

Mirant Potomac River Generating Station (PRGS)

Case Study

Clean Air Act Enforcement Lessons Learned Work Shop
Philadelphia, PA - June 10, 2009

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Mirant PRGS

Location – Alexandria, Virginia

Operation – Power Generation Facility

Capable Power Generation – 482 MW

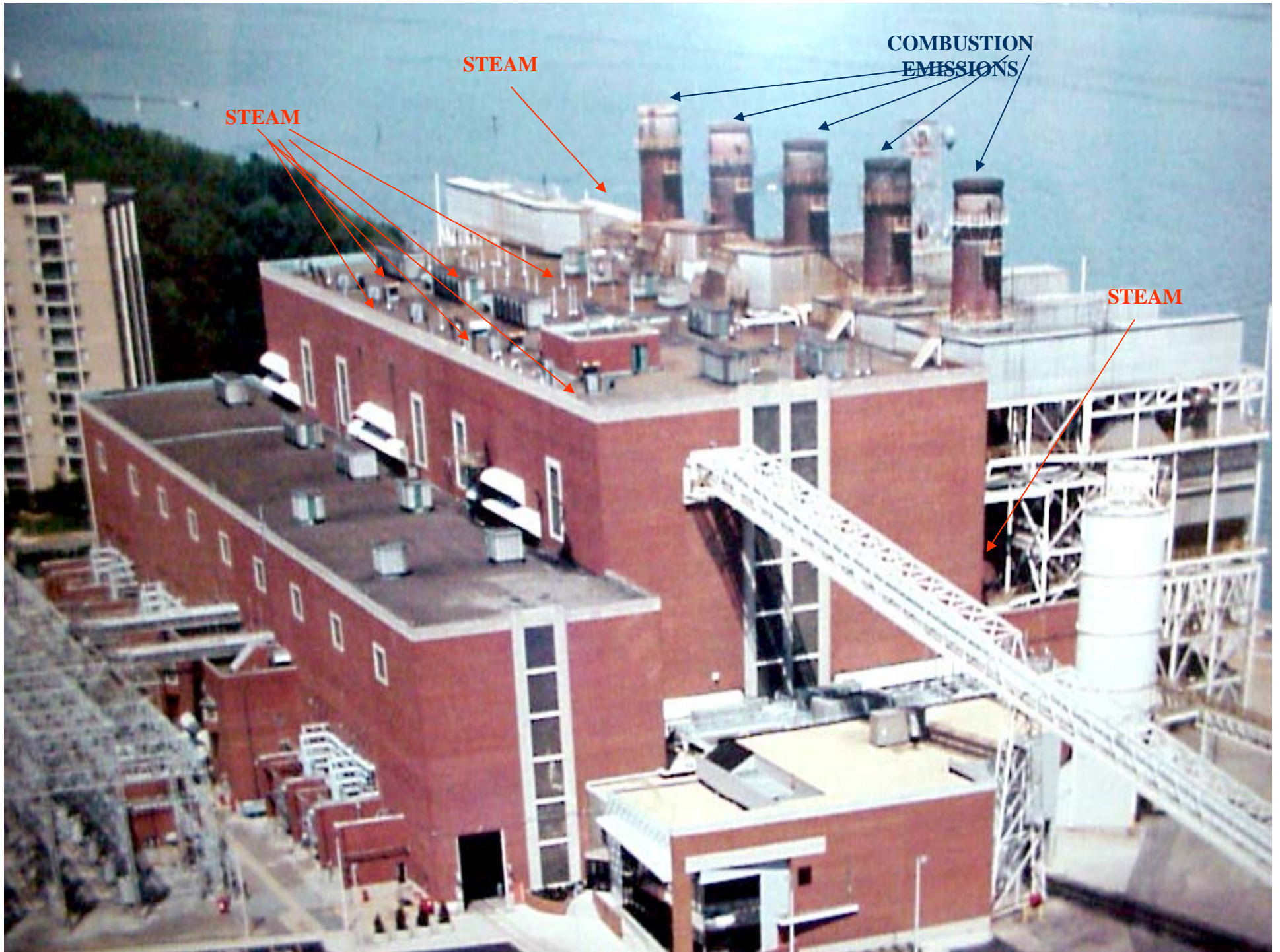
Generating Units – Five (5) (3 base & 2 cycling)

Primary Service Area – Washington D.C.

Mirant PRGS

- Constructed in 1949 and 1950, respectively, Unit 1 and 2 (cycling units) are rated @ 88 MW each.
- Constructed in the mid-1950's, Unit 3, 4, and 5 (base units) are rated @ 102 MW each
- Primary fuel is coal but all units are fired, stabilized, and warmed up on #2 fuel oil.





STEAM

STEAM

COMBUSTION
EMISSIONS

STEAM

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Coal Storage Area



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Alexandria, VA was designated by the EPA as part of the area including Washington D.C., Northern Virginia, and Suburban Maryland that had not attained the National Ambient Air Quality Standards (NAAQS) for ozone under the Clean Air Act.

The PEPCO PRGS was a major emitter of NO_x emissions, which is a precursor to ozone, and had no permit or limits for the pollutant. The Virginia Department of Environmental Quality (VADEQ) in an effort to ensure that PRGS NO_x emissions did not interfere with the area attainment status for ozone decided to cap their NO_x emissions during the ozone season in a permit.

Mirant PRGS

September 18, 2000 – A State Operating Permit (SOP) issued to PEPCO PRGS limiting ozone season (May – September) NOx emissions to 1019 tons (equivalent to 0.15 lb/MMBtu) by 2003 (provides 80% reduction in potential to emit (PTE) of NOx during ozone season). This reduction can be accomplished through credit trading program unless it hampers ozone season attainment efforts.

December 19, 2000 - Mirant Mid-Atlantic Corporation purchased the Potomac River Generating Station from PEPCO.

Mirant PRGS

February 2003:

- VADEQ informed Mirant PRGS that the only trading that will be acceptable for Sept. 2000 SOP is if trading comes from the metropolitan area facilities, but in 2003 there wasn't a NOx trading program in effect.
- Mirant PRGS is informed by VADEQ that they must meet NOx cap of 1019 beginning with the ozone season of 2003.

Mirant PRGS

Alleged violations detected @ the Mirant PRGS:

July 2003 – Analysis of Mirant’s continuous emissions data from May 1, 2003 to June 5, 2003 illustrated the facilities exceeded the permitted limit for NOx during ozone season. VADEQ consults with Mirant officials.

August 26, 2003 – Mirant’s Council confirms that emissions at the PRGS facility had exceeded the 09/18/00 SOP ozone limit for NOx.

September 10, 2003 – VADEQ issues a Notice of violation (NOV) for the NOx ozone exceedance @ PRGS.

October 20 2003 – A revised NOV was issued by VADEQ to Mirant PRGS for the NOx ozone season exceedance.

Mirant PRGS

In the same time frame EPA Region 3 issued a NOV to Mirant Mid-Atlantic Corporation involving the three plants operating in Maryland and the one in Virginia (PRGS). EPA's NOV addressed New Source Review (NSR) alleged violations.

January 22, 2004 – EPA joined VA DEQ's action and took the lead by issuing another NOV to Mirant Mid-Atlantic Corporation incorporating the both the NSR violations of the Clean Air Act and the federally-enforceable Virginia State implementation Plan (SIP) at Mirant's PRGS plant for the NOx violation.

The January 22, 2004 NOV focused on the continued operation of the PRGS plant at substantially similar levels as it did for the first 36 days of ozone season after initial notification that their NOx limit for ozone season had been exceeded by 155 tons within the first 36 days. By the end of ozone season the NOx emissions from the Mirant PRGS plant exceeded the permitted limit by approximately 965 tons.

Mirant PRGS

EPA in collaboration with Virginia and Maryland draft a Consent Decree (CD) for a settlement which is agreed upon and subsequently lodged with the court in September 2004 and again in February 2006. The CD included the three plants in Maryland and the PRGS in VA. The CD required:

- Installation of Low NOx Burners (LNB) on all five Units at the PRGS.
- Separated Over-Fired Air (SOFA) on Units 3,4,& 5 at the PRGS.
- Reduced the NOx emissions rate at PRGS by approximately 40%.
- Environmental projects at the PRGS aimed at reducing fugitive and other PM emissions from the station. Estimated at reducing 45 tons of PM emissions annually.
- NOx limits for the three Mirant Plants in Maryland during ozone season.
- Annual NOx emissions limits for the Maryland-Mirant Morgantown Generating Station
- Installation of SCR at the Morgantown Generating Station.

Mirant PRGS

Downwash Concerns from Mirant PRGS

April 2004 – Citizens of Alexandria contracted a consulting firm to perform screening analysis on Mirant PRGS for the surrounding area. The screening analysis indicated potential for serious downwash issues at the plant. The City of Alexandria notified the VA DEQ and requested further investigation into the matter.

September 23, 2004 – VA signs a Consent Order (CO) with Mirant agreeing to perform refined modeling to assess the effects of “downwash” on ambient concentrations for SO₂, NO_x, CO, & PM. Required was the submittal of modeling protocol within 21 days of the signed CO and results of modeling within 60 days of DEQ approval of the modeling protocol.

Mirant PRGS

August 19, 2005:

- Mirant presents a Dispersion Modeling Analysis of Downwash from the PRGS Plant that demonstrated their emissions from the plant result in, cause or substantially contribute to modeled violations of the primary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO₂), nitrogen dioxide (NO₂) and Particulate Matter of 10 microns (PM₁₀).
- DEQ's Director issued a letter that put Mirant on notice that it must take immediate steps to reduce the levels of SO₂ emissions in the surrounding area.
- Mirant's initial step was to shut down the facility until modeling could be accomplished to determine possible solutions. On August 24, 2005 @ midnight, Mirant PRGS shut down operation.

Mirant PRGS

Reliability impacts from the shut down of Mirant PRGS:

- PEPCO supplied power to the D.C. area with two (2) 230 KV lines and was installing an additional set of 230 KV lines into DC for reliability.
- Before and during the installation of the new 230 KV lines Mirant PRGS was the only other source of power into Washington D.C.
- Prior to completion of the new 230 KV lines if one of the 230 KV lines went out of service followed by the second it would cause a blackout of the Washington D.C. area for hours and possibly days until the lines could be repaired or Mirant PRGS could come on service to full demand power generation.

Mirant PRGS

August 25, 2005:

- The District of Columbia Public Service Commission (DCPSC) filed a Emergency Petition and Complaint with both the United States Department of Energy (DOE) and the Federal Energy Regulatory Commissions (FERC) pursuant to the Federal Power Act.

The basis of the petition was that the shutdown of the PRGS plant will have drastic and potential immediate effect on the electric reliability of the Washington D.C. area and could adversely impact hundreds of thousands of consumers, agencies of the federal government, the Blue Plains waste water treatment plant, and critical federal infrastructure to curtailments or blackouts of electrical power.

- DCPSC requested the Secretary of Energy to issue an order directing Mirant PRGS to continue operation.

Mirant PRGS

September 20, 2005 - Mirant PRGS restarted Unit 1 on a limited basis based on Mirant modeling analysis indicating no modeled NAAQS exceedances. Unit 1 was operated at eight hours maximum level or 88 MW, eight hours minimum level or 35 MW, and eight hours downtime in any given 24 hr period.

September 21, 2005 - The Governor of Virginia, now US Senator Mark Warner, responds to Mirant PRGS restart of Unit 1 without notification of VADEQ with “disappointment”. He states that Mirant PRGS must fully comply with environmental laws and regulations or shut down, no middle ground.

Mirant PRGS

Resolution to Downwash concerns

October 25, 2005 – Mirant PRGS proposes to test sodium sesquicarbonate (Trona) on Unit 1 to demonstrate the efficacy in reducing SO₂, HCL, and HF emissions.

October 27, 2005 – VADEQ responds to Mirant's proposal in approving the temporary use of Trona for testing purposes and approved the test protocol.

November 11, 2005 – Mirant began testing Trona injected in the flue gas stream prior to the electrostatic precipitators to control SO₂, HCl, and HF emissions. Test results indicated Trona injected into the flue gas controlled the emissions.

Mirant PRGS

December 20, 2005:

- The Secretary of Energy issued an Order pursuant to section 202(c) of the Federal Power Act requiring Mirant to operate PRGS to produce the amount of power (up to its full capacity) needed as specified by PJM in the event of a planned or unplanned 230 KV line outage.
- The Order required Mirant to keep as many units in operation and take all other measures to reduce the start-up time of units not in operation for the purpose of providing electricity reliability.
- The Order also required Mirant to develop a plan that addressed the reliability concerns while minimizing potential adverse environmental and health impacts from the operation of the plant.

Mirant PRGS

January 9, 2006 – the US Federal Energy Regulatory Commission issued an Order to PJM and PEPCO to jointly develop and implement a long term plan to provide adequate reliability in the transmission system serving the Potomac River substation irrespective of the PRGS due to NAAQS issues with the plant.

PEPCO proposed to install a redundant set of 230 KV lines and once operational the PRGS would not be a reliability factor. The plan is estimated to take 18 to 24 months to implement.

Mirant PRGS

June 1, 2006:

EPA and Mirant agree on circumstances under which Mirant PRGS can operate and comply with DOE's Order.

EPA issues an Administrative Consent Order (ACO) to Mirant allowing them to operate using predictive modeling 24 hours prior to daily operation in order to make adjustments regarding how many units can operate for energy demand and how much Trona must be injected to comply with the NAAQS for SO₂.

Also required in the ACO were ambient air monitors around the facility that would signal the operators if detected concentrations of SO₂ were within 80% of the 3 or 24 hour NAAQS so adjustments can be made.

The ACO expired in one year and was based upon the completion of the redundant 230 KV lines into Washington D.C. by PEPCO. ACO expired June 1, 2007.

Mirant PRGS

June 1, 2007 – Upon the expiration of the EPA ACO a State Operating Permit was issued by VA DEQ. The SOP restricted Mirant PRGS emissions of SO₂ to levels found protective of the NAAQS through modeling. The SOP limited operating scenarios and was very prescriptive as to how the units could operate to comply.

Mirant made several request of VA DEQ to merge the stacks in order to improve dispersion and subsequently eliminate the downwash issues. This would allow the plant more flexibility to operate at or close to capacity if needed.

Mirant did not feel the stack merge constituted New Source Review but the VA Citizen Air Pollution Control Board determined that it did and a SOP would have to issued before the stack merge could begin.

Mirant PRGS

July 31, 2008 – DEQ issues a State Operating Permit on behalf of the Citizen Air Pollution Control Board to Mirant PRGS approving the stack merge project. The project combined Units 1 & 2 into a single discharge point and the effluents of Units 3,4,& 5 into a single discharge point.

This existing source now has a permit that restricts emissions of CO, SO₂, NO_x, PM₁₀, and PM_{2.5} and all emission limits are both short term and annual. It also includes requirements, including several environmental projects, from the April 20, 2007 Consent Decree.

The Title V permit is in development and conditions of the SOP will be incorporated. Mirant PRGS has a application in with VA DEQ and are currently operating under the Title V permit shield.

Mirant PRGS

Questions?