To:	David Cramer, Larry Labrie	**Date:**	October 24, 2005
From:	Dave Shea	**File:**	Update 1 Background SO2
RE:	Derivation of 24-Hour Average SO2 Background for the Update 1 Report	**CC:**	

Mirant Potomac River Generating Station (PRGS) submitted a dispersion modeling report to VADEQ on September 20, 2005. This report, entitled Update 1 to: A Dispersion Modeling Analysis of Downwash from Mirant's Potomac River Power Plant: Modeling Unit 1 Emissions in a Cycling Mode documented that total air pollutant concentrations in the vicinity of the PRGS would be in compliance with the National Ambient Air Quality Standards (NAAQS). In order to demonstrate NAAQS compliance for the 24-hour period for SO_2, a background of 51 ug/m^3 was used. The previous modeling report submitted in August 2005 used a 24-hour background concentration of 60.3 ug/m^3.

This memo documents the fact that the observed 24-hour SO_2 background concentrations during periods when meteorological conditions produce highest impacts from Unit 1 operating in cycling mode range from 2 ug/m^3 to 36 ug/m^3, with nearly all measured concentrations below 20 ug/m^3. Therefore, use of a 51 ug/m^3 value for background is ultra conservative and ensures NAAQS compliance for SO_2.

Two scenarios were modeled for the Update 1 report. Tables 3-1 and 3-2 are reproduced from that report and show total SO_2 concentrations for Scenarios 1 and 2, respectively. Highest second-highest overall 24-hour impacts (313 ug/m^3 from PRGS + 51 ug/m^3 = 364.3 ug/m^3) were predicted for Scenario 2 in year 2002.

Tables 1 and 2 summarize the monitored background concentrations during years 2000 – 2004 on days when the model predicted highest SO_2 concentrations from Unit 1 operating in cycling mode. These concentrations were recorded at the same monitor used in the August 2005 report. This monitor is located 1 km SW of the PRGS at 517 N. Saint Asaph St. in Alexandria, VA. Table 1 presents monitored SO_2 concentrations on high impact days associated with Scenario 1. Table 2 presents monitored SO_2 background concentrations on high impact days associated with Scenario 2.

It is important to note that no attempt has been made to "back out" PRGS's contributions to the monitored background. Therefore, for some of these 24-hour SO_2 observations, we may be double counting by adding PRGS's modeled impacts to PRGS's monitored impacts.

Table 1 lists the monitored 24-hour SO_2 concentrations on the top 25 concentration days for Scenario 1. Many of the top 25 predicted concentrations occur on the same day at different receptors, thus there are generally between 5-10 days each year that produce highest impacts from Unit 1 operating in cycling mode.

The monitored concentrations in Table 1 never exceed 36 ug/m^3. A further review of the data indicates that all measured concentrations except two are below 20 ug/m^3. This is because highest impact days are characterized by persistent wind directions and moderate wind speeds. These are not the types of days on which highest ambient concentrations are measured. Highest measured concentrations occur on days when the winds are light and have been for at least the previous day.

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Internet Files\OLK4D\Memorandum on 51 micro grams
background (2).doc

Table 2 lists the monitored 24-hour SO_2 concentrations on the top 25 concentration days for Scenario 2. The monitored concentrations never exceed 20 ug/m^3 for the five year modeling period.

Of the two scenarios modeled, the highest, second-highest 24-hour impact from Unit 1 was predicted in year 2002 in association with Scenario 2. This concentration, 313 ug/m^3, was predicted on April 2, 2002. As shown in Table 2, the monitored 24-hour SO_2 concentration on that day was 16 ug/m^3. The addition of this background concentration to the impact predicted from PRGS results in a total concentration of 329 ug/m^3. As shown in the far right hand column of Table 1, this concentration is the highest for the three year period reviewed.