

Permitting Options for the Mirant – Potomac River Generating Station

Virginia DEQ
Presentation to
SAPCB
March 26, 2007

Significant Historical Events

- August 19, 2005 – DEQ instructs Mirant to take whatever steps necessary to “ensure protection of human health and the environment”
- August 24, 2005 – Mirant shuts down all 5 units
- September 21, 2005 – restarts unit C1 in on *8-8-8 operational schedule
- Fall 2005 – Mirant begins use of Trona
- December 20, 2005 – DOE orders Mirant to operate PRGS based on emergency reliability findings

*8-8-8 refers to unit C1 operating in any 24 hour period: 8 hours at maximum load, 8 hours at minimum load and not operating for 8 hours

Overview of Facility

What:

- 482-MW electricity generating station located in City of Alexandria supplying power to Central D.C.
 - 2 intermediate load units
 - 3 base load units
 - Steam Turbine
 - Coal and ash handling equipment
 - Trona storage units
- Coal fired units using distillate oil for ignition
- Began operation in 1949

Significant Historical Events

- June 1, 2006 – EPA ACO becomes effective authorizing the use of predictive modeling and MES
- Spring 2006 – DEQ begins preparation of State Operating Permit
- Summer 2006 – City of Alexandria requests DEQ stop work on SOP in lieu of Major NSR determination

Significant Historical Events

- 2003 – Mirant exceeds Ozone Season NO_x Limit
- 2004 – Judicial NO_x Consent Decree drafted requiring:
 - installation of LNB on all units
 - installation of SOFA on units C3, C4, & C5
 - “downwash” study
 - most recent version lodged in the court May 2006
- August 2005 – DEQ receives downwash study results indicating modeled exceedence of the NAAQS for NO₂, SO₂, and PM-10

Major NSR Look Back

- Technical Analysis on Approximately 75 past actions
- Technical Analysis Complete
- Awaiting Final Legal Analysis

Consent Order

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Consent Order More Protective than EPA ACO

- Predictive modeling for HCl and HF
- Four additional SO₂ monitors
- Three PM_{2.5} monitors
- "Best Practices" requirement for Line Outage Situations
- DEQ retains right to take appropriate enforcement or regulatory action in event of monitored exceedance

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Purpose and Basis of Proposed Bridge Consent Order

- To serve as bridge to regulate emissions from Potomac River Plant from expiration of EPA's Administrative Compliance Order (ACO) until issuance of permit with NAAQS-protective emission limits
- Based on structure and requirements of EPA ACO

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Necessity of Consent Order

- Essential to have enforceable mechanism to regulate emissions following expiration of EPA ACO until permit issuance – otherwise emissions may be unregulated during that period
- Consent Order may not be revised, amended or altered without consent of Mirant – alternative to order by consent is lengthy adversarial administrative proceeding

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Consent Order Key Points for Consideration

- Temporary
- Necessary
- Consent
- Protective of NAAQS and Toxics Standards
- More protective than EPA ACO

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Recommendation

- DEQ recommends the Board approve the Consent Order as presented for the Director's signature

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Permitting Options

- State Operating Permit
- Minor NSR Permit
 - baseline used to determine permit applicability

DEQ believes that the facility is not subject to the provisions under Major NSR regulations based on the application submitted.

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Option 2

DEQ Consent Order, Minor NSR Permit, and State Operating Permit effective upon completion of the stack merge:

- Authorizes stack merge project
- Active concurrently with DEQ CO:
 - Allows daily predictive modeling
 - Effective from expiration of EPA ACO (June 1, 2007) until permit issued with NAAQS protective emission limits (Fall 2007)
 - Results in four additional SO₂ monitors and three PM_{2.5} monitors
 - Does not include a provision allowing facility operations in a manner that demonstrates a modeled NAAQS exceedance due to specifications by PJM

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Option 1

Approve a State Operating Permit that incorporates the operating scenarios and emission rates established in Table 1 of the EPA ACO

- Short term and annual emission rates that do not result in modeled exceedances of any NAAQS as demonstrated by ambient air quality modeling
- EPA ACO Table 1 emissions rates have been determined by EPA to be protective of the NAAQS
- Plant operations limited

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Option 2 (cont.)

DEQ Consent Order, Minor NSR Permit, and State Operating Permit effective upon completion of the stack merge

- Minor NSR permit caps the facility's annual emissions
- SOP with short term emission limits issued prior to completion of the stack merge ~ approximately Fall 2007.

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Option 1 (cont.)

Approve a State Operating Permit that incorporates the operating scenarios and emission rates established in Table 1 of the EPA ACO

- Does not allow daily predictive modeling
- Does not authorize stack merge
- Does not include a provision allowing facility operations in a manner that demonstrates a modeled NAAQS exceedance due to specifications by PJM

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Option 3

DEQ Consent Order, Minor NSR Permit, and State Operating Permit effective upon completion of the MES

- Authorizes stack merge project
- Active concurrently with DEQ CO:
 - Allows daily predictive modeling
 - Effective from expiration of EPA ACO (June 1, 2007) until permit issued with NAAQS protective emission limits (about 2 years)
 - Results in four additional SO₂ monitors and three PM_{2.5} monitors
 - Does not include a provision allowing facility operations in a manner that demonstrates a modeled NAAQS exceedance due to specifications by PJM
- Allows Mirant to complete the MES at the PRGS

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Option 3 (cont.)

DEQ Consent Order, Minor NSR Permit, and State Operating Permit effective upon completion of the MES

- Minor NSR permits caps the facility's annual emissions
- SOP with short term emission limits issued upon completion of the MES ~ in approximately 2 years

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Questions on Permitting Options

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Summary of Board's options:

A. Approve State Operating Permit

B. Approve Minor NSR permit followed by a State Operating permit with effective short term limits upon completion of the stack merge project (Fall 2007)

C. Approve Minor NSR permit followed by a State Operating permit with effective short term limits upon completion of the Modeling Evaluation Study (approximately 2 years)

**Emission caps in Minor NSR permit determined by the Board's choice of baseline emissions.

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State Operating Permit Chapter 80 Article 5

Authority: 9 VAC 5-80-800 C.

Permits may be issued under this article in situations including, but not limited to, the following:

2. At the discretion of the board:
 - a. To cap the emissions of a stationary source or emissions unit contributing to a violation of any air quality standard; or
 - b. To establish a source-specific emission standard or other requirements necessary to implement the federal Clean Air Act or the Virginia Air Pollution Control Law.

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Recommendation

- DEQ recommends that the Board
 - Approve the draft order as presented
 - Direct staff to move forward with the minor NSR Permit authorizing the stack merge project
 - Direct staff to begin working on a State Operating Permit that contains short term limits upon completion of the stack merge project
- The Board may
 - Adopt all or part of the staff recommendation
 - Authorize staff to move forward with a modified approach to any of these options based on guidance from the Board
 - Defer action and direct staff to seek additional information

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State Operating Permit Chapter 80 Article 5

- Establishes emission caps at levels as necessary to protect the NAAQS
- Does not authorize the stack merge project

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Minor NSR Permit Stack Merge Project

- Mirant has submitted three Form 7 Air Permit Applications requesting a permit applicability determination that the stack merge project is exempt from Minor NSR permitting
- DEQ has reviewed the applications and believes that the project is subject to Minor NSR permitting

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Air Permit Application Timetable

- June 20, 2006 – Mirant notifies DEQ during a conference call about pending stack reconfiguration
- July 13, 2006 – DEQ meets with Mirant and requests Form 7 for stack merge project
- July 21, 2006 - Mirant submits letter requesting permit applicability determination for stack merge project
- August 1, 2006 - DEQ meets with Mirant
- August 8, 2006 - DEQ receives application for stack merge

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Minor NSR Permit Chapter 80 Article 6

Authority: 9 VAC 5-80-1100 et seq.

- Net Emissions increase from modifications that exceeds the exemption threshold levels listed in the Minor NSR regulations (9 VAC 5-80-1320 D.1)
- Authorizes stack merge project
- Establishes annual emission caps
- Concurrent with DEQ Consent Order
- Follow up State Operating Permit issued containing annual caps and short term emission limits

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Air Permit Application Timetable

- August 16, 2006 - DEQ issues application deficiency letter requesting more information and modeling protocol and notifying Mirant that the project is subject to Minor NSR permitting
- August 30, 2006 - DEQ receives revised application
- September 6, 2006 - DEQ issues 2nd application deficiency letter requesting more information and modeling protocol
- September 14, 2006 - DEQ meets with Mirant

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Overview of Stack Merge Project

- Merge stacks for units C1 & C2
- Merge stacks for units C3, C4, & C5
- New ductwork
- Replacement of all existing exhaust fans with larger capacity fans
- Replacement of power and control cables

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Air Permit Application Timetable

- October 11, 2006 – DEQ receives additional information from Mirant
- November 6, 2006 - DEQ issues 3rd application deficiency letter requesting more information and modeling protocol
- January 19, 2007 - DEQ meets with Mirant
- February 9, 2007 - DEQ receives letter from Mirant stating Minor NSR does not apply

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Air Permit Application Timetable

- February 23, 2007 – DEQ receives modeling protocol
- February 26, 2007 – DEQ receives revised application
- March 5, 2007 - DEQ meets with City of Alexandria
- March 12, 2007 – DEQ, EPA, Mirant, and Alexandria modelers meet to discuss modeling protocol
- March 19, 2007 - DEQ, EPA, Mirant, and Alexandria modelers participate in conference call continuing to resolve modeling protocol issues

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Minor NSR Permit Applicability Stack Merge Project

Past actual emissions:

- 2004-2005 is the preceding 2 year period for the stack merge project
- 2005: PRGS shutdown briefly and curtailed operations after the modeled NAAQS exceedences were discovered
- 2004: PRGS curtailed operations to meet ozone season NOx cap and install LNB
- DEQ used 2002-2003 as the past actual emissions for permit applicability

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Minor NSR Permit Applicability Stack Merge Project

DEQ believes the project is subject to permitting under Minor NSR

- Minor NSR permitting is applicable if a physical or operational change at a stationary source results in a net emissions increase at a stationary source from a project
- The stack merge project is considered a physical change
- Net emission increase test is based on past actual to future potential emissions test

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Historical Plant Operations

Year	Net Output (MWH)
2000	2,018,257
2001	2,187,023
2002	2,331,055
2003	2,400,499
2004	2,073,664
2005	1,319,769
2006	1,093,521

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Minor NSR Permit Applicability Stack Merge Project

Past actual emissions:

- the average rate of emissions (in tons per year) emitted in the 2 year period preceding the proposed project; or
- A different 2 year period if it is more representative of normal operations
- Actual emissions adjusted downward for:
 - Control strategies employed after the 24 month period
 - Emissions exceeding any federally enforceable limits

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Minor NSR Permit Applicability Stack Merge Project

2-Year Average Past Actual Emissions

Pollutant	2004-05	2003-04	2002-03	2001-02	2000-01
PM	375.61	567.10	549.35	431.20	358.15
PM-10	375.61	567.10	549.35	431.20	358.15
*PM-2.5	150.46	421.05	549.35	431.20	358.15
SO _x	11212.6	0	14542.55	15629.20	15969.35
NO _x	3629.40	5245.65	5737.75	5943.90	5805.55
CO	188.26	241.54	249.29	237.00	229.97
VOC	22.66	31.74	35.07	33.22	32.23
Pb	0.16	0.204	0.215	0.21	No data

*2000-2003 assumes PM-2.5 = PM-10

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Minor NSR Permit Applicability Stack Merge Project

Future Potential Emissions:

- Based on the maximum capacity of a stationary source to operate
- Takes into account federally enforceable physical or operational limits including:
 - Pollution control equipment
 - Permit emission limits

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BACT Applicability Stack Merge Project

9 VAC 5-50-260 B:

A modified source shall apply best available control technology for each change with a net emissions increase greater than the levels in 9 VAC 5-80-1320 D.1. for each regulated pollutant at the source.

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Minor NSR Permit Applicability Stack Merge Project

Pollutant	(2002-03) Past Actual Emissions (tpy)	Future Potential Emissions (tpy)	Net Emissions Increase (tpy)	Exempt Levels (tpy)
PM	549.4	3264.0	2714.7	15
PM-10	549.4	2186.9	1637.5	10
PM-2.5	549.4	946.6	397.2	10
SO ₂	15629.2	97280.0	81650.8	10
NO _x	3975.3	*3700.0	0	10
CO	249.9	452.9	203.6	100
VOC	35.1	64.3	19.3	10
Pb	0.2	0.4	0.2	0.6

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*Future NO_x emissions are limited by the NO_x Consent Decree

BACT Applicability Stack Merge Project

- BACT applicability is determined by subtracting the past actual emissions from the projected future actual emissions (proposed permit limits)
- Future actual emissions are based on emission caps of past actual emission levels as proposed by Mirant

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Minor NSR Permit Applicability Stack Merge Project

- Net Emissions Increase greater than exemption levels for PM, PM-10, PM-2.5, SO₂, CO, and VOC
- Project is a modification to a stationary source
- Minor NSR Permit required
- BACT applicability determination required

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BACT Applicability Stack Merge Project

Pollutant	(2002-03) Past Actual Emissions (tpy)	Future Actual Emissions (tpy)	Net Emissions Increase (tpy)	Exempt Levels (tpy)
PM	549.35	549.35	0	15
PM-10	549.35	549.35	0	10
PM-2.5	549.35	549.35	0	10
SO ₂	15629.2	15629.2	0	10
CO	249.88	249.88	0	100
VOC	35.0715	35.0715	0	10

*No BACT applicability for NO_x and Pb because there was no Minor NSR permitting was not triggered for those pollutants.

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BACT Applicability Stack Merge Project

- No BACT evaluation required
 - Net Emissions Increase less than exemption levels for PM, PM-10, PM-2.5, SO₂, CO, and VOC
- Permit emission limits will be capped at the 2002-2003 baseline actual emission levels

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Toxic Emissions Evaluation Under State Regulations

- 9 VAC 5-60-300 C.5. Addresses source categories EPA has determined should not be regulated under section 112 of the Clean Air Act.
- HCl and HF will be evaluated through modeling based on authority in 5-60-300 F. "to prevent or remedy a condition that may cause or contribute to the endangerment of human health."
- Will be regulated under CAMR.

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Minor NSR Permit Stack Merge Project

- Any Minor NSR Permit issued to authorize the stack merge project would be followed by a State Operating Permit containing short term limits effective:
 - Upon completion of the stack merge;
OR
 - Upon completion of the Modeling Evaluation Study
- DEQ Consent Order would be effective until a State Operating Permit is issued

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Fugitive Emissions Evaluation

- Six primary sources of fugitive particulate (PM/PM-10) emissions at the plant
 - Ash silo vents
 - Ash loader
 - Re-suspended roadway dust from truck traffic
 - Coal pile wind erosion
 - Coal stackout
 - Railcar dumper

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Questions on Minor NSR Applicability

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Fugitive Emissions Evaluation

- Controls for ash silo vent emissions, coal pile wind erosion emissions, and railcar dumper emissions
- Ash silo vent emissions – exhausts from baghouses on fly ash silos are routed back to boiler C1 hot side electrostatic precipitator
- Coal pile wind erosion – 4 acre pile controlled by use of wind screen
- Railcar dumper – partial enclosure

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Fugitive Emissions Evaluation

- Fugitive particulate emissions (PM) calculated at approximately 9.5 tons per year with controls
- Fugitive particulate emissions (PM-10) calculated at approximately 7.4 tons per year with controls
- No additional fugitive emission controls are proposed at this time

*Emissions estimates as of February 2007 (includes truck traffic associated with increased ash handling from usage of Trona)

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Future Applicable Requirements

CAIR – NO_x Allocations

2005 *CAMD Actual Annual Emissions (tpy)	CAIR Phase I Annual Allocations (tpy)	2005 *CAMD Actual Ozone Season Emissions (t/season)	CAIR Phase I Ozone Season Allocations (t/season)
2,524	1,734	1,162	711

*CAMD: EPA's Clean Air Markets Division

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Air Quality Analyses

- All permit options will include modeling to demonstrate compliance with air quality standards
 - National Ambient Air Quality Standards (NAAQS) for PM10, SO₂, NO₂, CO
 - Significant Ambient Air Concentrations (SAAC) for HF and HCl
- PM2.5 to be modeled on a local and regional basis in accordance with upcoming EPA guidance and as part of the Washington, D.C. MSA SIP demonstration (due to EPA in April 2008)

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Future Applicable Requirements

CAIR –SO₂ Allocations

Title IV –Acid Rain Allocation (tpy)	2005 *CAMD Actual Annual Emissions (tpy)	CAIR Phase I Annual Allocations (tpy)
12,049	8,476	6,025

*CAMD: EPA's Clean Air Markets Division

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Future Applicable Requirements

- Clean Air Interstate Rule (CAIR)
 - Establishes emissions caps for NO_x and SO₂
 - NO_x caps effective January 1, 2009
 - SO₂ cap effective January 1, 2010
- Clean Air Mercury Rule (CAMR)
 - Establishes emissions cap on Hg
 - Effective January 1, 2010

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Future Applicable Requirements

CAMR – Hg Allocations

*2002 Mercury Annual Emissions (lbs/yr)	CAMR Phase I Annual Allocations (lbs/yr)
118.26	72.37

*As provided by Mirant for the Virginia DEQ mercury study

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Other Control Strategies

- Other control options considered by DEQ for the PRGS:
 - Selective Catalytic Reduction (SCR) for NO_x control
 - Lime Spray Dryer (LSD) for SO₂ control
- Cost effectiveness of controls evaluated using EPA's CUECOST3 spreadsheet

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Summary of Options:

- Approve State Operating Permit
- Approve Minor NSR permit followed by a State Operating permit with effective short term limits upon completion of the stack merge project (Fall 2007)
- Approve Minor NSR permit followed by a State Operating permit with effective short term limits upon completion of the Modeling Evaluation Study (approximately 2 years)

**Emission caps in Minor NSR permit determined by the Board's choice of baseline emissions.

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Other Control Strategies

For Control of One Boiler		
Control Device	Total Estimated Capital Cost	Estimated Annualized Cost
SCR	\$14,800,000	\$3,600/ton NO _x removed
Lime Spray Dryer	\$45,800,000	\$2,300/ton SO ₂ removed

•Does not factor in control currently achieved by Trona
 •Does not factor in future federally enforceable limits

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Recommendation

- DEQ recommends that the Board
 - Approve the draft order as presented
 - Direct staff to move forward with the minor NSR Permit authorizing the stack merge project
 - Direct staff to begin working on a State Operating Permit that contains short term limits upon completion of the stack merge project
- The Board may
 - Adopt all or part of the staff recommendation
 - Authorize staff to move forward with a modified approach to any of these options based on guidance from the Board
 - Defer action and direct staff to seek additional information

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Special Considerations

- Baselines
 - Minor NSR applicability can be calculated using any baseline selected by the Board.
- Public Participation
 - All permits would require public participation including a comment period and hearing on all aspects of the permit (baseline, modeling, etc.)

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