EPA United States Environmental Protection Agency New England

One Congress Street, Suite 1100
Boston, MA 02203

FACT SHEET

Fore River Development, LLC
9 Bridge Street
N. Weymouth, MA 02191

EPA Draft Permit

Acronyms and Abbreviations

BACT	Best Available Control Technology
BTU	British thermal unit
CAA	Clean Air Act
CEM	Continuous Emission Monitor
CFR	Code of Federal Regulations
CPA	Comprehensive Plan Approval
CTG	Combustion Turbine Generator
DEP	Massachusetts Department of Environmental Protection
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FWS	US Fish and Wildlife Service
HHV	Higher Heating Value
HRSG	Heat Recovery Steam Generator
MM	million
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NSR	New Source Review
ppm	parts per million
PSD	Prevention of Significant Deterioration
SCR	Selective Catalytic Reduction
STG	Steam Turbine Generator
tpy	tons per year

On March 31, 2006, Fore River Development, LLC (Fore River) filed an application with the Environmental Protection Agency (EPA) Region 1 office to modify its existing Prevention of Significant Deterioration (PSD) permit. A copy of the application is attached. The Massachusetts Department of Environmental Protection (DEP) originally issued the PSD permit and associated State Comprehensive Plan Approval (CPA) (collectively, the PSD/CPA permit) on May 5, 2000 to Fore River for the construction and operation of a 775 MW combined cycle electrical generation utility project. The March 31, 2006 application requests several minor changes to the PSD permit, including a revision that would allow Fore River the opportunity to burn additional amounts of low sulfur fuel oil above the existing fuel oil cap provided the sulfur content of the additional fuel oil is 0.003% sulfur by weight or less. The current permit allows the fuel oil sulfur content of 0.05% by weight.

On June 23, 2006, Fore River also submitted a letter to EPA to address the PSD major modification applicability test issues associated with the March 31, 2006 application. A copy of the June 23, 2006 letter is attached. Information provided in the June 23, 2006 letter shows that Fore River's proposed permit revisions will not result in a significant emission increase under the federal PSD program and, therefore, is not subject to major source PSD review.

EPA proposes to approve Fore River's application and revise those provisions that apply to the PSD portion of the DEP's May 5, 2006 PSD/CPA permit exclusively. This document serves as the fact sheet as required by 40 CFR part 124-Procedures for Decisionmaking and explains the legal and factual basis for EPA's approval.

Please note that this project is also subject to the DEP's Plan Approval requirements under the state regulations at 310 CMR 7.02. On March 20, 2006, the DEP issued a revised CPA that regulates all pollutants emitted by the source including the emissions regulated under the PSD permit. EPA has worked closely with the DEP to ensure this PSD permit does not conflict with the DEP's revised CPA requirements. Although EPA's PSD permit includes additional requirements for burning distillate fuel oil beyond the requirements of the DEP's May 5 2006 CPA, EPA has determined that these additional requirements will not conflict with the DEP's CPA, and compliance with the PSD permit will not conflict with the CPA. Fore River must comply with both the federal PSD permit and the CPA.

I. Applicant

Fore River Development, LLC
9 Bridge Street
N. Weymouth, MA 02191

II. Project Location

Fore River Station is located in N. Weymouth, MA in Norfolk County. This location is designated as attainment/unclassified for the following national ambient air quality

standards (NAAQS) pollutants: nitrogen oxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter – 10 microns (PM-10) and lead. The county is designated nonattainment for ground level ozone.

III. Facility Description

Since 2003, Fore River has operated a dual fuel combined-cycle electric generating facility in Weymouth, Massachusetts. The station is configured as a main power block generating nominal 775 Megawatts (MW) of electric power. Although the station is capable of burning both natural gas and distillate fuel oil, to date Fore River has operated only on natural gas.

Fore River Station (Units 11 and 12) includes two Mitsubishi Heavy Industries Model 501G combustion turbine generators (CTGs), two heat recovery steam generators (HRSG) and a new steam turbine generator (STG). Each CTG has a nominal generating capacity of approximately 250 MW. The hot exhaust gases from each CTG pass through a HRSG, which uses the heat from these gases to produce steam. These exhaust gases also contain sufficient oxygen to allow the placement of supplemental firing burners in the ducts just upstream of the HRSG equipment. Each HRSG houses an oxidation catalyst for carbon monoxide (CO) control, followed by an ammonia (NH_3) injection grid and selective catalytic reduction (SCR) catalyst for the control of nitrogen oxides (NO_x). The steam produced by each HRSG is fed into the single condensing STG. The STG has a nominal generating capacity of approximately 275 MW. An air-cooled condenser is used to condense the steam.

Other auxiliary equipment includes an aqueous ammonia storage tank, a continuous emissions monitoring system (CEMS), an auxiliary boiler and an emergency diesel generator. The auxiliary boiler is designated as Fore River Unit AB and provides steam for plant startup when both CTGs are off line. The auxiliary boiler has a maximum energy input of 83 million British Thermal Units per hour (MMBtu/hr), Higher Heating Value (HHV). The 1,500 kilowatt emergency generator, (15.4 MMBtu/hr, HHV), is designated as Fore River Unit EDG1 and is required for facility backup power to support shut down operations if no power is available from the grid.

IV. Current PSD Permit

Fore River station operates under a combined PSD/CPA permit (MA PSD permit number MBR-99-COM-018) issued by DEP on May 5, 2000, pursuant to the federal PSD regulations at 40 CFR 52.21. On March 3, 2003, EPA withdrew delegation of authority to administer the PSD program from the DEP in response to the DEP's decision to cease implementing the federal PSD program at 40 CFR 52.21. As such, EPA now issues all PSD permits and PSD permit revisions in Massachusetts.

V. Proposed Permit Modification

EPA is proposing the following revisions to the PSD permit:

- A new alternative fuel oil provision that allows the two CTGs to burn additional amounts of lower-sulfur distillate fuel oil (e.g., ultra-low sulfur diesel oil);
- Changes to fuel use provisions for the auxiliary boiler;
- Changes to minimum operating load requirements for the two CTGs; and
- Incorporation of new startup/shutdown emission limits for the two CTGs.

VI. Analysis

A. Alternative Fuel Oil Provisions for CTGs

1. Current Permit

The current PSD/CPA permit contains emission limitations and operational restrictions reflecting Best Available Control Technology (BACT) that apply to the facility when either or both of the two CTGs burn distillate fuel oil. Among other requirements, the permit allows for combustion of no more than 29,074,350 gallons of transportation grade distillate fuel oil (i.e., distillate with a maximum sulfur content of 0.05% by weight) during any rolling 12-month period. *See* PSD/CPA permit, condition III.E. This operational restriction reflects the maximum quantity of distillate fuel oil that the facility can burn over 720 hours (30 days) at 100% load at -12^{o}F. The PSD/CPA permit also contains short-term emission limits for NOx, SO_2, PM-10, CO, VOC, and NH_3 during periods of oil-firing expressed as a concentration emission limit (i.e., parts per million) and/or a heat input emission limit (i.e., pounds (lbs) per MMBtu), and as a maximum *hourly* emissions limit based on the maximum heat input.

During the period from May 1 through September 30, the PSD/CPA permit further restricts use of distillate fuel oil to emergency situations (i.e., where the DEP grants the facility a variance from the gallon limitation), natural gas unavailability, commissioning (i.e., initial testing of turbines while firing distillate oil), and periodic readiness testing.

The PSD/CPA permit also contains maximum annual emission limits in tons per year (tpy) for all pollutants. These limits were calculated assuming that the combustion turbines would burn 8040 hours of natural gas at maximum heat input and 720 hours (i.e., 29,074,350 gallons) of distillate fuel oil at maximum heat input. In addition, the annual emission limits calculations assumed that the turbines would emit at their maximum short term emission limits.

2. Proposed Revision

EPA proposes to add an alternative distillate fuel oil provision to the PSD permit. The alternative provision will apply only where (1) total deliveries of 0.05% by weight distillate fuel oil in the preceding 12-month period have not exceeded 12,500,000 gallons, and (2) the sulfur content of all other delivered distillate fuel oil is 0.003% by weight or less. Under the alternative provision, the gallon limitation on distillate fuel oil will be replaced by the annual emission limits reflected in the PSD/CPA permit for oil-fired operations. That is, Fore River's use of distillate fuel oil will be restricted by the requirement that *actual* emissions over any 12-month period not exceed the permitted

annual emissions limits for oil-fired operations. Fore River will be required to track its actual emissions while burning distillate oil using data collected by the facility's existing monitoring requirements, including the CEMS instrumentation where applicable. The proposed alternative distillate fuel oil provision and the formula for calculating annual emissions are provided on page ___ of the proposed revised PSD permit and on page ___ of the CPA number MBR-99-COM-018. EPA is also removing the provision allowing the DEP the ability to grant variances for PSD requirements. EPA has also added clarification to the conditions under which Fore River may combust oil during the Ozone Season (May 1 – September 30).

All other provisions of the PSD permit will remain in effect.

3. PSD Review

In evaluating applications to revise PSD permits, EPA considers whether the change triggers new requirements and whether the requested changes to the permit ensure that the PSD requirements continue to be met. EPA must also ensure that the revisions are consistent with the requirement to install the BACT and do not interfere with the source's obligation or ability to protect ambient air quality and increments. Finally, EPA must comply with the requirements of the Endangered Species Act (ESA) in processing this permit revision.

a. Emissions Increase

Fore River's Supplemental Submission indicates that its proposed operational change will not result in a significant emissions increase and, therefore, is not a major modification subject to PSD review. 40 CFR 52.21(b)(2)(i), (b)(40), (b)(23). According to EPA's PSD regulations at 40 CFR 52.21, an emissions increase resulting from a physical or operational change is measured by calculating the difference between the "baseline actual emissions" and "projected actual emissions." 40 CFR 52.21(b)(41), (48). "Baseline actual emissions" for an existing electric utility steam generating unit means "the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding" the operational change. 40 CFR 52.21(b)(48)(i). "Projected actual emissions" means "the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the [operational change]…." 40 CFR 52.21(b)(41). In determining the projected actual emissions, the owner or operator of the source must consider all relevant information, including but not limited to historical operational data, the company's expected business activity, and the company's highest projections of business activity. 40 CFR 52.21(b)(41)(ii)(a).

Following EPA's regulations, Fore River used actual emissions data from its operations during 2004 and 2005 to determine its "baseline actual emissions." Then, to determine the "projected actual emissions" resulting from the proposed operational change, Fore River considered historical operational data and its expected future business activity (see

June 23, 2006 letter). Based on this information, Fore River determined that the proposed operational change will not result in any emission increases that exceed the PSD program "significant emissions increase" thresholds at 40 CFR 52.21(b)(23). The operational impacts and emission changes resulting from the proposed operational change are explained further below.

b. Operational Impacts

The total amount of ultra-low sulfur distillate oil that may be burned under the proposed alternative fuel provision will depend on Fore River's actual emissions while burning the lower sulfur distillate fuel oil. If Fore River switches to a lower sulfur fuel, actual SO_2 emissions would be significantly below the existing permitted SO_2 emission limits. PM-10 emissions should also be well below the permitted PM-10 limits. However, actual NOx and CO emissions may be much closer to the permitted limits since these pollutants are less affected by sulfur content. Therefore, emissions of these pollutants, particularly NOx, may be the limiting factors on the quantity of distillate oil Fore River may burn under the alternative provision.

In general, the lower Fore River keeps its actual emissions of NOx or CO under its permitted NOx and CO emission limits while burning distillate fuel oil, the more distillate it can burn. For example, if the actual emissions are half of the permitted levels, Fore River may burn twice the amount of distillate fuel oil. However, if actual emissions are at or just below the permitted limits, Fore River may burn no more than its current allowable fuel allotment.

EPA notes that Fore River's SO_2 emissions while burning ultra-low sulfur distillate will be substantially below the permitted SO_2 short-term and annual emission limits. In addition, the new provision does not allow Fore River to exceed the current permit's short term emission limits or annual emission limits for any pollutant. EPA also notes that the short-term emissions limits in Fore River's PSD/CPA permit are based on the maximum heat input capacity of the CTGs. The proposed alternative fuel provision would not affect the CTG's heat input rating and, therefore, would not change the amount of fuel Fore River can burn during any 1-hour, 3-hour or 24-hour period. The proposed alternative fuel provision would only allow Fore River to operate using distillate oil for an increased number of days each year.

The DEP has approved these revisions into its revised CPA (Attachment A of the March 31, 2006 application). EPA proposes to incorporate the new alternative distillate oil operational restriction into the PSD permit. EPA's alternative restriction includes the additional condition that only allows use of the alternative operational condition if Fore River has taken delivery of less than 12,500,000 gallons of oil exceeding 0.003% sulfur in the preceding 12 months.

B. Auxiliary Boiler Fuel Use Provisions

The original PSD/CPA permit restricted fuel use in the auxiliary boiler to no more than 48,000 MMBtu of either natural gas or 0.05% sulfur transportation diesel fuel oil per

rolling 12-month period (Condition III.H. of the PSD/CPA permit). The auxiliary boiler is used primarily during startup of the facility when both turbines are off-line. The current limitation of 48,000 MMBtu was developed when both the DEP and Fore River expected the facility to be primarily a baseload plant (i.e., a plant that operates continuously) with relatively infrequent startups. Due to the current market conditions, Fore River anticipates that the facility will cycle more frequently resulting in more startups, at least for the relatively near-term. Therefore, Fore River expects to use the auxiliary boiler more frequently than previously anticipated. Based on the new anticipated cycling schedule, Fore River is requesting to increase the auxiliary boiler's rolling 12-month fuel quantity to a total of 132,000 MMBtu, with the oil portion of this fuel quantity limited to 24,000 MMBtu.

The applicant asserts that the changes do not increase the annual facility-wide emissions, emission limits or result in a significant emission increase. The annual facility-wide limit is based on 8760 hours per year of turbine operation at maximum load. The PSD/CPA permit (at footnote 6 to Tables 1 & 2 in Section III.A.) limits total emissions from the CTGs but does not specifically allot any portion of this emission limit to the auxiliary boiler or emergency generator. If the auxiliary boiler operates, it means both turbines have been offline with a period of no emissions. The permit accounts for all annual emissions from all emission points at the facility including the turbines (including startups) and the auxiliary boiler/emergency generator operation. Because operation of the auxiliary boiler typically indicates that the CTGs have been offline, the increased use of the auxiliary boiler means less annual emissions from the CTGs and a decrease in overall annual emissions from the facility.

The application indicates that the revision will result in a small change in the potential emissions for the auxiliary boiler. Attachment C of the March 31, 2006 application presents the comparison of current and proposed auxiliary boiler potential emissions. As shown, potential emissions of NOx from the auxiliary boiler will increase by 0.7 tons per year (tpy). Potential emissions of CO will increase by 3.4 tpy. Potential emissions of SO_2 and PM, however, will decrease (by 0.5 and 0.6 tpy respectively) due to the restriction on the quantity of distillate fuel oil that can be burned in the auxiliary boiler.

The DEP has approved these revisions in its revised CPA. EPA proposes to incorporate the revisions to the auxiliary boiler fuel use restriction into the PSD permit

C. Minimum Turbine Operating Load Condition

The PSD/CPA permit included a restriction that the turbines not operate at less than 75% power, excluding startups, shutdowns, and fuel transfers (Condition X.2. of the PSD/CPA permit). This restriction was based on the manufacturers' minimum load guarantees for emissions performance of the system.

Fore River's actual operation on natural gas has shown that the facility can comply with the permitted emission limits at lower operating load levels. Reduced load emission testing was conducted on August 13, 2003. The reduced load testing was done in accordance with a Protocol that was approved by the DEP. This testing demonstrated

that the Fore River turbines could operate in compliance with the approved emission rates down to 55% turbine load. Dispersion modeling was also conducted which demonstrated that the exhaust conditions at 55% load were consistent with ambient air quality compliance.

The DEP approved these revisions into its revised CPA. EPA proposes to incorporate these revised operational restrictions into the PSD permit.

D. Startup/Shutdown Emission Limits and Duration

The PSD/CPA permit required Fore River to conduct initial compliance tests for startup and shutdown operations in order to allow the DEP to approve the maximum allowable emission limits for these operations conditions (Condition X.12. of the PSD/CPA permit). Fore River completed this testing and has submitted the associated CEMS data to the DEP for review and approval. The DEP approved of the startup/shutdown limits and incorporated the limits into the revised CPA at Table 4 (page 14 of 72). EPA proposes to incorporate these revised emission limits during startup/shutdown into the PSD permit.

The PSD/CPA permit also included a condition that restricted turbine operation below 75% power (now 55% power as discussed above) to no more than 3 hours duration for each startup, shutdown and fuel transfer or for a duration that may otherwise be practical to achieve startup from a cold, warm, or hot turbine condition (Condition X.2.of the PSD/CPA permit). Based on actual operating data from the facility, the DEP has modified the condition in the CPA to increase the permitted duration to a maximum of 5.0 hours for startups, 3.0 hours for fuel transfers, and 2.0 hours for shutdowns, or for a duration that may otherwise be practical to achieve during startup from a cold, warm, or hot turbine condition.

EPA proposes to incorporate the specific maximum hours for startup/shutdown only. EPA is not incorporating the portion of the condition that allows “durations that might otherwise be practical.”

VI. BACT

PSD sources are required to implement BACT emission control strategies. Prior to issuance of the May 2000 PSD/CPA permit, the DEP conducted a BACT analysis for all emissions at Fore River. These analyses are documented in the PSD/CPA permit. The revisions proposed today do not alter any of these BACT analyses. In fact, the proposed permit revisions, which will facilitate Fore River’s ability to burn lower sulfur fuel oil, are expected to decrease the emission rates of SO_2 and PM-10. Accordingly, EPA concludes that the revisions do not affect the existing BACT findings or require additional BACT analysis.

VII. Air Quality Impacts

The PSD regulations require an ambient air quality impact analysis to determine the impacts of a proposed permit action on ambient air quality. For all regulated pollutants emitted in significant amounts, the analysis must consider whether the proposed project

will cause or contribute to a violation of (1) the NAAQS and (2) the applicable PSD increments. 40 CFR 52.21(k), (m).

Prior to issuance of the May 2000 PSD/CPA permit, the DEP conducted the required ambient air quality analysis based, conservatively, on the short-term emission limitations in the permit. These modeling analyses demonstrated that the emission limits satisfied PSD requirements for protection of ambient air quality and increment consumption.

The only proposed permit revision that altered the May 2000 PSD/CPA permit short-term emission limits is the inclusion of the start-up/shutdown emission limits and the longer cold startup period. On October 29, 2003, Epsilon Associates, Inc (Epsilon) submitted to the DEP a modeling report on behalf of Fore River for the new start-up/shutdown emission limits. Based on the results from EPA-approved SCREEN3 dispersion modeling, the report showed that the maximum concentrations for the start-up/shutdown emission limits are below EPA's significant impact limits for all pollutants and averaging periods. EPA reviewed Epsilon's modeling report and concurs with the modeling methodology and results. EPA concludes that the startup/shutdown emission limits will not cause or contribute to a violation of a NAAQS or applicable PSD increment. In addition, the increased cold startup period should not increase total actual emissions since a cold start typically means the facility has not operated and has not emitted pollutants for some extended period of time. A copy of Epsilon's report is attached.

Since the remaining proposed permit revisions do not alter any emission limitations in the PSD permit, the prior air quality modeling analysis carried out for the permit remains applicable. Accordingly, EPA concludes that the remaining proposed permit revisions will not cause or contribute to a violation of a NAAQS or applicable PSD increment.

VIII. ESA

Section 7 of the ESA requires that certain federal actions such as federal PSD permits address the protection of endangered species in accordance with the ESA. To comply with the ESA, Region 1 consulted with Vernon Lang of the United States Fish and Wildlife Department (FWS)-New England Field Office to determine if the proposed revisions to EPA's Fore River PSD permit posed any risk to endangered species in Norfolk County, Massachusetts. After reviewing the specific impacts from the project, Mr. Lang concluded that the revisions did not pose a threat to any endangered or proposed endangered species or their habitat in the area subject to FWS jurisdiction, and that no further ESA impact analysis was required.