MARYLAND DEPARTMENT OF NATURAL RESOURCES

PSC Case No. 9087
DNR Exhibit__(JS-3)

PPRP

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

DRAFT FOR REVIEW

19 March 2007

MARYLAND POWER PLANT RESEARCH PROGRAM

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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 Dickerson Generating Station in Montgomery County, Maryland (see general location in Figure 1-1). The proposed modification would enable Mirant to install air quality control systems at the facility, which promise significant environmental benefits in the form of reduced air emissions.

The proposed modifications include a wet flue gas desulfurization (FGD) system to reduce sulfur dioxide (SO_2) a new water treatment system, and associated enhancements. The project is in response to Maryland's Healthy Air Act legislation, which requires steep reductions in nitrogen oxides (NO_x), SO_2, and mercury emissions for all coal-fired electric generating units in the state.

The Department of Natural Resources (DNR) Power Plant Research Program (PPRP), coordinating with other State agencies, performed this environmental review of the Dickerson project as part of the PSC licensing process. Before undertaking modifications of the facility, Mirant must obtain a Certificate of Public Convenience and Necessity (CPCN) from the PSC. PPRP's review is being conducted to evaluate the potential impacts to environmental and cultural resources associated with the proposed modification, 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 license conditions for operating the modified facility, pursuant to Section 3-306 of the Natural Resources Article. PPRP's recommendations are made in concert 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. Appendix A of this report includes the initial recommended license conditions for the modified facility.

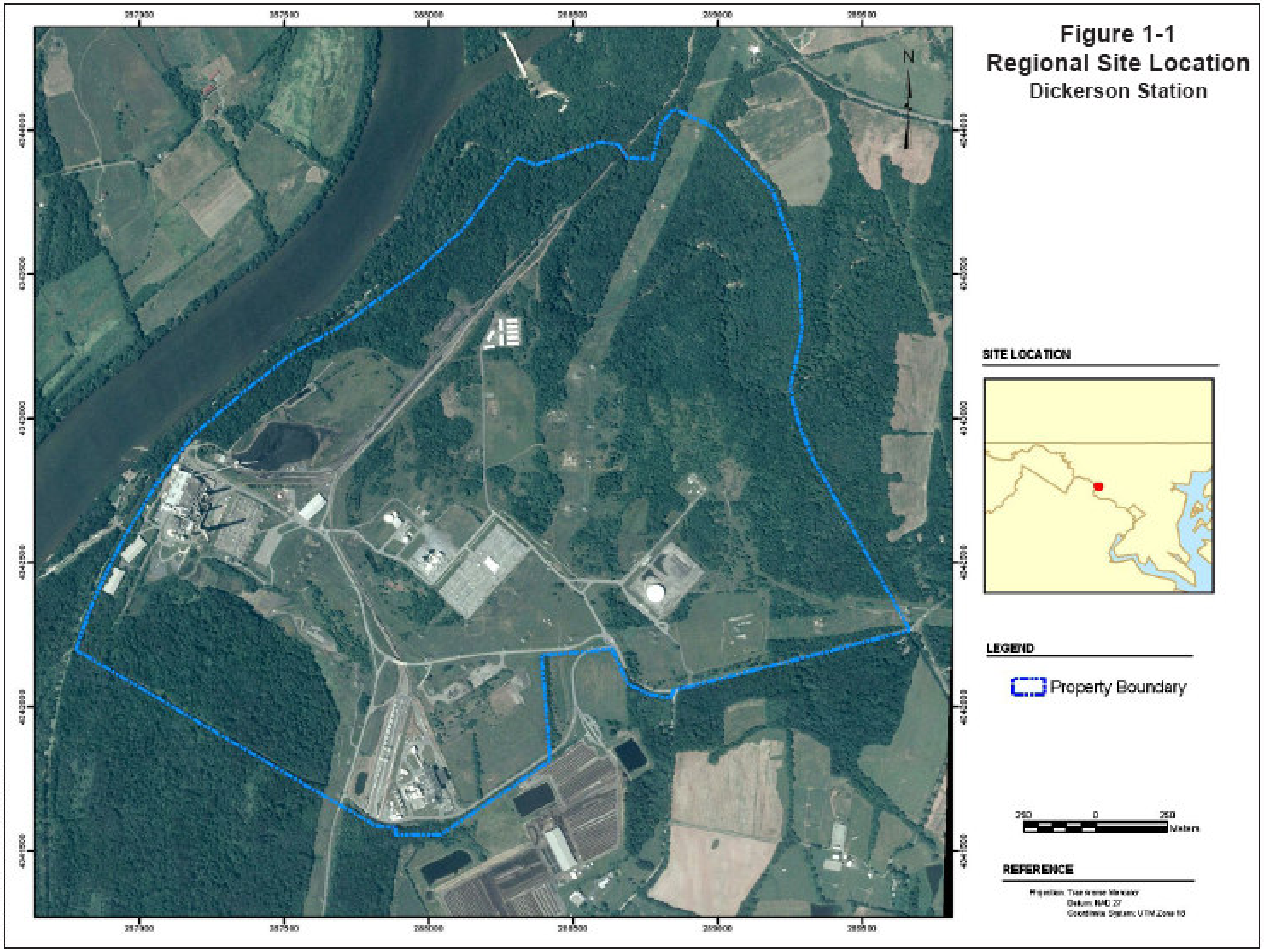


Figure 1-1
Regional Site Location
Dickerson Station

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 nitrogen oxides (NO_x), sulfur dioxide (SO_2), and mercury from 15 coal-fired generating units at seven power plants in Maryland, including Dickerson Units 1, 2, and 3. 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'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.

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.

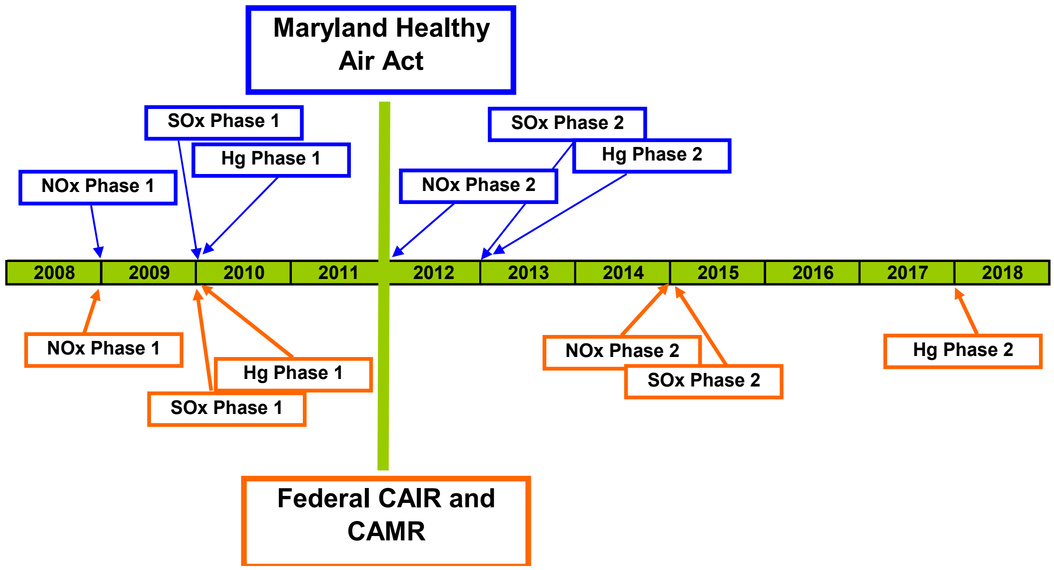
Table 1-1 Emissions Caps and Reduction Requirements in HAA Enabling Regulations (COMAR 26.11.27) in Tons

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 (2012) 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

tpy= tons per year

t/O_3=tons during ozone season

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



Note: Hg = mercury

1.2.2 *Project Schedules*

FGD system installations involve substantial construction projects. Mirant indicates in its CPCN application that it will need to initiate construction on the project in 2007 to complete the design, purchase, and installation of the air pollution control systems and be able to meet the HAA Phase 1 deadlines. Because of the aggressive HAA deadlines, and the size and complexity of the FGD project, Mirant has requested an expedited review of its application. It is expected that construction will last for 28 months.

1.3 *REPORT ORGANIZATION*

This report synthesizes 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 proposed project.
- Section 3 describes the existing site conditions, including 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 presents other environmental impacts that the project will have on the surrounding area, in particular to ecological, socioeconomic, and cultural resources, and the acoustic environment.
- Section 6 discusses the project's water supply needs, proposed source, and associated impacts.
- Section 7 describes Mirant's proposed FGD by-product management and offsite disposition, and presents 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 Dickerson Generating Station located approximately one mile east of Dickerson, Maryland and west of Maryland State Road 28 in Montgomery County, Maryland. It is along the eastern boundary of the Potomac River, south of the Monocacy River (see Figure 2-1). Mirant acquired the electric generating station and approximately 800 acres of the Dickerson site from PEPCO in 2000; PEPCO retains ownership of equipment located on approximately 200 acres of the site.

2.2 EXISTING FACILITY

The Dickerson Generating Station currently consists of three nominal 182-MW net coal-fired units, two nominal 147-MW net gas and oil-fired simple cycle combustion turbines (CTs), and one 13-MW black start and peaking turbine.

The coal-fired units designated as Units 1, 2, and 3, were constructed in the late 1950s and began operation in 1959, 1960, and 1962 respectively. The units are base-loaded steam electric units. Exhaust gases from these units exit a 700-foot high stack constructed in 1978. The two existing 400-foot high stacks, originally constructed, are used when the 700-foot high stack is under going maintenance. Condenser cooling is accomplished with once-through cooling water from the Potomac River. The once-through water circulation system discharges water back into the Potomac River at a rate of up to 285,000 gallons per minute or about 400 million gallons per day. Coal is delivered to the units by a CSX Transportation Corporation (CSXT) rail spur off the main line. Units 1, 2, and 3 are equipped with high-efficiency particulate control devices to minimize emissions of particulate matter. Low NO_x burners and separated overfire air have recently been installed on Units 1, 2, and 3 to limit NO_x emissions. By-product ash is stored in a facility adjacent to Dickerson.

The two simple cycle CTs, designated as Units H1CT and H2CT, are General Electric (GE) Frame 7F gas turbines. Units H1CT and H2CT began operation in 1992 and 1993, and are normally fired with natural gas from a Consolidated Natural Gas pipeline traversing the Dickerson site. A gas pressure reducing and heating station is located onsite and supplies the natural gas directly to the units. A 10 million gallon oil storage tank

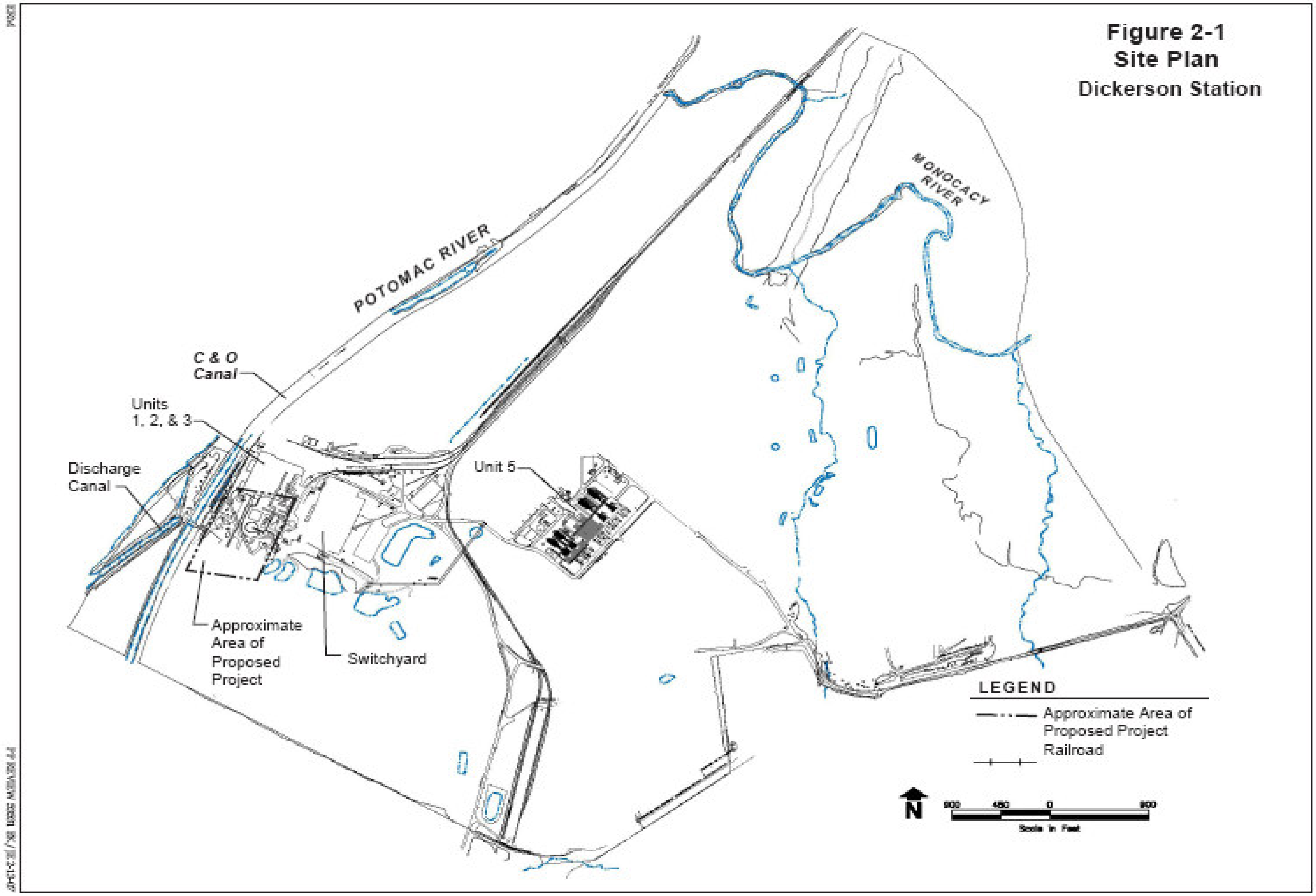


Figure 2-1
Site Plan
Dickerson Station
POTOMAC RIVER
MONOCACY RIVER
C & O Canal
Units 1, 2, & 3
Discharge Canal
Unit 5
Approximate Area of Proposed Project
Switchyard
LEGEND
Approximate Area of Proposed Project
Railroad
N
Scale in Feet

was installed with units H1CT and H2CT to supply distillate oil in the event that natural gas is not available, or is too expensive. Two 130-foot high stacks were installed to exhaust gases from units H1CT and H2CT. To control emissions of NO_x, water injection is used.

2.3 *PROPOSED PROJECT*

The proposed modification of Dickerson, also referred to as the Air Pollution Control (APC) project, consists of the installation of a wet FGD system and associated enhancements of the facility necessary for the operation of the systems. Operation of the FGD system will decrease SO_2 emissions substantially and will also reduce mercury emissions from Units 1, 2, and 3. Sulfuric acid mist (SAM) associated with the operations of the units will be controlled as part of the APC project by injection of a sorbent (sodium bisulfide).

A single FGD SO_2 absorber unit will serve the combined flue gas from Units 1, 2, and 3. The new FGD system will also include the following associated facilities:

- SAM reagent receiving, handling, and storage facilities;
- limestone receiving, handling, and storage facilities;
- limestone slurry preparation;
- gypsum byproduct storage, handling, and off-loading facilities;
- makeup water supply and makeup water treatment system;
- wastewater treatment systems for water treatment and scrubber wastewater;
- solid waste storage and handling system for scrubber and wastewater treatment solids; and
- single-flue, 400-ft exhaust stack.

The treated flue gases from all three units will be released to the atmosphere from the new single-flue, 400-ft stack, lined with fiberglass reinforced plastic. The stack will contain the majority of the continuous emissions monitoring systems.

Ancillary supporting systems will be added outside of the power generation area, including water supply, wastewater treatment, and materials handling systems for reagents, by products, and solid wastes.

2.3.1 *FGD System*

Operation of the wet FGD system requires input of a mixture of ground limestone and water (limestone slurry). 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.

The FGD system design includes a single 100-percent capacity SO_2 absorber for all three Dickerson units that is projected to reduce SO_2 emissions by about 92 percent from current levels. The absorber is designed to maximize contact between the gas and slurry droplets for efficient SO_2 removal. Gypsum (also known as calcium sulfate) is formed as a by-product when the limestone slurry reacts with SO_2 in the flue gas. This synthetic gypsum is potentially suitable for use in 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) will be extracted from the FGD system and sent to the wastewater treatment system.

2.3.2 *Limestone Receiving, Handling, and Storage*

Approximately 190,000 tons of limestone will be delivered to the facility annually at 100 percent FGD system capacity (see Figure 2-2). Limestone will be delivered to the facility primarily by rail cars, with trucks as a backup (only in the event that rail service is interrupted for a time). The incoming rail cars will be 100 ton capacity, covered top, bottom discharge and will dump into a below grade hopper or hoppers. The system will be designed to unload a maximum of 20, 100-ton railcars in an 8-hour shift. It is expected that, on average, up to 40 rail cars per week of limestone will be unloaded. If trucks are used (only under emergency conditions), 20-ton capacity trucks will dump the limestone into a hopper. It is expected that on average, up to 180 trucks per week will be unloaded, if truck transport is required.

2.3.3 *Gypsum Handling, Storage, and Load-out System*

Up to a maximum of 310,000 tons of gypsum will be generated and removed from the site annually. Gypsum by-product created from the FGD process will be collected from two; 100-percent capacity vacuum belt filters (1 operating, 1 spare) in the FGD dewatering facility. Figure 2-3 provides a flow diagram for the movement of gypsum. The enclosed area has a capacity of seven days of gypsum production storage, approximately 5,000 tons.

Gypsum will be transported offsite primarily by rail. The gypsum rail transport system has a capacity to load 20, 100-ton rail cars in one 8-hour shift. It is expected that on average up to 60 rail cars per week will be used for gypsum transport. Trucks may also be used if necessary, but only for emergency backup.

Mirant expects that by-product dewatering, on-site handling, off-site transport, and final disposition will be handled by a third party. The applicant estimates that a contract will be in place before summer 2007.

2.3.4 Other Reagent Storage

Wastewater Treatment Lime Silo

Hydrated lime will be utilized for pH control in the wastewater treatment system. Lime will be delivered onsite by bulk carrier truck and be pneumatically conveyed into the silo. The silo will be provided with a dust collector.

SAM Control System Reagent

A sodium bisulfide reagent will be used for SAM control. Reagent will be delivered onsite by bulk carrier truck and be pneumatically conveyed into the silo. The silo will be provided with a dust collector.

2.3.5 Wastewater Treatment System

The wastewater treatment system treats the chloride purge stream water that is drawn out of the FGD absorber and replaced with makeup water, to control chloride and suspended solids concentrations in the absorber vessel. The wastewater treament system consists of physical/chemical unit processes to remove suspended solids and metals from the purge stream, and biological unit processes for biochemical oxygen demand (BOD) and nitrogen removal.

Physical/Chemical Wastewater Treatment

Suspended solids and metals removal is a two-stage process. Wastewater is continually pumped from the equalization tank to a reaction tank for

Figure 2-2
Process Flow Diagram
Limestone Handling
System
Dickerson Station

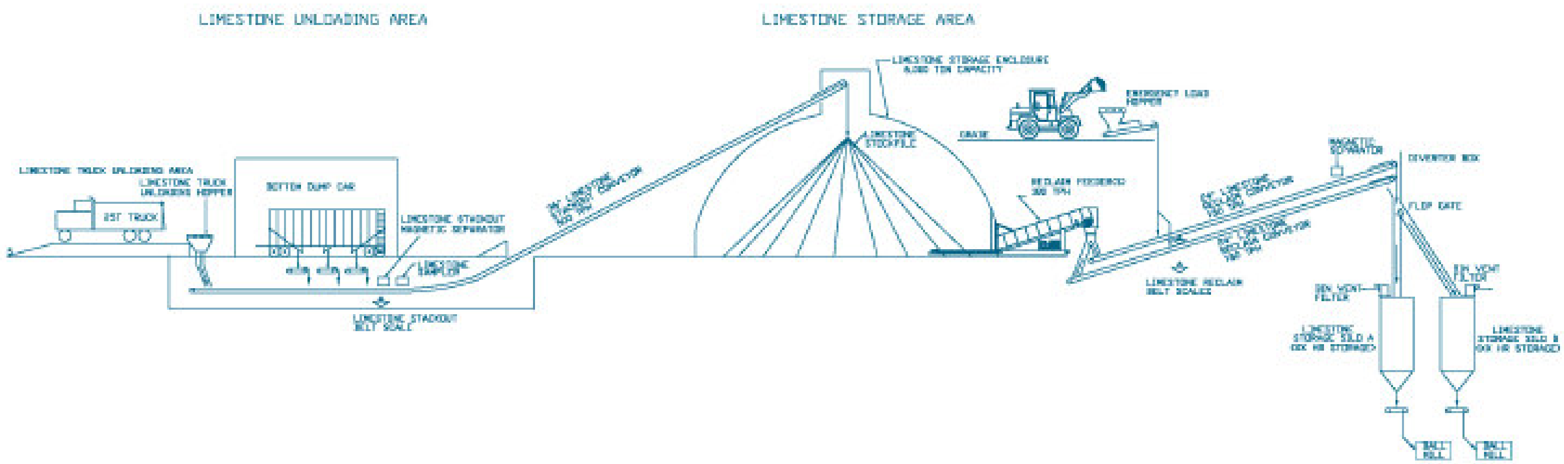
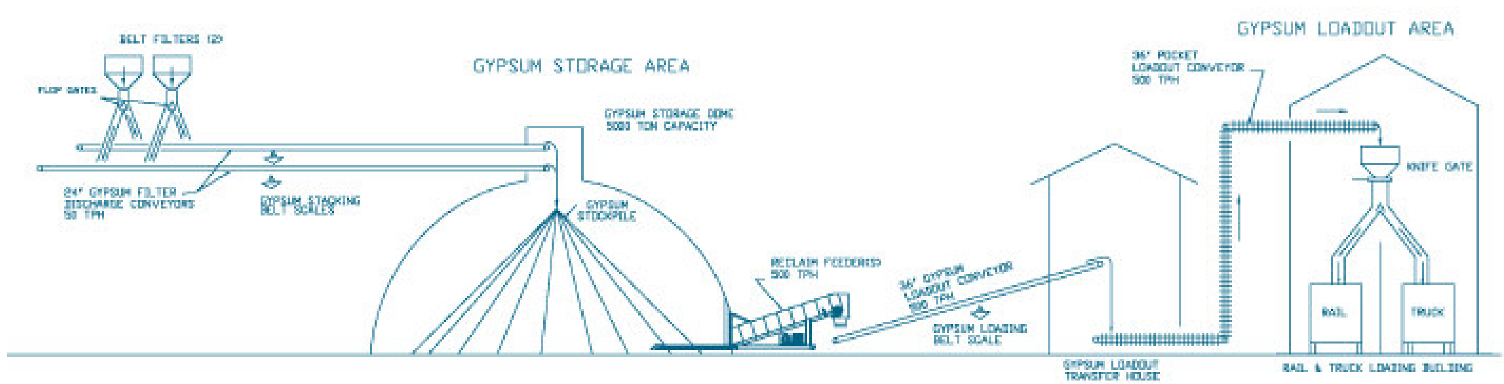


Figure 2-3
Process Flow Diagram
Gypsum Handling System
Dickerson Station



calcium sulfate desaturation and pH adjustment to between 8.5 and 9.2. Wastewater flows by gravity into a second tank, where sulfide reagent is added to form insoluble metal sulfides, which are removed by chemical precipitation. Wastewater then flows to a clarifier for removal of suspended solids. A coagulant and coagulant aid are added to improve solids flocculation and settling. Sludge from the clarifier is pumped to a thickener for concentration. Clarified water is treated with hydrochloric acid to reduce the pH to a concentration suitable for downstream biological treatment and for discharge.

Biological Wastewater Treatment

Wastewater is cooled and diluted. Biological treatment removes nitrogen and BOD. Wastewater flows to a biological sludge clarifier where the biological sludge is settled and pumped to the thickener for disposal or reactor use.

Sludge Handling

The sludge from the wastewater treatment system clarifiers and the water treatment system clarifier will be transferred to a sludge thickener for concentration. Thickened sludge will be pumped to filter presses for dewatering, resulting in an approximately 50 percent solids sludge cake. Sludge hoppers are loaded and trucked offsite to a landfill where the sludge is unloaded and placed for final disposal.

The average weight of sludge produced is 24,400 lb/day. At a sludge density of 70 pounds per cubic feet, the volume of sludge is 350 cubic feet per day. Based on a truck capacity of 6 tons, approximately two truck loads per day of solids will be produced.

2.3.5 Storm Water Management

Dickerson currently discharges site storm water runoff to the Potomac River under the plant's existing National Pollutant Discharge Elimination System (NPDES) permit. The existing Storm Water Pollution Prevention Plan (SWPPP) minimizes discharge of potential contaminants from plant storm water runoff. All storm water runoff from plant industrial areas is collected and treated in storm water detention basins prior to discharge to the river, and will continue to be so upon implementation of the APC project.

3.0 EXISTING SITE CONDITIONS

3.1 WATER RESOURCES

3.1.1 Surface Water

The Dickerson site is located on the Maryland shore of the Potomac River, approximately one mile below the confluence with the Monocacy River, the largest Maryland tributary to the Potomac. The Potomac River is relatively broad and flat in the vicinity of the Dickerson site, with an average depth of 3 to 4 feet. The Potomac River is designated as an American Heritage River. In the area of Dickerson, the Monocacy is typically less than 330 feet wide and less than 3 feet deep. The Little Monocacy River and several unnamed tributaries flow through the site. The Little Monocacy River flows under the C&O Canal and enters the Potomac River less than 1,000 feet downstream from the confluence of the Monocacy and Potomac Rivers.

The Potomac River serves as the primary water source for the Washington, D.C. metropolitan area. A great majority of the time, flow in the river is more than adequate to supply the needs of users, including a minimum flowby to support freshwater stream communities downstream of the Washington water suppliers' intake.

Water quality data from the U.S. Geologic Survey (USGS) for the Potomac River at Washington, D.C. indicates that since 1985 total phosphorus has decreased and nitrogen concentrations have stabilized (USGS 1998). Nutrient concentrations stabilized or decreased while the human population in the river basin increased by 44 percent from 1970 to 1990. USGS concluded, however, that water quality in the Potomac River will likely continue to be stressed by population growth and associated pressures well into the 21st century.

At present, water quality concerns in the section of the Potomac River near the Dickerson site primarily involve acid mine drainage (from upstream sources), agricultural and urban runoff, and industrial and domestic waste loading. Runoff and waste loading are the predominant sources of river impairment in the middle Potomac River basin. Although nutrient loading remains a water quality concern, long-term monitoring conducted in the basin indicates significant downward trends in nutrient concentrations in the river (Allegheny Energy 1999, USGS 1983, EPA 1979, USGS 1989, Chesapeake Bay Program 2000).

In PPRP's long-term benthic monitoring study conducted in the middle and upper Potomac River from 1983 to 1991, water quality was classified, based on dissolved oxygen concentrations, as good (6.0 to 7.9 mg/L) to excellent (8.0 to 9.5 mg/L), using the Interstate Commission on the Potomac River Basin's (ICPRB) water quality classification system (Versar 1992). More recent water quality data collected as part of DNR's fisheries surveys indicate continued good to excellent water quality in the Potomac River.

3.1.2 Ground Water

Ground water occurs under unconfined water table conditions in joints, fractures, and bedding planes of the shallow bedrock aquifer in the upland portion of the Dickerson site. Flow generally mimics surface topography, with recharge occurring in the upland area and ground water flowing eastward and westward toward discharge areas in the Little Monocacy River and Potomac River, respectively. The water table surface lies at a depth of 10 to 20 feet (PPRP 1987). Water resources data collected as part of the earlier Dickerson Station H licensing case in the mid-1980s indicate that the nearest ground water users are located about one mile north of the Dickerson site, with the Little Monocacy River lying between the site and those users.

3.2 BIOLOGICAL RESOURCES

3.2.1 Vegetation and Land Cover

3.2.1.1 Upland Communities

Upland vegetation at the Dickerson site includes infrequently maintained grasslands, mixed deciduous forest, and deciduous forest. The infrequently maintained grassland occupies 602 acres (59 percent of the site), deciduous forest occupies 212 acres (21 percent of the site), and mixed deciduous forest covers 147 acres (15 percent of the site).

Infrequently maintained grasslands occupy the southern, central, and most of the eastern portions of the site. The primary land use in these areas is transmission lines and road rights-of-way. These areas are periodically mowed and dominated by wiregrass *(Aristida dichotoma),* goldenrod *(Solidago sp.),* and foxtail grass *(Setaria sp.),* with an assortment of common weedy ruderal species, including various asters *(Aster* spp.), pasture thistle *(Cirsium discolor),* Queen Anne's lace *(Daucus carota),* and broomsedge *(Andropogon virginicus)*. Along the boundaries between grasslands and adjoining hardwood forests, red cedar *(Juniperus virginiana),* tulip poplar *(Liriodendron tulipifera),* black cherry *(Prunus serotina),* and a variety of shrubs and vines encroach upon the grasslands.

Mixed deciduous forest occupies level to gently sloping uplands on the Dickerson site. Dominant tree species in the overstory of the forest include Virginia pine *(Pinus virginiana),* red cedar, sycamore *(Platanus occidentalis),* tulip poplar, red oak *(Quercus rubra),* American elm *(Ulmus americanus),* and red maple *(Acer rubrum)*. The subcanopy layer is dominated by flowering dogwood *(Cornus florida),* Virginia pine, red maple, and tulip poplar. The herbaceous groundcover is approximately 60 percent non-vegetated forest floor covered with leaf litter interspersed with species including the invasive species garlic mustard *(Alliaria petiolata)* and Japanese honeysuckle *(Lonicera japonica).*

The deciduous forest community at the Dickerson site is located along the steeply sloping bluffs adjacent to the Little Monocacy River, the tributary to the Little Monocacy River, the Potomac River, and the C&O Canal. The canopy in the deciduous forest is dominated by tulip poplar, chestnut oak *(Quercus montana),* mockernut hickory *(Carya tomentosa),* American elm, black cherry, and pignut hickory *(Carya glabra)*. Subcanopy trees are predominately tulip poplar and mockernut hickory. Spicebush *(Lindera benzoin),* box elder *(Acer negundo),* and papaw *(Asiminia trilobum)* are the three most common species in the shrub layer, while honeysuckle and mayapple *(Podophyllum peltatum)* as the most common herbaceous groundcover species.

3.2.1.2 *Wetland Communities*

The Dickerson site contains approximately 41 acres of wetland floodplain forest (4 percent of the total site area) and 13 acres of non-forested wetlands (1 percent of the total site area). Floodplain forest areas on the site lie between the C&O Canal and the Potomac River. These areas are periodically flooded by the Potomac River. Dominant canopy species include box elder, silver maple *(Acer saccharinum),* American elm, and mockernut hickory. The subcanopy contains primarily spicebush, box elder, and papaw. The shrub layer is sparsely vegetated with spicebush and box elder saplings. The dominant herbaceous species include garlic mustard and jewelweed *(Impatiens duthicae)*.

Non-forested wetlands on the Dickerson site consist of seasonally flooded depressions, shallow marshes, shrub swamps, and open freshwater. The seasonally flooded depressions are located along small drainages and poorly drained soils associated with overlying fly ash fill within the infrequently maintained grassland areas. They are predominantly vegetated with herbaceous species such as soft rush *(Juncus effusis),* barnyard grass *(Echinochloa crusgalli),* wicker microstegium *(Microstegium vimineum),* nutsedge *(Cyperus strigosus),* smartweeds (*Polygonum* spp.), and sedges of the genus *Carex*. Dryer areas in the wetlands contain woody shrubs and small trees such as persimmon *(Diospyros virginiana),* silver maple, and red maple.

Shallow marshes and shrub marshes are found along sections of the C&O Canal and Potomac River. The shallow marshes contain wetland species such as Joe Pye weed *(Eupatorium fistulosum),* smartweeds, sedges, rushes, jewelweed, and cattail *(Typha latifolia)*. The shrub marshes contain small red maples, speckled alder *(Alnus rugosa),* and swamp rose *(Rosa palustris)*. Open freshwater areas on the Dickerson site consist of small ash settling ponds located near the existing plant. These manmade ponds are typically devoid of aquatic vegetation with the exception of floating plants such as duckweed (*Lemna* spp.).

3.2.2 *Wildlife*

The terrestrial vertebrate fauna of the area in the vicinity of the Dickerson site consists primarily of mammals, birds, reptiles, and amphibians characteristic of disturbed habitats, deciduous and mixed deciduous upland forests, and forested and non-forested wetlands. Up to 39 species of mammals could potentially occur in the vicinity of the site. The most commonly observed mammals include white-tailed deer *(Odocoileus virginianus),* Eastern cottontail *(Sylvilagus floridanus),* and white-footed mouse *(Peromyscus leucopus)*. Other species on the site include house mouse *(Mus musculus),* short-tailed shrew *(Microsorex horyi),* least shrew *(Cryptotis parva),* meadow vole *(Microtus pennsylvanicus),* pine vole *(Pitymys pinetorum),* opossum *(Didelphis marsupialis),* raccoon *(Procyon lotor),* muskrat *(Ondatra zibethica),* gray fox *(Uryocyon cinereoargenteus),* red fox *(Vulpes vulpes),* and feral cat *(Felis domesticus)*.

According to studies performed by Mirant at the time that the Dickerson expansion was being proposed, a total of 108 species of birds have been observed on the Dickerson site; 62 species are known or suspected to breed on the site. In the infrequently maintained grassy areas, 26 species of birds have been observed. The most common breeding bird in the grasslands was chipping sparrow *(Spizella passerine)*. Thirty-four species were observed along the tributary to the Little Monocacy. The most common species in these forests were rufous-sided towhee *(Pipilo erythrophthalamus)* and wood thrush *(Hyolocichla mustelina)*. Twenty-seven species were observed in the forests in the Little Monocacy Ravine; the most commonly observed were the tufted titmouse *(Parus bicolor)*, Carolina wren *(Thryothorus ludocivicianus),* wood thrush, northern cardinal *(Cardinalis cardinalis),* and red-bellied woodpecker *(Melanerpes carolinus)*. The forested area along the C&O Canal provides ideal habitat for migratory birds and yielded a total of 40 bird species. Several species include Eastern kingbird *(Tyrannus tyrannus),* white-breasted nuthatch *(Sitta carolinensis),* brown creeper *(Certhia americana),* hermit thrush *(Catharus guttatus),* bluegray gnatcatcher *(Polioptila caerulea),* and golden-crowned kinglet *(Regalus satrapa)*. Surveys on the Potomac River in the vicinity of the Dickerson site yielded 21 species of birds, the most common being the Northern rough-winged swallow *(Stelgidopteryx serripennis),* tree swallow *(Tachycineta bicolor),* green-backed heron *(Butorides striatus),* Eastern kingbird, and mallard *(Anas platyrhynchos)*.

Mirant indicated that a variety of turtles and frogs were also found in the wetland areas on the Dickerson site, including stinkpot *(Sternotherus odoratus),* Eastern mud turtle *(Kinosternon* *subrubrum),* common snapping turtle *(Chelydra serpentina),* Eastern painted turtle *(Chrysemys picta),* red-bellied turtle *(Chrysemys rubiventris),* red-eared turtle *(Chrysemys scripta elegans),* bullfrog *(Rana catesbeana),* green frog *(Rana clametans melanota),* Southern leopard frog *(Rana utricularia),* wood frog *(Rana sylvatica),* pickerel frog *(Rana palustris),* and spring peeper *(Hyla crucifer).* Snake species observed along the C&O Canal and the Potomac River include the northern ringneck snake *(Diadophis punctatus edwardia)* and northern water snake *(Nerodia sipedon).* The long-tailed salamander *(Eurycea longicunda)* and the northern two-lined salamander *(Eurycea bislineata)* were found in the Little Monocacy River. Several other reptiles and amphibians were found in the upland areas of the site, including:

- ground skink *(Scincella lateralis)*
- five-lined skink *(Eumeces faciatus)*
- six-lined racerunner *(Cnemidophorus sexlineatus)*
- broad-headed skink *(Eumeces laticeps)*
- northern fence lizard *(Sceloporus undulatus)*
- eastern hognose snake *(Heterodon platyrhinos)*
- black racer *(Coluber constrictor)*
- eastern box turtle *(Terrapine carolina)*
- American toad *(Bufo americanus)*
- Fowler's toad *(Bufo woodhousii fowleri)*

3.2.3 Threatened and Endangered Species

A review for the presence of species of concern at the Dickerson site was performed by the Maryland DNR Wildlife and Heritage Division in the spring of 2001. The review by DNR identified two rare invertebrate species known to occur on the project site, Pizzini's cave amphipod *(Stygobromus pizzini)* and a species of isopod (*Caecidotea* sp. 4). In addition, four species of concern have occurred in the vicinity of the project site, the white trout lily *(Erythronium albidum),* Short's rockcress *(Arabis shortii),* roundtop amphipod (*Stygobromus* sp. 14), and the dickcissel *(Spiza americana).*

Pizzini's cave amphipod, the isopod species, and the roundtop amphipod are subterranean invertebrates collected outside of caves and underground streams. All three species are classified as highly rare in the State of Maryland. The white trout lily is listed as State-threatened. It is found in rich deciduous woods, often along stream banks and associated ravine slopes. According to the Wildlife and Heritage Division, a known occurrence of white trout lily was recorded along the Monocacy River near the C&O Canal, west of the Dickerson property boundary. Short's rockcress is an herbaceous species currently listed as State-threatened. It is found in wooded steep slopes with limestone outcrops. Short's rockcress has also been observed along the Monocacy River near the C&O Canal, west of the site boundary. The dickcissel is a small bird typically found in meadows, roadside edges and ditches, and oldfield habitats. Breeding populations of dickcissels are considered rare in the State of Maryland (their typical range is from central Ohio south to Georgia, and west across the Great Plains). Dickcissels have apparently never been observed on the Dickerson site; no historical records document their presence there.

3.2.4 Aquatic Wildlife Resources

The fish community in this section of the Potomac River is typical of warm water fish communities in large rivers in the Mid-Atlantic region, being dominated by cyprinids and centrarchids. A total of 42 species were reported, including 11 species of minnow and 10 species of sunfish. Spotfin shiner and bluntnose minnow were most abundant among minnows, while redbreast sunfish, smallmouth bass, and bluegill were the most abundant sunfish species. Other numerically dominant species included the golden redhorse, channel catfish and northern hog sucker (the latter at Taylor's Landing). Smallmouth bass and channel catfish are two of the major species sought by recreational fishermen in this river region. Fish abundance varies widely from year to year, with reproductive success being strongly influenced by river conditions during the spawning season. Abundance of various species also varies considerably among sampling locations. Such differences are likely a result of differing habitat characteristics among sampling stations.

Fishery data for the Potomac River from 1979 to 1986 have shown no change in the relative proportions of the fish community during that time period. Proportions of sport, forage, and rough fish indicate a well-balanced fishery in the vicinity of the Dickerson facility. No fish species listed as threatened, endangered, or in need of conservation under federal or state law have been collected in the vicinity of the Dickerson site. This information is confirmed by a long-term study (Loos and Perry 2001) that examined fish distribution from 1979-2000 in relation to the thermal discharge at the Dickerson facility. Results of this study indicate that the thermal plume does not adversely affect the fish community in the vicinity of the facility. In fact, local enhancement may occur due to the increased prevalence of game and pan fishes in the impact region, especially during cold periods. These results show that the heated discharge has only a minor seasonal effect on the distribution of fishes in the immediate vicinity of the station and appears to have no adverse long-term effects on fish distribution in the area of the facility.

3.3 REGIONAL SOCIOECONOMIC SETTING

Montgomery County is located in Central Maryland, and is part of the Washington, D.C. metropolitan area. The Dickerson site is located in western Montgomery County within Planning Area 12: Little Monocacy Basin Dickerson – Barnesville, and is part of Community Based Planning Area 7 – Rural Area. Although the County as a whole has been affected by suburban sprawl from the Washington metropolitan area, the western part still retains a rural character throughout much of its area. The site is within the 93,000-acre Agricultural Reserve, and near the crossroads communities of Beallsville and Dickerson.

3.3.1 Population Trends

Montgomery County is Maryland's most populous county. In 2004, the population of Montgomery County was estimated to be 931,000, an increase of 6.6 percent from 2000 (M-NCPPC 2005). Population is projected to grow at a rate of about 0.75 percent per year through the year 2020, to slightly more than one million. By comparison, Maryland’s population is projected to grow at a rate of 0.7 percent annually between 2000 and 2020 (Maryland Department of Planning 2001).

Population is concentrated in the eastern part of the county, near job centers in Maryland, northern Virginia, and the District of

Columbia. Gaithersburg is the largest incorporated city with a population of 52,613 (year 2000), followed by Rockville (47,388); they are the third and fifth largest cities in Maryland, respectively. Other major centers in the urban part of the county are Bethesda and Silver Spring.

The closest population center to the Dickerson site is Poolesville (5,151 in 2000). Since 1970, Poolesville has evolved from a small rural town with a strong agricultural base into a suburb of the Washington metropolitan area. Most of its residents work along the I-270 corridor, in Washington, DC or in northern Virginia. Resident opinion and constraints in sewage capacity and water supply have shaped a development plan that prescribes limited population growth for the foreseeable future (Poolesville Planning Commission 2005). As a result, housing prices have increased rapidly over the past decade.

The Dickerson Generating Station falls within census tract 7005.00, which is the largest in the area, but is one of the least populated. It includes the town of Poolesville, and the communities of Sugarland, Beallsville, Martinsburg and part of Dickerson. Other nearby communities are Comus, Thompsons Corner, Barnesville, Slidell, Bucklodge and Boyds, all of which are within five miles of the facility.

3.3.2 Employment and Income

Much of Montgomery County's employment is located in the I-270 and US 29 corridors. The county hosts more than 23,000 businesses and is a major center for high technology and government. The county is home to more than 60 percent of Maryland's biotechnology companies. The largest private sector employers in the county include Adventist Hospital, Giant Food, IBM (Federal Unit), and Marriott International. Several agencies of the federal government, including the National Institutes of Health, Food and Drug Administration, and the National Institute of Standards and Technology, have a major presence in Montgomery County.

In 2005, the total number of jobs in the county was projected to be 520,000 up from 479,800 (8.5 percent) in 2000. Population in the Dickerson area (Planning Areas 12,16,17,18) was 2,099 in 2005. Employment in the county is projected to reach 680,000 by 2030

(M-NCPPC 2006). Strong employment growth has kept the unemployment rate low, less than three percent in December 2004.

According to the 1997 census update survey of Montgomery County residents, nearly 60 percent worked in the county, while 31.6 percent commuted to Washington, D.C., or northern Virginia. In contrast, the number of employed residents in Poolesville and vicinity was about 4,400 in 1997 with more than 77 percent working in the county (Table 3-1). Most Poolesville and vicinity residents commute to North Bethesda, Rockville, Gaithersburg, and rural areas of Montgomery County.

Table 3-1 Breakdown of Employment Locations for Dickerson Area Residents

Planning Area	Total Employed	% in County	% Inside Beltway	% Outside Beltway	% Elsewhere in MD	% to DC	% to VA
Montgomery	464,115	57.9%	18.4%	39.5%	9.2%	23.6%	8.0%
Poolesville & Vicinity	4,430	77.2%	11.9%	65.3%	6.0%	9.1%	6.7%

Source: Montgomery County Department of Parks and Planning 1997

Communities near the Dickerson site host small retail and service establishments, which account for less than one-half percent of office and retail space in the county (Montgomery County Department of Parks and Planning 1997). With the exception of the existing Mirant facility and the adjacent Montgomery County Resource Recovery Facility (RRF), most jobs are located elsewhere in the county.

3.3.3 Land Use and Zoning

Montgomery County has experienced rapid land use change during the past several decades, transforming itself from a rural, agricultural county in the 1950s to a major residential and commercial center in the Washington metropolitan region. The county has zoning jurisdiction over most of the land within its borders. The county's general plan is based on a "wedges and corridors" concept, which specifies that development should follow transportation corridors, while the areas between these corridors (the wedges) are preserved. In general, the county has successfully encouraged growth of jobs near transit centers and highways, although residential development has been considerably more dispersed (U.S. Department of Transportation 2001).

The Dickerson site is located within Montgomery County's 93,000 acre Agricultural Reserve, which was created in response to increasing development pressures on agricultural land. The Reserve was set aside to preserve farmland, open space, and wooded areas for recreation, and to help protect the environment. In 1973, the Montgomery County Council adopted the Rural Zone limiting development to a minimum of 5-acre lots in most of the undeveloped, upper one-third of the county. With continuing erosion of farmland and open space, the Council passed interim legislation in 1979 limiting development in a defined prime agricultural area to one dwelling per 25 acres, and directed the Planning Board to develop a permanent plan to preserve farmland.

In 1980, the Council approved the Functional Master Plan for the Preservation of Agricultural & Rural Open Space, which designated the Agricultural Reserve and rezoned it from the Rural Zone to the Rural Density Transfer (RDT) Zone, where development is limited to one dwelling per 25 acres. The RDT zone allows owners to sell the development rights from their properties to buyers who can apply those rights in areas of the county identified for development.

The Dickerson site is zoned RDT except for those areas hosting existing generating facilities, which are zoned Heavy Industrial. The site is outside Montgomery County's designated Priority Funding Areas associated with the State's Smart Growth program.

Preservation of rural land for agricultural use is a high priority in Montgomery County and there are five separate agricultural land preservation programs available to landowners.

- Montgomery County Agricultural Easement Program (AEP)
- Maryland Agricultural Land Preservation Foundation (MALPF)

- Maryland Environmental Trust (MET)
- Montgomery County Transfer of Development Rights Program (TDR)
- Montgomery County Rural Legacy Program (RLP)

Each program places an easement on the property to prevent future commercial, residential, or industrial development of the land. Table 3-2 lists the number of acres in protective easements in Montgomery County.

Table 3-2 Protective Easements in Montgomery County

	Total Land (acres)	**1994 Agricultural Use**	**MALPF Easements 2001**	**MET Easements 2001**	**County Easements & TDRs 2001**	**Private Conserv. Easements 2001**
Montgomery	316,272	104,800	2,305	2,122	46,227	80
%		33.1	0.7	0.7	14.6	<0.1
Maryland	6,212,80	2,289,100	128,032	49,479	75,296	21,700
%		36.8	2.1	0.8	1.2	0.3

Source: Maryland Department of Planning 2002.

Although the Agricultural Reserve is protected from residential encroachment through development restrictions, large-scale, land-intensive public projects threaten agriculture around Dickerson. The Montgomery County RRF adjacent to the Mirant property began operating in 1993 and was expanded in 1999 to host a yard waste composting facility and bagging operation. In 2004, the RRF received 640,000 tons of waste.

The Woodstock Equestrian Park, an 825-acre park on MD 28 west of Beallsville, opened in Spring 2006 and includes over 15 miles of equestrian and hiking trails. Future facilities may include outdoor riding rings, an indoor arena and a cross-country course. Montgomery County's Comprehensive Ten-Year Solid Waste Plan (2004-2013) includes a proposed landfill (designated as Site 2) located on 820 acres of land between Wasche Road and Martinsburg Road (Department of Public Works and Transportation 2004). A landfill permit for a 125-acre fill area on the site was issued in 1998, but the County currently has no plans to develop the site while out-of-county landfill options remain viable. The County's contract for out-of-state disposal of solid waste expires in 2012, with an option to 2017.

3.3.4 Transportation

There are approximately 3,000 miles of roads in Montgomery County. Major highways in the county include I-495 – the District of Columbia beltway – and I-270, which provides service to the northwest. The county is also served by two branches of the Metrorail Red Line, which provides high-speed transit access to the District of Columbia. The MARC passenger rail system originating in Brunswick traverses Montgomery County from Dickerson to Silver Spring, with a final destination at Union Station in Washington.

The Dickerson site is served by MD 28, also known as Dickerson Road in the western part of the county. MD 28 is classified as a rural minor arterial from the Frederick County line through Beallsville. It is an undivided highway with no access controls and 12-foot lanes. The speed limit in the area ranges from 40 to 50 mph except in Beallsville, where the posted speed is 30 mph (SHA 2005). Access to the Dickerson site is via Martinsburg Road (CO 253), 2.1 miles east of the Frederick County line. The average annual daily traffic on MD 28 between Martinsburg Road and Beallsville was 5,525 in 2005 and the highway has experienced little traffic growth over the past five years.

There are no projects planned for western portions of MD 28 in Montgomery County in the State’s Consolidated Transportation Program. MD 28, from the Frederick County line to MD 107, was resurfaced in 2004 (SHA 2006).

The Dickerson site is served by a spur from the CSX rail line. The spur also services the Montgomery County RRF, which is used to transport solid waste from the Transfer Station in Derwood and to dispose of RRF ash bypass waste and non-processible wastes.

3.3.5 Public Safety

Montgomery County is served by 19 fire departments responsible for direct fire suppression and emergency medical services. The

Dickerson area is served by the Upper Montgomery County Volunteer Fire Department (Station 14) located in Beallsville. The entrance to the Dickerson site off MD 28 is less than three miles from Station 14.

Upper Montgomery County is served by the Montgomery County Sheriff's Office and the Maryland State Police. Both the Sheriff's office and State Police are located in Rockville. Emergency management is under the authority of the Fire Administrator in the Montgomery County Fire and Rescue Service, and the Local Emergency Planning Council for Hazardous Materials.
In Montgomery County, there are five major hospitals providing medical services to the public. The closest facility in the county is Shady Grove Adventist Hospital in Rockville, with a patient capacity of 563 hospital beds. The Dickerson site is also close to Frederick Memorial Hospital, a 248-bed facility located in Frederick.

3.3.6 Recreation and Tourism

Montgomery County manages a 30,000-acre park system that includes neighborhood parks with playgrounds, stream valley parks with trails and recreational areas, regional parks, and conservation parks that are retained in their natural state. Dickerson Regional Park abuts the Mirant property to the south. There are also more than 34 miles of trails in the county.

There are two state parks in Montgomery County. The Patuxent River State Park is located along the upper 12 miles of the Patuxent River in Howard and Montgomery Counties. The park contains 6,700 acres of natural areas and farmlands. A portion of the park is a state wildlands area. The 7,000-acre Seneca Creek State Park extends along 12 miles of the Seneca Creek near Gaithersburg. The C&O Canal National Park stretches along the Potomac River in Montgomery County from approximately milepost 5 to milepost 42 and abuts the Dickerson site.

The Montgomery County Heritage Area (MCHA) became a Certified Heritage Area (CHA) in 2004. Based on a vision for raising the profile of Montgomery County's heritage, fostering stewardship of historic buildings and sites and increasing heritage tourism by residents and visitors, the Montgomery County Heritage Area Management Plan defines heritage area boundaries around clusters based upon three interpretive themes: Quakers and the Underground Railroad, Farming History and Technological Innovation. The boundary for the Farming History cluster is essentially that for the Agricultural Reserve, while the Technological Innovation cluster includes resources along the Potomac River and C&O Canal and resources along the Metropolitan Branch of the B&O Railroad. The Dickerson site is therefore within or adjacent to both the Farming History and Technological Innovation clusters (Mary Means & Associates 2002).

Poolesville is a targeted investment zone (TIZ), a specific area within the CHA that is a priority for private investment. The Montgomery County Heritage Area Management Plan identifies Poolesville as the gateway to the Farming History Cluster and an example of a Maryland/Mid-Atlantic agricultural village. The Plan envisions interpretive presentations, a heritage trail and other tourism initiatives for the town. The MARC station at Dickerson is included in the gateway network for the Technological Innovation Cluster.

3.4 NOISE

3.4.1 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 tenfold 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 3-3.

Table 3-3 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, L_{eq}, over a given time period. A one-hour L_{eq}, 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 L_{eq} as well as L_{90}, the sound pressure level that is exceeded 90 percent of the time. The L_{90} is also called the "noise floor," the minimum background noise level that is characteristic of that monitoring location. The difference between the L_{90} and the L_{eq} 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.

3.4.2 Existing Noise Levels at the Site

Mirant conducted ambient noise surveys in August of 2006 to characterize the existing acoustic environment in the area. Daytime and nighttime measurements were collected at six locations along the site boundary. Table 3-4 shows the results of these surveys; monitoring locations are illustrated in Figure 3-1.

As shown in Table 3-4, the daytime L_{eq} sound levels at the monitoring locations ranged from 40.6 dBA at Site 3 to 59.2 dBA at Site 1. The nighttime L_{eq} sound levels ranged from 42.6 dBA at Site 3 to 58.9 at Site 5.

Table 3-4 Baseline Ambient Sound Pressure Level Data for Mirant's Dickerson Power Plant

Site Number	Location	Date	Time	Sound Levels (dBA) L_{min}	L_{max}	L_{90}	L_{eq}	Comments/Notes
1	Near Water Intake	16-Aug-06	Day	54.4	68.2	54.7	59.2	Water intake noise
			Night	57.7	61.5	58.0	58.5	Insects, plant noise
2	Next to Railroad Entrance to Plant	16-Aug-06	Day	44.1	60.6	44.7	51.1	Air traffic, insect noise
			Night	44.0	48.7	44.6	45.8	Insect noise, air traffic
3	East Property Line	16-Aug-06	Day	37.7	47.6	38.2	40.6	Air traffic, insect noise
			Night	41.2	49.5	41.7	42.6	Insect noise, bird noise
4	By Gas Metering Station	16-Aug-06	Day	45.8	49.5	46.1	46.8	Insect noise
			Night	48.8	60.5	50.1	53.6	Insect noise
5	Nearest Resident	16-Aug-06	Day	43.3	48.8	43.7	45.5	MMRF Plant hum
			Night	54.9	71.9	55.6	58.9	Insect noise, MMRF plant hum

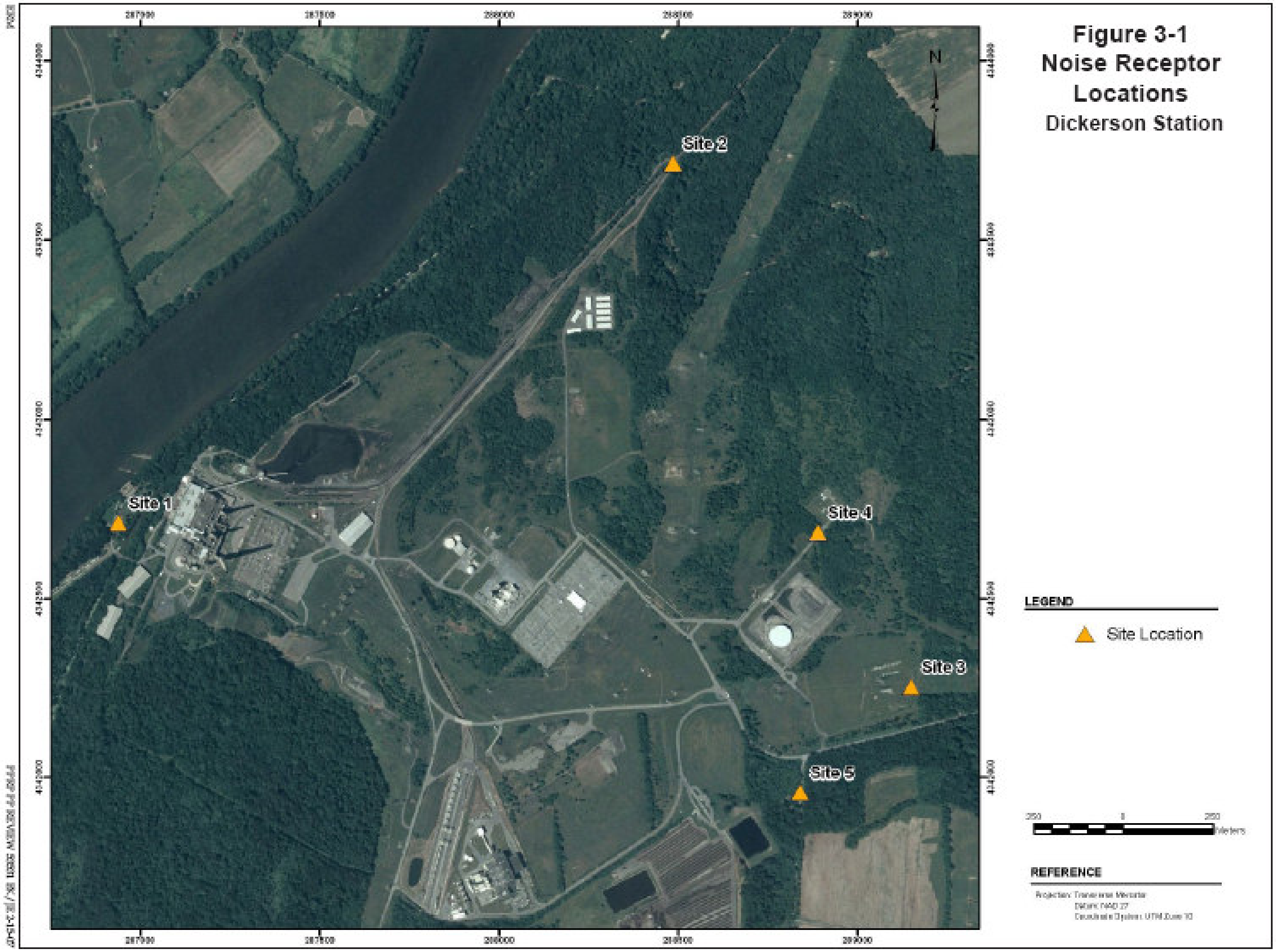


Figure 3-1
Noise Receptor Locations
Dickerson Station

3.5 CLIMATOLOGY AND AMBIENT AIR QUALITY

3.5.1 Climatology

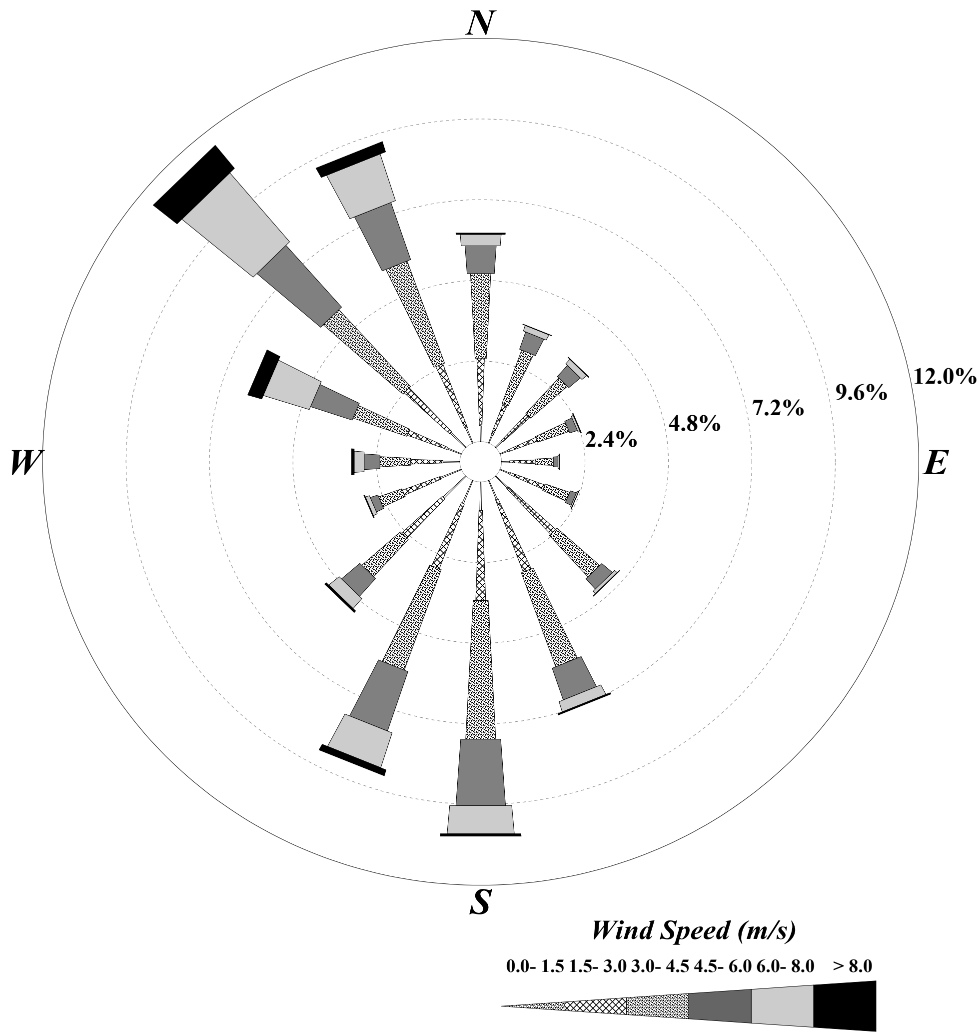
The discussion of climatology in the vicinity of the Dickerson plant is based primarily on data from Dulles International airport (IAD), which is the closest National Weather Service (NWS) station to the Dickerson site. The climate data cited in this section is from the Maryland State Climatologist Office Website, which is operated by the University of Maryland Department of Atmospheric and Oceanic Science. IAD is located approximately 12 miles west of the Dickerson facility, and is considered representative of the area.

The climate in the vicinity of the Dickerson site is temperate with four defined seasons. The annual mean temperature is approximately 55°F. The record minimum and maximum extreme temperatures range from a daily low of -18°F to a daily high of 104°F. Normal minimum and maximum temperatures are 22°F and 87°F, respectively. Lowest yearly temperatures tend to occur in January, while highest temperatures occur in July.

Precipitation is evenly distributed throughout the year. The mean annual precipitation is approximately 42 inches. This total has varied from as little as 30 inches to over 65 inches during the past 30 years.

The average annual wind speed at IAD is 6.3 miles per hour. Based on wind data at IAD from 1991-1995, prevailing winds are from the northwest. A wind rose of IAD wind measurements based on data from 1991 through 1995 is presented in Figure 3-2.

Figure 3-2 Wind Rose for Dulles International Airport (IAD), 1991-1995



3.5.2 *Existing Ambient Air Quality Standards and Designations*

Air Quality: Monitoring and Determining Attainment of Ambient Air Quality Standards

The U.S. Environmental Protection Agency (EPA) monitors concentrations of the "criteria" pollutants, NO_x, SO_2, particulate matter (PM), ozone, carbon monoxide (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 PM10, 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 PM2.5, PM less than 2.5 microns in diameter. PM2.5, 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 PM2.5 nonattainment areas.

EPA and states makes 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.

EPA's six stated objectives for the monitoring network design for the SLAMS are (EPA 1998; pg 2-1):

(1) to determine highest concentrations expected to occur in the area covered by the network;

(2) to determine representative concentrations in the areas of high population density;

(3) to determine the impact on ambient pollution levels of significant sources or source categories;

(4) to determine general background concentration levels;

(5) to determine the extent of Regional pollutant transport among populated areas, and in support of secondary standards; and

(6) to determine the welfare-related impacts in more rural and remote areas (such as visibility impairment and effects on vegetation).

EPA further explains that SLAMS monitors are intended to be located so that the samples they collect are representative of air quality over the entire area they are intended to cover. The Agency has established "spatial scales of representativeness" to ensure that monitoring of specific pollutants is appropriate and representative. The scales of representativeness include microscale, middle scale, neighborhood scale, urban scale, and regional scale (EPA 1998). The scale takes into consideration such factors as local terrain, pollutant-specific criteria, and population density. EPA reviews the program annually to "…improve the network to ensure that it provides adequate, representative, and useful air quality data" (EPA 1998).

In summary, EPA and state air agencies have established a monitoring network designed to allow collection of monitoring data sufficient for EPA to determine ambient air quality of criteria pollutants. The monitoring data is used to determine background ambient concentrations of criteria pollutants, and to classify all areas of the county as attainment or nonattainment of the NAAQS.

3.5.3 Local Air Quality

The air quality in Montgomery County, which is designated as Area IV (COMAR 26.11.01.03) by ARMA, is currently in attainment for all criteria pollutants with the exception of ozone and PM2.5. Because of the high levels of ozone historically found in Montgomery County during the ozone season (May-October), the County was formerly designated as "severe" for the 1-hour ozone NAAQS and is now designated "moderate" for the 8-hour ozone standard. Emissions of the two pollutants that are the primary precursors to ozone—volatile organic compounds (VOCs) and

NO_x—are regulated more stringently in ozone nonattainment areas to ensure that air quality is not further degraded (i.e., the ambient air concentrations of ozone do not continue to increase as new sources of emissions are constructed).

PM2.5 is a newly regulated pollutant. Montgomery County (and several other counties in Maryland and other states) became a designated PM2.5 nonattainment area as of April 5, 2005. Although EPA has promulgated an ambient standard for PM2.5 and has designated PM2.5 nonattainment areas, there are no Federal or State implementing regulations for PM2.5, as there are for ozone. EPA published interim guidance for implementing PM2.5 nonattainment programs in a memorandum of September 2005. PPRP and MDE have used the interim guidance on PM2.5 for this case.

Figure 3-3 illustrates ambient air quality monitoring stations in and around Montgomery County, operated under the SLAMS network. The monitoring data are collected and maintained by EPA's AIRS database and is available from the EPA's website (www.epa.gov/air/data/). Table 3-5 presents the maximum ambient air concentrations for ozone and PM2.5 in Montgomery County since 2005.

Figure 3-3 Location of Pollutant Monitoring Stations in and around Montgomery County

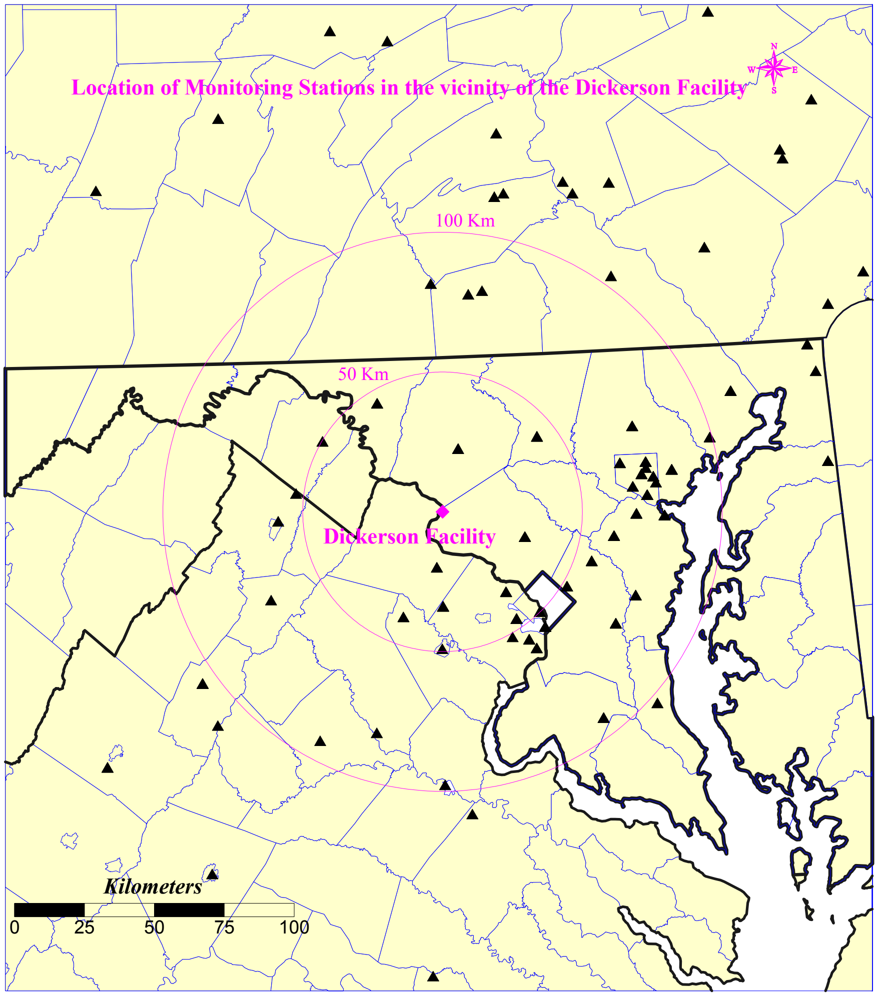


Table 3-5 Summary of Monitoring Data for Ozone and PM2.5 in Montgomery County

Pollutant	Averaging Period	Maximum Concentration
Ozone	1-hour	0.127 ppm
	8-hour	0.101 ppm
PM2.5	24-hour	38.0 μg/m³
	Annual	13.6 μg/m³