

3.0 REGULATORY REQUIREMENTS

The principal air quality regulatory programs that potentially apply to the proposed facility are the Massachusetts Air Plan Approval program (310 CMR 7.02), the Nonattainment NSR provisions (310 CMR 7.00 Appendix A and B) and the PSD requirements of 40 CFR 52.21. The Air Plan program is administered by DEP while the NSR and PSD programs are administered by the EPA.

3.1 Overview of Applicability of Federal Regulations

As discussed further in Section 3.1.3 below, the EPA has promulgated NAAQS and Massachusetts has adopted similar state air quality standards (MAAQS). Federal and state air regulations are designed to ensure that ambient air quality is in compliance with the ambient standards. Each area of the country has been classified as in "attainment," "nonattainment," or "unclassified" with respect to ambient standards. If an area is classified as "attainment" or "unclassified" for a particular pollutant, then PSD review applies, including the application of BACT and a demonstration of compliance with the NAAQS. If an area is designated as "nonattainment" for any pollutant, and if the proposed facility is a major source of the nonattainment pollutant, then Nonattainment NSR applies. This includes the application of more stringent pollution control requirements known as LAER and the need to secure emission offsets.

The NSR and PSD regulations apply to new "major sources" and also to "major modifications" of existing stationary sources of emissions. EPA regulations will treat as a single source "all of the pollutant emitting activities which belong to the same industrial grouping (SIC/NAICS Code), are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control)."10 Watson Station and Potter II belong to the same industrial grouping (electric power generation, fossil fuel) and are located on the same larger, single parcel, and will both be under the control of BELD. Accordingly, Potter II's emissions will need to be taken into account for purposes of applying NSR and PSD to Watson Station.

In March of 2003, the US EPA promulgated new regulations implementing changes to the NSR programs for PSD and Nonattainment NSR. Massachusetts did not accept the changes to the NSR program and as consequence relinquished authority for implementation of the PSD part of the NSR program. Since Massachusetts is no longer a "delegated" state under PSD, new major sources and major modifications to existing sources must obtain approval from the US EPA under the federal program at 40 CFR 52.21. Massachusetts is currently evaluating Nonattainment NSR under 310 CMR 7.00 Appendix A.

^{10 40} C.F.R. §§ 51.165 (a)(1)(i) and (iv).

The NSR requirements for major sources include meeting the New Source Performance Standards (NSPS), which constitute a set of national emission standards for major stationary sources of air pollution. These emission standards are applicable to specific categories of sources and apply only to new sources of air pollution. The major requirements are summarized below:

- The Facility cannot cause or contribute to the violation of any National or Massachusetts State Ambient Air Quality Standard;
- The Facility must meet all requirements of the NSR program;
- ◆ The Facility must meet all requirements of the Clean Air Act Amendments of 1990; and
- The Proponent must obtain a Massachusetts Plan Approval for the facility before commencement of construction at the site and an Operating Permit before commencement of commercial operations.

In September of 2006, EPA issued revised NAAQS for PM_{2.5} which went into effect in December of 2006. The new NAAQS for PM_{2.5} went from a daily standard of 65 μ g/m³ to 35 μ g/m³. The annual standard remains unchanged at 15 μ g/m³. EPA is in the process of revising the NSR and PSD thresholds for PM_{2.5}. Until the PM_{2.5} thresholds are promulgated, it is our understanding that States should use PM₁₀ as surrogate to address the PM_{2.5} requirements for NSR and PSD.

As demonstrated in this Application, the Project will meet all applicable emissions standards and ambient air quality standards.

3.1.1 Nonattainment New Source Review

The Clean Air Act Amendments of 1990 (CAAA) define levels of nonattainment classifications for ozone (O₃). The entire Commonwealth of Massachusetts is classified as a moderate nonattainment area for O₃ (40 CFR 81.322). Accordingly, there are special requirements for sources of VOC and NO_x which are the two O₃ precursors that are regulated by the Clean Air Act (Clean Air Act §182(f), 42 U.S.C. 7511(f)). Nonattainment NSR relative to O₃ is required for emissions of VOC and/or NO_x for new major sources or major modifications to existing sources. In moderate ozone nonattainment areas, the threshold for applicability of NSR for nonattainment is 50 tons per year (tpy) for new "major sources", and 25 tpy for "major modifications".

Potter II is an existing facility with potential NO_x emissions which exceed 100 tpy, therefore, the existing Potter II facility is considered a "major" source of NO_x. (See Table 2-2) Potential VOC emissions for Potter II are less than 50 tpy (approximately 7.6 tpy of potential emissions); therefore, the facility is not a "major" source of VOC. Accordingly, the proposed plant is not subject to NSR for VOC.

In that Potter II is a "major" source of NO_x, the next step in the process is to examine the applicability of the "major modification" threshold. To make this determination, "past actual" emissions from Potter II are compared with "future potential" emissions from the proposed Watson Station. Future potential emissions are conservatively calculated based on the assumption that the Watson Station will operate at 100% capacity, 8760 hours per year. The potential NO_x emissions for the proposed Watson Station are 58.8 tons per year. (See Table 3-1, below)

The baseline NO_x emissions for the BELD's Potter II plant are 76 tons of NO_x, the average of the most representative emissions (2001 and 2002) from the last five years of available data. Potential emissions from the new Watson Station plus the baseline emissions are 134.4 tons per year (58.8 tpy + 75.6 tpy), an increase of 58.8 tons per year. Since the NO_x emissions increase is greater than 25 tons per year, the proposed Watson Station is subject to nonattainment NSR for NO_x.

Applicable NSR requirements for nonattainment include application of LAER technology and acquisition of emission offsets. For major sources of NO $_{\rm x}$ in a moderate ozone nonattainment region, offsets are required at a minimum ratio of 1.26 to 1. 11 BELD will purchase the necessary NO $_{\rm x}$ offsets for the new Watson Station (58.8 tpy x 1.26 = 74 tpy NO $_{\rm x}$ offsets required). NO $_{\rm x}$ offsets are available from the facilities that have generated real and quantifiable reductions in emissions by either shutting down equipment or overcontrolling beyond the regulatory requirements.

Table 3-1 Maximum Potential Annual Emissions for the Proposed Watson Station

Pollutant	Maximum Potential Annual Emission Rate (tpy)		
NOx	58.8		
SO ₂	11.5		
PM ₁₀ /PM _{2.5}	72.9		
СО	53.5		
VOC	7.6		

Notes: assumes turbines operate 245 days per year on natural gas at 100% load (59°F), and 120 days on ULSD 100% load (59°F).

SO₂ emissions conservatively assume 365 days per year on natural gas at 100% load (59°F) as the sulfur content of natural gas is higher than ULSD, so potential SO₂ emissions would be greater on natural gas.

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^{11 5%} over 1.2:1 ratio is required for the use of any offset per 310 CMR 7.00 Appendix B.

3.1.2 Prevention of Significant Deterioration (PSD)

The prevention of significant deterioration of air quality (PSD) applicability procedures are given in 40 CFR 52.21 (a)(2). PSD requirements apply to the construction of new major stationary sources or major modifications in areas designated as attainment or unclassifiable under Sections 107 (d)(1)(A)(ii) or (iii) of the Clean Air Act. The project is considered a major modification if it causes a significant emissions increase and results in a significant net emissions increase. The procedure for calculating whether a significant increase will occur is given in 52.21 (a)(2)(c)-(f).

The existing Potter II unit (combined cycle turbine) is a fossil fuel-fired steam electric plant of more than 250 million Btu/hr heat input (one of the 28 source categories defined in 52.21 (b)(1)(i)(a)). The potential to emit from the existing unit exceeds 100 tons per year for NO_x, SO₂, PM₁₀ and CO; therefore it is considered an existing major stationary source.

As part of this project, the Potter II unit will reduce SO₂ emissions by switching from conventional distillate fuel oil (0.3%S or 3,000 ppm) to ULSD (0.0015%S or 15 ppm). The current and proposed potential emissions for the existing facility (Potter II unit) are given below.

Table 3-2 Maximum Potential Annual Emissions for the Existing Potter II Unit

Pollutant	Current Permitted Emissions (tpy)	Proposed Potential Emissions (tpy)
NOx	902	902
CO	655	655
PM ₁₀	523	523
SO ₂	1,337	40

The facility is located in an area where the air quality is designated as in attainment for NO_x , CO, SO_2 , and PM_{10} .

The proposed Watson Station simple cycle units will be considered a "major modification" of this facility and therefore are subject to PSD regulations if emissions increases are equal to or greater than EPA significance criteria ("PSD Significant Emission Rates" as per 52.21(b)(40) for major modifications). The emission increases from the modification exceed the PSD Significant Emission Rates for NO_x and PM₁₀ as shown in Table 3-3.

Table 3-3 Significant Emissions Increase Test for Comparison to PSD Significant Emission Increase Rates

Pollutant	Watson Station Units Maximum Potential Annual Emissions Rate (tpy)	PSD Significant Emission Rates (tpy)	Exceeds PSD Significant Emission Rates
NOx	58.8	40	Yes, >40
CO	53.5	100	No, <100
PM ₁₀	72.9	15	Yes, >15
SO ₂	11.5	40	No, <40

As shown in Table 3-2, BELD does not plan to reduce NO_x and PM_{10} emissions from the existing Potter II facility so there is no need to conduct the second test for PSD applicability, a net emissions increase determination (52.21(b)(3)).

The project is not a major modification for SO₂ and CO. Since the proposed project SO₂ and CO emissions are not significant, the PSD regulations do not require consideration of contemporaneous emissions increases or decreases of SO₂ or CO.

Based on the significant emissions increase analysis, the proposed modification is subject to PSD review for both NO $_{\rm x}$ and PM $_{\rm 10}$. As per 52.21 the project will need to meet BACT for NO $_{\rm x}$ and PM $_{\rm 10}$. However, BACT for NO $_{\rm x}$ will be identical to the proposed LAER limit, (SCR combined with water injection). BACT for PM $_{\rm 10}$ will be the use of natural gas as the primary fuel and ULSD as the alternate fuel.

Based on the refined modeling results (See Table 6-9), modeled ground level concentrations are well below Significant Impact Levels (SILs) for all pollutants and averaging periods. Therefore, a PSD increment consumption analysis will not be required.

3.1.3 Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA has promulgated NAAQS for these criteria pollutants; nitrogen dioxide (NO₂), SO₂, PM (PM₁₀ and PM_{2.5}), CO, O₃, and lead (Pb). The DEP has also promulgated these limits, plus it has also adopted a 1-hour ambient guideline limit for NO₂ as the MAAQS. The NAAQS/MAAQS along with the appropriate SILs are listed in Table 3-3.

The NAAQS presented in Table 3-3 specify concentration levels for various averaging times. The NAAQS include both "primary" and "secondary" standards. The primary standards are intended to protect human health; whereas, the secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards are applicable to the evaluation of the proposed Project.

Table 3-3 National and Massachusetts Ambient Air Quality Standards

		NAAQS/MAAQS (μg/m³)		Significant Impact Level
Pollutant	Averaging Period	Primary	Secondary	$(\mu g/m^3)$
NO_2	Annual (1)	100	Same	1
	1-hour(2)	320	None	32
SO ₂	Annual (1)	80	None	1
	24-hour (2)	365	None	5
	3-hour (2)	None	1,300	25
PM ₁₀	Annual (6)	Revoked by EPA,	Same	1
		50 (MAAQS)		
	24-hour (3)	150	Same	5
PM _{2.5}	Annual (4)	15	Same	TBD
	24-hour (5)	35	Same	TBD
CO	8-hour (2)	10,000	Same	500
	1-hour (2)	40,000	Same	2,000
Ozone	8-hour (3)	235	Same	N/A
Pb	3-month (1)	1.5	Same	N/A

¹ Not to be exceeded

Source: 40 CFR 50 and 310 CMR 6.00

The NAAQS also reflect various durations of exposure. The NAAQS for short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term NAAQS refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The Inhalable Particulate (PM₁₀) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a new Fine Particulate (PM_{2.5}) NAAQS effective December 2006. Based on recent discussions with DEP, air dispersion modeling should be conducted for comparison to the annual standard of 15 μ g/m³ and the 24-hour standard of 35 μ g/m³.

² Not to be exceeded more than once per year.

³ Not to be exceeded more than an average of one day per year over three years.

⁴ Not to be exceeded by the arithmetic average of the annual arithmetic averages from 3 successive years.

⁵ Not to be exceeded based on the 98th percentile of data collection.

⁶ Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).

The Braintree area in Norfolk County is presently unclassified or in attainment for NO₂, SO₂, PM₁₀, CO and Pb and classified as a moderate nonattainment area for the 8-hour ozone standard. The area is currently classified as attainment/unclassifiable for PM_{2.5}.

In order to identify those new sources with the potential to significantly alter ambient air quality, the EPA and DEP have adopted SILs for the contaminants with ambient air quality standards. As shown in Table 3-3, the SILs are small fractions of the health protective National Ambient Air Quality Standards. For new sources that exceed these levels, the air quality impact analysis is required to include the new source, existing interactive sources and measured background levels. If the new project impacts are above the SILs, then interactive source modeling is required for comparison to the NAAQS. As discussed in Section 6, the proposed Project will be well below SILs for all pollutants. Accordingly, interactive modeling is not required.

3.1.4 New Source Performance Standards

The NSPS regulate the amount of air contaminants that may be emitted from a given process. For combustion sources, emission standards are typically expressed in terms of fuel quality or exhaust gas concentration. The EPA has established NSPS for various categories of new sources. The EPA NSPS requirement applicable to the new BELD Project is 40 CFR 60 Subpart KKKK for the gas turbine. This requirement applies to all stationary combustion turbines with a heat input greater than 10 MMBtu/hr constructed after February 18, 2005. Project emissions rates will be well below the NSPS.

The applicable NO_x standard for the proposed turbine is 0.43 lb/MW-hr (approximately 15 ppmvd) when firing natural gas and 1.3 lb/MW-hr (approximately 42 ppmvd) firing oil. Accordingly, project NO_x emissions, 0.085 lb/MW-hr (2.5 ppm) when firing natural gas and 0.18 lb/MW-hr (5 ppm) when firing ULSD) will be far below the NSPS limit.

Under the Federal NSPS, SO₂ emissions are limited based on fuel sulfur content (20 grains per 100 cubic feet (gr/ccf) of natural gas or 0.05% (500 ppm) sulfur by weight in fuel oil). For the proposed Watson Station, the estimated sulfur content of natural gas is 0.8 gr/ccf while ULSD will have a 0.0015% (15 ppm) sulfur content. Both fuels are well below the NSPS limits.

3.1.5 Title IV Sulfur Dioxide Allowances and Monitoring (40 CFR 72 and 75)

Pursuant to 40 CFR 72, the proposed Watson Station will be designated as a Phase II Acid Rain "New Affected Unit" on January 1, 2009, or 90 days after commencement of commercial activities, whichever comes later, but not after the date the facility declares itself commercial. As one of the features of the Acid Rain Program, EPA has established a program to reduce SO₂ emissions from existing power plants by allocating allowances to existing power plants and by requiring new plants to purchase allowances to offset their

potential to emit SO₂. Allowances are available through the Chicago Board of Trade and will be secured by the Project.

In accordance with these regulations, the Project will have a Designated Representative (DR) and install a Continuous Emissions Monitor System (CEMS). The DR is the facility representative responsible for submitting required permits, compliance plans, emission monitoring reports, offset plans, compliance certification, and is responsible for the trading of allowances. The CEMS will meet the requirements specified in EPA 40 CFR 75 for monitoring SO₂, NO_x, and CO₂ emissions (lb/MMBtu) as well as opacity and volumetric flow of the flue gas. EPA allows gas and oil-fired facilities to conduct fuel quality and fuel flow monitoring in place of SO₂ monitoring.

3.2 Massachusetts Regulations and Policies

3.2.1 Air Plan Approval

The DEP requires an Air Plan Approval for all new facilities exceeding specific thresholds set forth in 310 CMR 7.02. Because of the potential to emit greater than 50 tons of NO_x annually, the Watson Station will require a Major Source Comprehensive Air Plan approval. The regulation prohibits the construction, substantial reconstruction, or alteration of any regulated facility unless the plans, specifications, proposed standard operating procedures and proposed maintenance procedures for such a facility have been approved by the DEP. It is through this preconstruction permit review process that the DEP implements the key federal requirements for demonstration of compliance with the NAAQS, nonattainment NSR and compliance with NSPS. In addition, the Air Plan Approval process serves as the state's mechanism for reviews in accordance with the State's noise policy.

In addition to the requirements set forth in 310 CMR 7.02, the regulations also require the application of "Massachusetts BACT" for each pollutant regulated as part of the Air Plan review. Therefore, in addition to LAER requirements for NO_x, the proposed Project will incorporate Massachusetts BACT for the remaining criteria pollutants and Massachusetts BACT for all pollutants. BACT is based on the maximum degree of reduction of any regulated air contaminant, which the DEP determines, on a case-by-case basis, is achievable taking into account energy, environmental and economic impacts. In this case, proposed MA BACT limits are equal to the proposed Federal level BACT and LAER Requirements (see Table 2-1).

Based on emissions data provided by Rolls-Royce, LAER for the proposed Watson Station is proposed to be:

◆ Water injection and SCR for natural gas and ULSD combustion to reduce NO_x emissions; and

BACT for the remaining pollutants is proposed to be:

- ◆ The use of natural gas as the primary fuel, thus lowering all criteria and non-criteria pollutants compared to other fuels;
- ◆ The use of ULSD (0.0015 percent sulfur) oil as a secondary fuel that lowers SO₂ and PM₁₀/PM₂.5 emissions compared to higher sulfur oils;¹² and
- An advanced technology combustion turbine, providing a high level of efficiency. The turbine also minimizes incomplete combustion, thus minimizing emissions of VOC, CO and PM₁₀/PM_{2.5}.
- Efficient combustion design and an oxidation catalyst to reduce CO and VOC emissions.

The combination of an efficient simple cycle aero-derivative turbine, clean fossil fuels, combustion controls and very effective air pollution control system will produce emissions rates which comply with the aggressive LAER and BACT requirements.

3.2.2 Noise Control Regulation and Policy

DEP regulations, set forth in 310 CMR 7.10 and as interpreted in the DEP Noise Policy 90-001, limit noise increases to 10 dBA over the existing L₉₀ ambient level at the closest residence and at property lines. For developed areas, the DEP has utilized a "waiver provision" at the property line in certain cases. This is appropriate when are there are no noise-sensitive land uses at the property line and the adjacent property owner agrees to waive the 10-dBA limit. This may occur when the impact is in an area that is not noise-sensitive such as an adjacent industrial parcel. The ambient noise level may also be established by other means with DEP's consent. DEP also prohibits "pure tone" sounds, defined as any octave band level which exceeds the levels in the two adjacent octave bands by 3 dB or more. A full discussion of noise considerations is provided in Section 7 below.

3.2.3 Emission Limitations for Fossil Fuel Utilization

DEP regulations at 310 CMR 7.02(8), Table 1 limit new fossil fuel utilization facilities greater than 250 MMBtu/hr heat input to a PM emission rate of 0.05 lb/MMBtu. BELD's proposed PM limit ranges from 0.01 to 0.02 lb/MMBtu on natural gas and 0.03 to 0.05 lb/MMBtu on ULSD, thus complying with the DEP limit.

It should be noted Watson Station's emission limits are conservatively based on "front and back half" (method 5 and 202A) catch for PM testing. Based on available data, the "front half" or filterable particulates account for approximately 80% of the total particulate

BELD is also switching Potter II from 0.3% sulfur distillate to ULSD. This fuel switch will reduce potential emissions by 1,330 tons of SO₂ per year.

emissions. The PM emission rate specified at 310 CMR 7.02(8), Table 1, (0.05 lb/MMBtu) only specifies front half catch (method 5).

3.2.4 Visible Emissions

Opacity is limited by 310 CMR 7.06 to 20 percent. The Project's opacity will be well below 10 percent.

3.2.5 Short-term NO₂ Policy

On April 20, 1978 and in an update on November 3, 1980 DEP adopted a policy entitled "New Source Performance Criteria for Allowable Ambient NO₂ Concentrations." The policy applies only to new major sources or modifications to an existing source, which would result in increased emissions of 250 tpy of NO_x. The proposed facility is not subject to the DEP NO₂ policy because the Project will have maximum potential NO_x emissions of 58.8 tpy, far below the threshold of 250 tpy of NO_x.

However, the Project's ambient air quality analysis does include a comparison with the 1-hour NO₂ policy limit. The policy requires new major sources to demonstrate that emissions will not result in ambient NO₂ concentrations in excess of 320 μ g/m³ for any one-hour period on more than one day per year. The compliance demonstration must include the existing background NO₂ level, the impact of the existing area sources, as well as the impact of the new source. For areas where the existing NO₂ level already exceeds 320 μ g/m³, the impact of the proposed new source will be considered acceptable if it will not increase the hourly concentration by more than 32 μ g/m³ on more than one day per year when the concentration exceeds 320 μ g/m³.

As shown in Section 6, the modeled maximum one hour NO_x concentration for the proposed Project is 9.3 μ g/m³; this is well below the most stringent policy limit.

3.2.6 Operating Permit

BELD will file an application for an operating permit pursuant to 310 CMR 7.00, Appendix C(4)(a). The operating permit is for a fixed term of five years and will define applicable requirements for the facility, including emission limitations, emissions monitoring, operating conditions, and recordkeeping and reporting.

3.2.7 Emission Offsets

As discussed in Section 3.1.1, the facility's proposed emissions increase is greater than 25 tpy of NO_x, so the new facility is required to apply LAER technology and obtain emission offsets for NO_x. Emission offsets will be required at a minimum ratio of 1.26:1 per 310 CMR 7.00 Appendices A and B. NO_x offsets are available from the facilities that have generated real and quantifiable reductions in emissions by either shutting down equipment or over-controlling beyond the regulatory requirements. BELD will obtain the necessary

 NO_x offsets (58.8 tpy potential NO_x emissions x 1.26 = 74 tpy NO_x offsets) at the appropriate time in the permitting process and construction process.

3.2.8 Intent to Comply with DEP Clean Air Construction Initiative (construction stage)

BELD proposes that all contractors associated with the construction of the Project meet the DEP's Clean Air Construction Initiative.¹³ The main aspects of this program include:

- ♦ All contractors shall use ULSD fuel in diesel-powered non-road vehicles.
- All non-road engines used on the construction site shall meet the applicable non-road engine standard limitations per 40 CFR 89.112.
- All contractors shall utilize the best available technology for reducing the emission of particulate matter and nitrogen oxides for diesel-powered non-road vehicles. The best available technology for reducing the emission of pollutants is that which has been verified by the EPA or the California Air Resources Board for use in non-road vehicles or on-road vehicles where such technology may also be used in non-road vehicles.
- All contractors shall turn off diesel combustion engines on construction equipment not in active use and on dump trucks that are idling while waiting to load or unload material for five minutes or more.
- All contractors shall establish a staging zone for trucks that are waiting to load or unload material at the work zone in a location where diesel emissions from the trucks will not be noticeable to the public, and;
- All contractors shall locate construction equipment away from sensitive receptors such as fresh air intakes to buildings, air conditioners, and windows.

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On November 10, 1998 the Clean Air Construction Initiative was announced in Massachusetts to reduce air emissions generated by heavy-duty construction equipment used in the Central Artery/Tunnel Project. The Clean Air Construction Initiative was sponsored by the Massachusetts Turnpike Authority, the Central Artery/Tunnel Project, EPA-Region I New England, Massachusetts Executive Office of Environmental Affairs, Massachusetts Department of Environmental Protection, Manufacturers of Emissions Control Association and NESCAUM.