the arts. In 2005, the Charles County Economic Development Commission became a department of the county government, the Economic Development Department, to implement this strategy.

With respect to business and industrial land, the inventory of business park land has increased since 1997, but there are few improved industrial parcels in the county greater than 20 acres. The Morgantown Generating Station is in one of several of the county's Employment and Industrial Park Districts. However, its potential for further economic development is limited by its location.

In 2005, the Tri-County Council for Southern Maryland commissioned CCG Consulting Inc. to undertake a broadband study to identify broadband needs and availability. The study found that much of Southern Maryland is underserved or not served at all. Furthermore, most broadband products currently available to businesses in the county will not be adequate in the future, and there is an inadequate fiber infrastructure in place upon which to build a future network (CCG, 2005).

Tourism is an important industry in Charles County. In 2004, more than 6,000 jobs in the county were related to tourism (MDP, 2006b). Visitors to Charles County spent $79.5 million in 2004, generating $20 million in payrolls and more than $3.9 million in local tax receipts (Charles County Office of Tourism, 2007). Enhancement of its tourist attractions is an important goal in the county's economic development plan, from developing waterfront recreation areas along the Potomac River to promoting historic sites. With Calvert and St. Mary's counties, Charles County adopted the Southern Maryland Heritage Tourism Management Plan in 2003 (Redman/Johnston Associates, 2003). Charles County also sponsored a study of its natural assets focusing on ecology, tourism and open space preservation (Fermata, 2000). In recognition of the importance of tourism to economic development, in June 2006, the Charles County Department of Tourism was merged into the Economic Development Department.

3.4.3 Land Use and Zoning

Over the pasts 25 years, Charles County has been transformed from a rural to urban character with its greatest assets – open space, natural areas, and shorelines – threatened by residential and commercial sprawl, traffic congestion and inadequate services to meet the needs of its growing

population. Since 1990, land use and development in Charles County has been guided by the Comprehensive Plan. Updated in 1997 and 2006, the Comprehensive Plan meets state requirements for local government planning in Maryland and establishes the policy framework to manage and direct future development in Charles County through 2025 (County Commissioners of Charles County, 2006a). The plan provides guidance and is influenced by companion documents that, effectively, implement the plan's policy framework, including:

- Zoning ordinances
- Subdivision regulations
- Chesapeake Bay Critical Area Program
- Waldorf and Bryans Road-Indian Head sub-area plans
- Land Preservation, Parks and Recreation Plan
- Comprehensive Water and Sewer Plan
- Capital Improvement Program

Other specialized plans, such as the Solid Waste Management Plan, Historic Preservation Plan, Hazard Mitigation Plan, Southern Maryland Heritage Area Heritage Tourism Management Plan, are considered or adopted as part of the comprehensive planning process.

The Adequate Public Facilities (APF) element of the Charles County Zoning Ordinance is designed to prevent new development from having an adverse effect upon public health and safety, to encourage new development in areas where public services are provided and to require developers to provide public services when existing or planned facilities are inadequate (Department of Planning and Growth Management, 2001). An Adequate Public Facilities Study (APFS) is required for any subdivision, site plan or zoning permit, with minor exceptions. Generally, an APFS must determine the adequacy of roads, schools and ground water supply before a site plan can be approved. APF requirements were first integrated into the Charles County Zoning Ordinance in 1992.

As noted earlier, Mirant's Morgantown facility is located in the Tompkinsville Election District which is considered part of the Rural Area of Charles County. Except for the Morgantown site and land along the US 301 corridor, which is an Employment and Industrial Park District, Swan

Point (Mixed Use District), and eight villages, including Cobb Island, Morgantown and Tompkinsville (Village Center), the Tompkinsville region is designated an Agricultural Conservation District in the county's Land Use Concept Plan. Employment and Industrial Park Districts are selected on a number of principles, which include minimizing adverse effects and preserving the character and aesthetics of adjoining residential areas. Constructed in the 1960's, the Morgantown Generating Station precedes the county's formal adoption of comprehensive planning principles.

The most prevalent activity in the Agricultural Conservation District is farming. The land in this district is characterized mostly by open fields, woodlands, and marshes. Concern for increasing residential development in the Rural Area has been articulated in the Comprehensive Plan, and retaining the rural character is one of its goals. Current zoning permits residential development in the Rural Area at a density of one dwelling per five acres, which the 1997 Comprehensive Plan concluded was incompatible with the plan's vision. Although a subsequent Rural Commission made a number of recommendations (County Commissioners of Charles County, 2002), a key recommendation for down-zoning parts of the Rural Area was rejected by the County Commissioners. However, in 2005 the County Commissioners made mandatory rural cluster development in the Agricultural and Rural Conservation districts for subdivisions of six or more lots and set a minimum open space requirement for rural cluster developments to 65 percent.

A controversial land use issue near Morgantown concerns Swan Point. A resort community originally approved in 1986, the first phase of development constructed 322 homes, a golf course and other recreation facilities on the Potomac River near Cuckold Creek. A second phase, named the Villages at Swan Point, would build another 1,500 homes in five villages, plus a hotel, 219-slip marina, observation piers and a bridge over Weir Creek, and would reconstruct the shoreline along the Potomac River. Amendments to the plan for the second phase, including the rezoning of a 200-acre horse farm, were approved by Charles County in June 2006, but the plan also requires changing the designation of 138 acres of the Critical Area from a Limited Development Area to an Intensely Developed Area (IDA) and nearly 21 acres from a Resource Conservation Area to an IDA.

The Charles County Chesapeake Bay Critical Area Program is the county's implementation of the state's Critical Area Act, passed in 1984, that addresses development in the "Critical Area", defined as all land within

1,000 feet of the Mean High Water Line of tidal waters of the Chesapeake Bay at its tributaries (Charles County Department of Planning and Growth Management, 2001). The program recognizes three zoning districts (overlay zones) corresponding to the three development classifications in the Critical Area law. An Intensely Developed Area (IDA) is an area of at least 20 acres where development predominates and there is little natural habitat. A Limited Development Area (LDA) is an area developed in low or moderate intensity uses, but contains natural habitat and the quality of run-off has not been substantially compromised. A Resource Conservation Area (RCA) is a relatively undeveloped area dominated by natural habitat.

The Critical Area in Charles County, excluding federal land, comprises 30,424 acres, or about 10 percent of the county's land area. Within this total, approximately 278 acres (0.9%) are in the IDA, 2,217 acres (7.2%) are in the LDA and 27,929 acres (91.7%) are in the RCA. Within the RCA are 5,347 acres of tidal wetlands. To limit development in the Critical Area, the Critical Area Law assigns a growth allocation to counties, which limits the number of acres that can be converted from RCA to other classifications (LDA, IDA) or from LDA to IDA. No subdivision within the Charles County Critical Area has been approved since 1985, leaving the county with its initial allocation of 1,129 acres, less nine acres for the Robinson Terminal project in Indian Head (Charles County Department of Planning and Growth Management, 2001).

That the second phase of the Swan Point development would comprise nearly 15 percent of the county's growth allocation, which the state's Critical Area Commission must approve, has been a focal point among those in the community opposed to the project, although other issues including groundwater consumption, traffic and environmental disruption are also of concern. The State's Critical Area Commission has denied growth allocations previously, most recently the proposed Blackwater Resort on Maryland's Eastern Shore, and another proposed development at Chapman's Landing, partly in the Charles County Critical Area, was preempted when the State and a private foundation purchased the property.

Preservation of rural land for agricultural use is a concern in Charles County but less programmatic effort has been put into preservation than other counties in the state. The county's Agricultural Land Preservation Program was certified by the state in 1996, and in 2000 the County Commissions appointed a Rural Commission to develop a land use plan for the Rural Area (County Commissioners of Charles County, 2006a). Among Maryland counties with the least amount of protected agricultural

land, even less is under permanent easement in Charles County (County Commissioners of Charles County, 2002). As of 2006, 15,504 acres of agricultural and forest land were permanently protected from development, and another 17,932 acres were in Agricultural Land Preservation Districts, which restricts property to agricultural uses for five years. This includes substantial acreage in the Tompkinsville district. In addition, 9,873 acres were under a 10-year Tobacco Buyout Affirmative Agricultural Covenant (County Commissioners of Charles County, 2006b). A listing of protected lands in the county is shown in Table 3-4.

With the addition of 480 acres from three land owners, the Maryland Environmental Trust held more than 6,000 acres of easements in Charles County in January 2007 (DNR, 2007), two of which are located in the Tompkinsville election district (Maryland Greenways Commission, 2000). Including non-agricultural lands, approximately 1,100 acres are protected by Rural Legacy easements within the Zekiah Watershed Rural Legacy Area.

There were 20,359 acres of recreation and resource land in Charles County in 2005. This included 2,824 acres in county parks, school facilities in the county and in Indian Head and LaPlata, and 16,425 acres of state and federal recreation and open space lands, including 7,837 acres of recreation land (County Commissioners of Charles County, 2006b). About two percent of recreation and open space lands (333 acres) are located within the Tompkinsville election district, consisting of 57 acres of county recreation and natural resource facilities and 276 acres of private quasi-public lands and facilities, such as neighborhood parks, marinas and other facilities. Swan Point Golf Course comprises 200 acres of private quasi-public lands in the district. The closest recreation facilities to the Morgantown Generating Station are located at Dr. Thomas Higdon Elementary School and Piccowaxen Middle School on Rock Point Road (MD 257).

Table 3-4 Protected Agricultural Lands in Charles County, Maryland

Program	Properties	Acres
MD Agricultural Land Preservation Easements	25	4,363
Rural Legacy Easements (agricultural land only)	3	302
MET Easements with some agricultural land	32	5,000
TDR	15	2,244
DNR Easement – (Glatfelter Pulpwood)	1	3,595
TOTAL	**76**	**15,504**
MALPF Agricultural Districts (not permanent)	122	17,932
Tobacco Buyout Affirmative Agricultural Covenant	105	9,873

Source: County Commissioners of Charles County 2006b.

3.4.4 Transportation

There are approximately 1,100 miles of highways in Charles County. The major north-south highway is US 301, which enters Maryland at the Governor Harry W. Nice Memorial Bridge in Morgantown and enters Prince George's County just north of Mattawoman. Other major arterial highways are MD 5, which traverses the county from Prince Georges' County to St. Mary's County, MD 6, an east-west highway, MD 210 from Indian Head to Prince George's County, MD 228, MD 231 and MD 234.

Access to the Morgantown site is from US 301, just north of the Governor Harry W. Nice Memorial Bridge. US 301 is a paved, four-lane highway with 12-foot lanes. The average annual daily traffic (AADT) on US 301 at Morgantown was 17,966 in 2005, up eight percent from 2003 (SHA, 2005). Slightly north of the plant is MD 257, also known as Rock Point Road, a major collector linking Cobb Island and other villages in the Cobb Neck peninsula to US 301 at Newburg. MD 257 is a paved, two-lane road with 11-foot lanes and paved shoulders. The AADT on MD 257 in the vicinity of US 301 was 7,225 in 2005.

Traffic congestion is a major concern in the county, particularly in Waldorf where there is a high volume of traffic. This is caused partly by the imbalance of jobs to residents in the county, which results in substantial commuting to Prince George's County and the District of Columbia. The

Comprehensive Plan also notes that turning movements attributable to commercial development along the US 301, MD 5, MD 210 and MD 228 corridors has compromised the safety and efficiency of these highways (County Commissioners of Charles County, 2006a). However, congestion is less of an issue in southern Charles County, mainly south of LaPlata, and concerns in that part of the county are more associated with the loss of rural character of many of the county's roads, a consequence of growth in the Rural Area.

Growth in the sand and gravel industries in Charles County has resulted in more truck traffic on county roads. In January 2003, there were 33 mining permits issued to 17 operators in Charles County (County Commissioners of Charles County, 2006a). With population growth, truck traffic from sand and gravel operations has prompted noise and safety concerns. In response to this Charles County has amended its zoning regulations to limit the daily number of truckloads of sand and gravel that can be hauled from a site.

MD 257 is a Maryland Scenic Byway, the Rock Point Road branch of the Religious Freedom Tour. The 139-mile byway enables tourists to explore the roots of American religious toleration, and the Rock Point Road branch includes an Episcopal church in Wayside built in 1750 (SHA, 2007). In March 2006, the U.S. Department of Transportation awarded the State of Maryland a $150,000 grant to fund a Corridor Management Plan (CMP) for the Religious Freedom Tour (Mikulski, 2006). The CMP is a guide for the promotion, preservation and development of the byway for tourism development, highway safety, signage and preservation of natural features and historic structures. Oddly, Rock Point Road is not on the Religious Heritage route for the Southern Maryland Heritage Driving Tour, a promotion sponsored in part by the Charles County Office of Tourism (Charles County Office of Tourism, undated).

The only highway project on the books in the Morgantown area is a long range planning study to increase the capacity of the Governor Harry W. Nice Memorial Bridge. With only two narrow lanes and a steep vertical grade on a bridge connecting four-lane roads on either end, projected peak-hour traffic demand (expected to increase by 33 percent by 2025) is approaching the bridge's capacity. Weekend and holiday delays and lane closure for maintenance also contribute to congestion and accidents (MTA, 2007). Currently, the Maryland Transportation Authority is conducting a study to investigate capacity and safety needs of the bridge and approaches (MTA, 2006). A final design document is not expected until the summer of 2009.

The Morgantown Generating Station is served by the Pope's Creek Secondary of the CSX Transportation (CSXT) rail line. The line is the only rail service in Charles County and roughly parallels US 301 through Waldorf and LaPlata to a terminus at Mirant's Morgantown Generating Station. The CSX Herbert Secondary branches from the Pope's Creek line at Brandywine in Prince George's County to serve Mirant's Chalk Point Generating Station, approximately 17 miles from the junction. There is no local business on the Herbert Secondary. A U.S. Government railroad line runs from the Naval Surface Warfare Center (Indian Head Division) to a connection with the CSXT main line at White Plains.

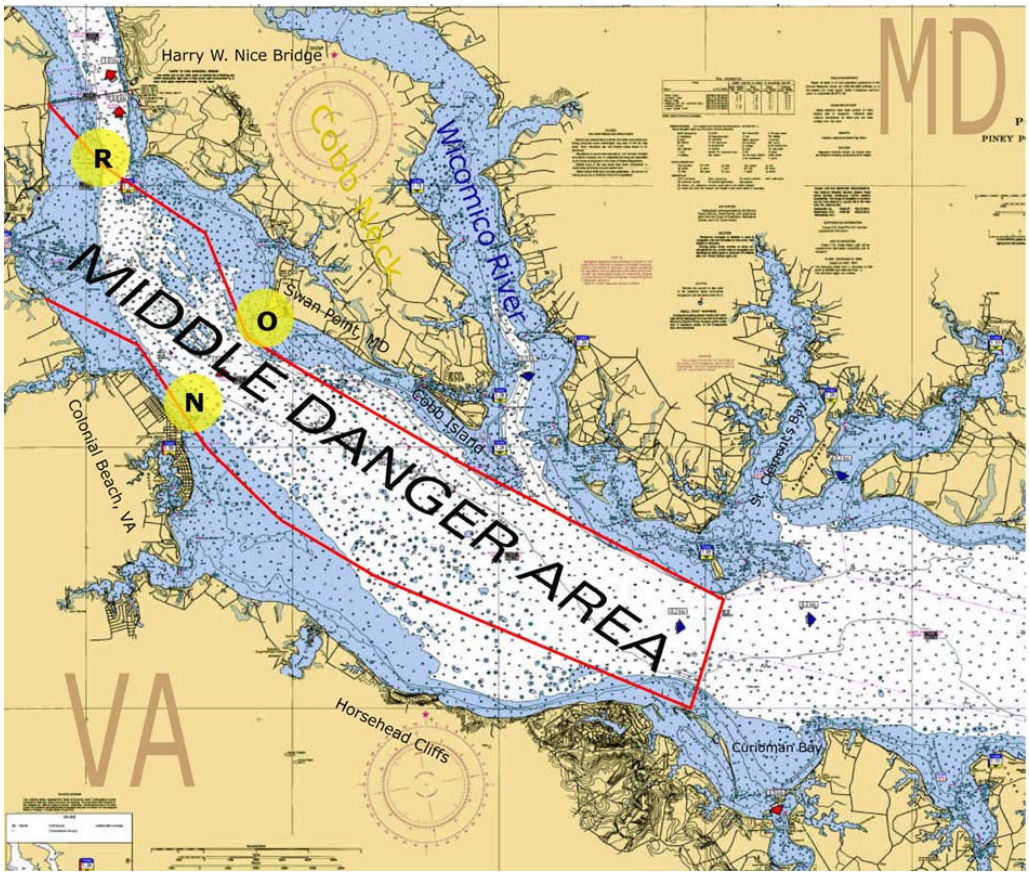
The Potomac River carries both recreational and commercial traffic. The main channel is approximately 50 feet deep in the vicinity of Morgantown. Industrial use of the river is a fraction of traffic in the early 1900's, but the Potomac carries sand and gravel barges from Charles County up-river to Washington. Other than sand and gravel barges, there are occasional oil shipments to Morgantown. Small ocean freighters deliver newsprint to the Robinson Terminal Warehouse in Alexandria (RiverExplorer.com, 2004).

The Potomac River is a test range for the Naval Surface Warfare Center (NSWC), Dahlgren Virginia. The Middle Danger Area (Figure 3-4) is part of larger danger zone described in 33CFR334.230, which is dangerous to watercraft when guns and other ordnance are being fired or when other testing is being conducted. No fishing or oystering vessels may operate within the danger zone unless authorized by the NSWC. Deep draft vessels using dredged channels and mechanical power traveling more than five miles per hour may proceed directly through danger zones without restriction except when especially notified otherwise.

Firing schedules are arranged to cause minimum inconvenience to river traffic and the range is usually closed for only short periods of time. Normally, test operations are conducted between the hours of 8:00 AM and 5:00 PM daily, except weekends and national holidays. Infrequently, the range is used during other hours and/or at night in order to take advantage of favorable light or atmospheric conditions or due to emergency situations (NSWC, 2007).

Typically, NSWC coordinates its activities with commercial vessels on the Potomac, so the maximum delay is about one hour. The range was in use for 105 days in 2006 to conduct test operations (Swope, 2007).

Figure 3-4 Middle Danger Zone, Potomac River



3.4.5 Cultural Resources

Charles County's cultural identity is tied to Southern Maryland's history and environmental assets. Captain John Smith of the Virginia colony at Jamestown is known to have visited the Wococomoco tribe on the Wicomico River and stopped along other tributaries of the Potomac in Charles County during his first Chesapeake voyage in 1608. Maryland's history began in St. Mary's County in 1634 with the arrival of 140 English colonists on the Ark and the Dove, intent on settling a colony based on religious freedom. By 1642, the settlement on the lower Potomac had grown into St. Mary's County, and the colonists had settled up-river as far as St. Clements on the Wicomico River. Charles County was formed in 1658 under Josias Fendall's governorship (Brugger, 1988). Initial settlement was along the shores of the Wicomico and Potomac Rivers, and along the tributaries of the Port Tobacco River, Nanjemoy Creek and Mattawoman Creek (County Commissioners of Charles County, 2004). Agriculture, particularly tobacco cultivation, was the economic base for the county, using slave labor.

Colonial transportation in Charles County utilized the waterways of the Potomac, Wicomico and Patuxent Rivers. Benedict, in the north east corner of the county, was one of Maryland's first ports, and was occupied by more than 4,000 British troops in August 1814. The invading British army defeated the American army at the Battle of Bladensburg and burned Washington before returning to Benedict to re-embark their ships. Port Tobacco was a center of commerce into the 19th century.

Charles County was sympathetic to the Confederates during the Civil War and was subject to frequent occupation by the Union Army. During the war, Benedict was the site of Camp Stanton, established to train a black infantry to serve in the Union Army. After the war, John Wilkes Booth escaped through Charles County to Virginia after assassinating President Lincoln, aided by several conspirators who were subsequently prosecuted.

Because of its dependence on a plantation economy, Charles County's economy stagnated after the Civil War, lasting into the early 20th century. But improved transportation, particularly the building of the railroad, encouraged agricultural diversification, helping to revive the economy. Improved transportation also led to the decline of steamboat transportation and its eventual disappearance from the county's rivers by the 1930's. A commercial seafood industry also developed after the Civil War, and four productive oyster bars were located off the Charles County shoreline. A naval ordnance manufacturing plant, now the U.S. Naval Surface Warfare Center Indian Head division, was built on Mattawoman Neck in 1890.

Change accelerated in the county with the building of Crain Highway (US 301) in 1922 and the construction of the Potomac River Bridge (now the Governor Harry W. Nice Memorial Bridge) at Morgantown in 1939, an area of the river having particular historical, recreational, and commercial significance. As early as 1719, a ferry operated by Rice Hooe connected Mathias Point in Virginia to Morgantown, Maryland. The ferry was part of the shortest route between the capitals of Maryland and Virginia and served as a principal link in the journeys of many early Americans. Patrick Henry rode the Ferry in 1775 on his way to attend General Congress. Others who used Hooe's Ferry were Henry "Light Horse Harry" Lee and George Washington during Revolutionary War years (King George County website, 2005). Barnesfield, the Hooe family home, was situated at Mathias Point and was burned by Union troops during the Civil War. The location is now part of a recreational park owned by King George County. The world's first aircraft carrier, the USS G.W. Parke-Custis, a coal barge converted to launch a hot air balloon during the Civil War, is

thought to have been constructed in the vicinity of the Governor Harry W. Nice Memorial Bridge.

Creation of a major north-south inter-regional transportation corridor and legalization of slot machines increased the popularity of Charles County as a tourist destination until the late 1960's, by which time the slots had been outlawed and suburbanization of the county was beginning.

Because of its long history, there are historical assets throughout Charles County. For example, there are over 3,000 properties in the county built before 1950. One National Register property – Waverly – is located just downriver from Morgantown. In addition, there are extensive subsurface and underwater archaeological resources from pre-historic Native American and colonial European occupation. Cultural landscapes have been partly retained by state and county land preservation efforts, and 1996 revisions to subdivision regulations require easements to be placed on private cemeteries before a development plan is approved (County Commissioners of Charles County, 2004).

However, many heritage resources are threatened by growth. The Charles County Historic Preservation Plan identifies a number of goals and preservation strategies to protect these assets including the encouragement of heritage preservation programs and promoting heritage tourism initiatives. These goals have been partly met by the Southern Maryland Heritage Area Tourism Management Plan (Redman/Johnston Associates, 2003), the Maryland State Highway Administration Scenic Byways program (SHA, 2007), the Chesapeake Bay Gateways Network (CBGN, 2004), the National Park Service National Underground Network to Freedom Program (NPS, 2007), the Southern Maryland Travel and Tourism Committee Bicycle Routes program (SMTTC, undated), other State and Charles County initiatives, and interpretive programs of many other private and quasi-public organizations.

The Southern Maryland Heritage Area Tourism Management Plan is a major blueprint for highlighting the region's cultural heritage. It defines five key resources – archaeological, architectural, cultural, historic, area natural and environmental – that puts Southern Maryland's history and character into context. It proposes a Certified Heritage Area (CHA) of eleven distinct clusters containing a concentration of heritage resources, existing or proposed interpretive facilities, and significant lands protected by federal, state and county ownership or easements. These clusters are connected by corridors comprising scenic byways, trials and waterways. The plan identifies key themes to guide visitors through Southern

Maryland's history and identity and, importantly, stewardship principles for sustaining and enhancing the region's heritage tourism initiative. Following the recommendations of the Southern Maryland Heritage Area Tourism Management Plan, the Maryland Heritage Areas Authority (MHAA) certified the Southern Maryland Heritage Area in July 2003 pending provision of additional performance measurement benchmarks. These conditions were satisfied in December 2004.

Nature and eco-tourism – one of the key themes in the Southern Maryland Heritage Area Tourism Management Plan – is addressed in another study prepared specifically for Charles County (Fermata, 2000). The study urges the county to leverage its tidal rivers for eco-tourism. Among its recommendations is the creation of an anchor destination to serve as a hub for eco-tourists and designing the county's nature tourism program around its impressive Bald Eagle population. The study specifically identifies five sites that were determined to be particularly attractive for hosting eco-tourism activities: Friendship Farm Park (recommended also as the eco-tourism hub), Bumpy Oak Road/13 Mile Naval Railroad Bed/Mattawoman Natural Environment Area, Maxwell Hall, Chapman's Landing and Mallows Bay/Douglas Point. Habitat protection for Douglas Point and a birding trail that would link to the Northern Neck Loop of the Virginia Birding and Wildlife Trail were among other recommendations in the report. The County Commissioners have directed the county's new Economic Development Department to make the Fermata report one of its program priorities (Charles County, 2006).

Two of the many other heritage activities in the Southern Maryland involve transportation. Southern Maryland Heritage Driving Tours meander through Charles, St. Mary's and Calvert counties using the themes Religious Heritage, Agricultural and Maritime Heritage, and Wars and Conflicts to direct tourists to interpretive sites, museums and festivals. The Agricultural/Maritime Heritage tour links Pope's Creek, where John Wilkes Booth and a coconspirator crossed the Potomac after assassinating President Lincoln, Smallwood Retreat House, the Thomas Stone National Historic Site and the Hughesville Tobacco Auctions to attractions in St. Mary's and Calvert counties. The Religious Heritage Tour connects Durham Parish in the southwest part of the county to the Mount Carmel Monastery and Christ Church in LaPlata. The Wars and Conflicts tour highlights the Port Tobacco and Bryantown Historic Districts, Benedict and the Dr. Samuel A. Mudd Home Museum. These tours are distinct from the Religious Freedom Tour designated in the Maryland Scenic Byways program.

There are four Charles County bicycle routes that have been identified by the Southern Maryland Travel and Tourism Committee. The Naturally Historic Route is a 55-mile ride loop around the Nanjemoy Peninsula that includes the Port Tobacco Historic District, the Thomas Stone National Historic Site, Smallwood Retreat House and other sites. The Amish Route is a 30-mile trek through country landscapes that includes Oak Ridge Park and Newport. The John Wilkes Booth Escape Route links the Cedarville State Forest, the Dr. Samuel A. Mudd Home Museum, Zekiah Swamp and St. Mary's Church, where Mudd is buried. The Heavenly Waters Route heads south from Mount Carmel Monastery, through Chapel Point State Park, Pope's Creek and Newburg, and down MD 257 to Cobb Island. An attraction on this route includes Christ Church, William and Mary Parish in Wayside, where Union troops were once quartered (SMTTC, undated).

There are many federal heritage initiatives in Charles County. Created by the Chesapeake Bay Initiative Act of 1998, the Chesapeake Bay Gateways Network (CBGN) is a system of parks, refuges, museums, historic sites and water trails within the Chesapeake watershed region. More than 140 sites across 64,000 square miles are linked in a joint strategy to coordinate visitor experiences and impart the values of the Chesapeake Bay. Charles County hosts a gateway at the Smallwood State Park on the Nanjemoy Peninsula upriver from Morgantown, and the Potomac River Water Trail follows the Maryland and Virginia shorelines from Washington D.C. to the river's confluence with the Chesapeake Bay.

The Potomac Heritage National Scenic Trail is an evolving network of locally-managed hiking trails in a 425-mile corridor between the Chesapeake Bay and the Allegheny Highlands. Administered by the National Park Service (NPS), the Potomac Heritage Trail (PHT) route in tidal Maryland consists of six hikes from Point Lookout in St. Mary's County to Oxon Hill in Prince George's County.

Congress recently established the Captain John Smith Chesapeake National Historic Trail, the first water trail in the United States. Signed into law by President George W. Bush in December 2006, the trail commemorates the voyages of Captain John Smith on the Chesapeake Bay and its tributaries during 1607-1609. Administered in coordination with the CBGN, the trail encompasses the routes of John Smith's two voyages around Chesapeake Bay in 1608, including tributaries of the Potomac River in Charles County. A trail management plan, due in 2007, is expected to guide interpretive and restoration efforts throughout the Chesapeake region.

The Thomas Stone National Historic Site, located north of Port Tobacco, honors the life and work of Thomas Stone, signer of the Declaration of Independence. Administered by the National Park Service since 1997, the 322 acre site preserves his restored plantation home, Haberdeventure, outbuildings and the family cemetery. The grounds are open to the public and there are guided tours through Haberdeventure.

Other federal, state, county, local and private cultural resources in Charles County are too numerous to mention.

The Northern Neck of Virginia has a long cultural heritage as well, particularly along the Route 3 Historic Corridor. The George Washington Birthplace National Monument in Westmoreland County is a 394 acre park that is part of the former Washington family plantation at the confluence of Pope's Creek and the Potomac River, opposite Cobb Island on the Maryland side. The site was settled by Washington's great-grandfather in 1657. George Washington was born there in 1732. Acquired by the Commonwealth of Virginia in 1858, the park was officially opened under the administration of the National Park Service in 1932. The historic area within the park fronts Popes Creek and consists of the birthplace site, gardens and a colonial living farm. The park contains a beach site with limited parking overlooking the Potomac River with views directly toward Morgantown.

Further east is Stratford, part of a 1,500 acre plantation purchased by Thomas Lee in 1717. Home to Richard Henry Lee and Francis Lightfoot Lee, the only brothers to sign the Declaration of Independence, the Great House was also the birthplace of General Robert E. Lee, whose father was Revolutionary War hero "Light Horse Harry" Lee. Stratford, a Virginia Historic Landmark, now consists of the original Great House, expansive grounds and vistas from bluffs overlooking the Potomac River. Stratford is adjacent to Westmoreland State Park, situated on the cliffs overlooking the Potomac River. The park contains cabins, campgrounds, beachfront picnic areas and wooded trails.

Further upriver is Colonial Beach, a former Victorian resort town situated on the Potomac River opposite Swan Point where the Bell House, once the summer home of Alexander Graham Bell, still stands. Nearby is the birthplace of James Monroe, fifth President of the United States. The site, situated between Colonial Beach and Monroe Bay on VA 205, is marked by an obelisk and interpretive highway sign, but otherwise has not been developed or preserved. Wayside Park and Barnesfield Park are recreational parks in King George County. Wayside Park overlooks the Potomac River at the Virginia entrance to the Governor Harry W. Nice

Memorial Bridge and offers beachfront recreational facilities. Barnesfield Park has sporting facilities and nature trails. Further upriver around Mathias Point is the Caledon Natural Area.

3.4.6 Public Services and Safety

Sewer services are concentrated in the northern part of the county. The Mattawoman Wastewater Treatment Plant is the primary treatment facility in the county, although there are municipal sewer systems in LaPlata and Indian Head. Cobb Island, Clifton-on-the-Potomac, Jude House/Bel Alton School, Mr. Carmel Woods and Swan Point are each served by community systems. Private community systems serve Hughesville and Potomac Heights, and there are treatment systems at the Naval Surface Warfare Center, Southern Maryland Correctional Institution, the College of Southern Maryland, and at Board of Education operated facilities (County Commissioners of Charles County, 2006a). The developers of Swan Point are currently building a new wastewater treatment plant to service the second phase of the project. Sewer service is an important growth management tool for the county.

Except for a limited supplementary source from the Washington Suburban Sanitary Commission, groundwater is the only source of potable water for Charles County. Water is distributed through 67 central water facilities in the county (County Commissioners of Charles County, 2006a). The Morgantown Generating Station is in one of the county's service areas.

Solid waste management is guided by the county's 10-year Comprehensive Solid Waste Management Plan (County Commissioners of Charles County, 2001). Most of the solid waste generated in the county is landfilled at the Charles County Landfill, located on Billingsley Road in Waldorf. Approximately 30 percent of solid waste is exported to landfills in Virginia and Pennsylvania. The Billingsley Road landfill is not expected to reach capacity until after 2025.

There are 19 elementary schools, seven middle schools and five high schools in Charles County, most of which are located in the northern part of the county (County Commissioners of Charles County, 2006a). The Dr. Thomas L. Higdon Elementary School and Piccowaxen Middle School are located in the Cobb Neck peninsula.

In 2005, there were 18 volunteer fire and fire/EMS stations in Charles County. Station 14/61 in Newburg houses the Newburg Volunteer Rescue Squad and Fire Department (NVRSFD), which is both a fire and

EMS company. It is less than three miles from the Morgantown Generating Station. The company consists of two engines, a brush truck, an ambulance and a utility vehicle. Based on data for the Fiscal Year 2007, the NVRSFD responds to an average of 35 fire and 75 EMS incidents per month (NVRSFD, 2007). A new station for the company is under construction on Rock Point Road (MD 257) near its intersection with US 301. There is also a fire/EMS station on Cobb Island. The Cobb Island Volunteer Fire Department also owns land in Tompkinsville, which would become the location of a new station (County Commissioners of Charles County, 2006a). The Charles County Dive Team Company 13, administratively based in Waldorf, undertakes water-related rescue and recovery.

The county is served by the Charles County Sheriff's Office (CCSO) and the Maryland State Police, both of which are headquartered in LaPlata. The CCSO is the primary law enforcement agency in Charles County. It is a full service law enforcement agency providing all policing services, plus court-related services. It also operates the Charles County Detention Center (CCSO, 2005). As of 2004, there were 233 sworn officers in the CCSO and 32 troopers attached to the LaPlata Barrack of the Maryland State Police. LaPlata is served by a police department with 10 officers (County Commissioners of Charles County, 2006a).

The CCSO maintains a patrol operations section, a special operations section, tactical response squad, a K-9 unit, traffic operations unit, emergency services team and hostage negotiations team. A security response vessel patrols Charles County's tidal and inland waters, conducting security patrols when the U.S. Department of Homeland Security heightens the terrorism threat level. In such conditions, the section safeguards bridges and shoreline properties (CCSO, 2005). There are also community services, community policing and crime prevention units attached to the CCSO.

Emergency management is under the direction of the Department of Emergency Services, based in LaPlata. In 2004, the county completed a Hazard Mitigation Plan and revised its Emergency Operations Plan (County Commissioners of Chares County, 2006a). The Hazard Mitigation Plan is a strategic document to prepare for natural hazards such as flooding and hurricanes. The Emergency Operations Plan (EOP) is a comprehensive plan of preparedness for response and recovery from emergencies ranging from natural hazards to terrorist attacks within Charles County (Charles County, 2002). The plan considers the Morgantown Generating Station among potential terrorist targets in the county, but also addresses radiological emergencies, transportation

accidents, hazardous material accidents, dam failure and other types of technological disasters. The plan is implemented through the Office of Emergency Preparedness (OEP). Local emergency operations are under the overall direction and control of the President of the Board of County Commissioners.

The Morgantown Generating Station is on Charles County's list of SARA Title III facilities, which is addressed in the SARA Hazardous Materials Plan Annex of the EOP. US 301, between the Governor Harry W. Nice Memorial Bridge and the Prince George's County line, is one of five HAZMAT transportation routes in the county, and the closest one to the Morgantown site.

The Civista Medical Center is the only hospital in Charles County. It is a 105-bed general medical and surgical hospital offering a full range of inpatient services. Two hospitals in Prince George's County, Southern Maryland Hospital and the Fort Washington Medical Center, also provide medical services to Charles County residents.

3.5 NOISE

3.5.1 Definition of Noise

Noise generally consists of many frequency constituents of varying loudness. Three decibels (dB) is approximately the smallest change in sound intensity that can be detected by the human ear. A tenfold increase in the intensity of sound is expressed by an additional 10 units on the dB scale, a 100-fold increase by an additional 20 dB. Because the sensitivity of the human ear varies according to the frequency of sound, a weighted noise scale is used to determine impacts of noise on humans. The most commonly used frequency filter is the A-weighted decibel (dBA) scale, which weighs the various components of noise based on the response of the human ear. For example, the ear perceives middle frequencies better than low or very high frequencies; therefore, noise composed predominantly of the middle frequencies is assigned a higher loudness value on the dBA scale. Subjectively, a ten-fold increase in sound intensity (10 dB increase) is perceived as an approximate doubling of sound. Typical A-weighted sound levels for various noise sources are shown in Table 3-5.

Table 3-5 Typical Sound Levels for Common Sources (dBA)

Noise Source	Typical Sound Pressure Level
Lowest sound audible to human ear	10
Soft whisper in a quiet library	30-40
Light traffic, refrigerator motor, gentle breeze	50
Air conditioner at 6 meters, conversation	60
Busy traffic, noisy restaurant, freight train moving 30 mph at 30 meters	70
Subway, heavy city traffic, factory noise	80
Truck traffic, boiler room, lawnmower	90
Chain saw, pneumatic drill	100
Rock concert in front of speakers, sand blasting, thunder clap	120
Gunshot, jet plane	140

Noise monitoring is typically conducted continuously over a period of time to obtain a representative picture of the acoustic environment. The length of time required for noise monitoring, and the frequency of individual measurements, will vary depending upon a number of factors, including surrounding land use, time of day, the purpose of noise monitoring, the number of locations at which sound levels are being measured, and the capabilities of the monitoring equipment being used.

Ambient sound pressure levels can also be expressed in various ways. Quite often, noise levels are measured or reported as equivalent sound levels, Leq, over a given time period. A one-hour Leq, for instance, is the constant sound level that has the same energy content as the actual sound variations over a one-hour monitoring period. Monitoring of the ambient noise levels in a community is often reported as Leq as well as L90, the sound pressure level that is exceeded 90 percent of the time. The L90 is also called the "noise floor," the minimum background noise level that is characteristic of that monitoring location. The difference between the L90 and the Leq is an indication of the variability of noise at a given location.

Because sound levels are expressed as relative intensities, multiple sound sources are not directly added. Rather, the total noise is primarily a result of the source of highest intensity. For example, two sources, each having a noise rating of 50 dBA, will together be heard as 53 dBA; a source of 65 dBA combined with a source of 85 dBA will result in a noise level of 85.1 dBA. As the intensity difference between the two sources increases, the effect of the lower sound source becomes negligible.

3.5.2 Existing Noise Levels at the Site

Mirant conducted an ambient noise monitoring study to assess the noise levels in and near the Morgantown site prior to the construction and operation of the project. The noise survey was conducted in August 2006. The study consisted of measuring the baseline noise levels and octave bands at several on-site locations at or near the property boundary. Table 3-6 shows the results of these surveys; monitoring locations are illustrated in Figure 3-5.

Table 3-6 Results of Ambient Noise Monitoring Surveys

Site Number	Location	Date	Time	Sound Levels (dBA)				Comments/Notes
				L_{min}	L_{max}	L_{90}	L_{eq}	
1	Southwest Corner near Bridge	15-Aug-06	Day	55.5	62.7	56.1	59.5	Insects, bird noise, bridge traffic
		15-Aug-06	Night	47.2	58.8	49.1	51.1	Bridge traffic, insect noise
2	Western Property Line near US Rout	15-Aug-06	Day	55.6	61.9	56.5	59.0	Traffic on US 301, insect noise
	301	15-Aug-06	Night	51.2	64.9	52.5	58.3	Traffic on US 301, insect noise
3	Southern end of Property Line	15-Aug-06	Day	48.2	50.6	48.4	49.1	Insect noise, back-up beepers
		15-Aug-06	Night	49.6	55.1	49.9	50.8	Insect noise
4	Railroad Entering Plan	15-Aug-06	Day	48.0	52.2	48.3	49.8	Air traffic, insect and bird noise
		15-Aug-06	Night	51.5	53.3	51.9	52.2	Insect noise
5	At FGD Location	15-Aug-06	Day	63.1	66.7	63.7	64.3	Plant noise, construction
		15-Aug-06	Night	56.6	61.5	57.6	58.4	Plant noise

Source: Golder Associates Inc., 2006.

The four monitoring locations were chosen to delineate the background noise levels at or near the Morgantown site boundary. Noise monitoring was performed at all the sites during the daytime and nighttime.

The observed Leq sound levels at the property boundary ranged from 49.1 dBA at site 3 to 59.5 dBA at site 1 during the day and 50.8 dBA at site 3 and 58.3 dBA at site 2 at night. Sites 1 and 2 are along U.S. Route 301 and include the transient noise from automobile traffic. Sites 3 and 4 are furthest from the facility and U.S. 301 and were mainly influenced by transient noises such as airplane traffic during the daytime and insect noise during the nighttime.

Figure 3-5
Noise Monitoring Locations
Morgantown

LEGEND

Site Location

200 0 200 Meters

REFERENCE

Projection: Transverse Mercator
Datum: NAD 27
Coordinate System: UTM Zone 18