D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. 3 Fuel Used Natural gas	PM	0.005 lb/MMBtu	0.005 lb/MMBtu	1.3	N/A	540 MMscf/yr
	$PM_{2.5}$	0.005 lb/MMBtu	0.005 lb/MMBtu	1.3	N/A	540 MMscf/yr
	PM_{10}	0.005 lb/MMBtu	0.005 lb/MMBtu	1.3	N/A	540 MMscf/yr
	NO_x	0.011 lb/MMBtu	0.011 lb/MMBtu	2.9	N/A	540 MMscf/yr
	CO	0.035 lb/MMBtu	0.035 lb/MMBtu	9.2	N/A	540 MMscf/yr
	VOC	0.005 lb/MMBtu	0.005 lb/MMBtu	1.3	N/A	540 MMscf/yr
	SO_2	0.0015 lb/MMBtu	0.0015 lb/MMBtu	0.4	N/A	540 MMscf/yr
	Max HAP	N/A	N/A	0.019	N/A	540 MMscf/yr
	Total HAPs	N/A	N/A	0.5	N/A	540 MMscf/yr
	CO_2	118.9 lb/MMBtu	118.9 lb/MMBtu	31,247	N/A	540 MMscf/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. 3 Fuel Used Natural gas	PM	0.40 lb/hr	0.40 lb/hr	1.3	N/A	540 MMscf/yr
	$PM_{2.5}$	0.40 lb/hr	0.40 lb/hr	1.3	N/A	540 MMscf/yr
	PM_{10}	0.40 lb/hr	0.40 lb/hr	1.3	N/A	540 MMscf/yr
	NO_x	0.88 lb/hr	0.88 lb/hr	2.9	N/A	540 MMscf/yr
	CO	2.8 lb/hr	2.8 lb/hr	9.2	N/A	540 MMscf/yr
	VOC	0.40 lb/hr	0.40 lb/hr	1.3	N/A	540 MMscf/yr
	SO_2	0.12 lb/hr	0.12 lb/hr	0.4	N/A	540 MMscf/yr
	Max HAP	N/A	N/A	0.019	N/A	540 MMscf/yr
	Total HAPs	N/A	N/A	0.5	N/A	540 MMscf/yr
	CO_2	N/A	N/A	31,247	N/A	540 MMscf/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, If Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, If Any)[5]	Proposed Fuel Usage Limit(s) (If Any)[6]
Unit No. 4 Fuel Used ULSD fuel oil	PM	0.232 g/kWh	0.232 g/kWh	0.06	N/A	15,810 gal/yr
	$PM_{2.5}$	0.232 g/kWh	0.232 g/kWh	0.06	N/A	15,810 gal/yr
	PM_{10}	0.232 g/kWh	0.232 g/kWh	0.06	N/A	15,810 gal/yr
	NO_x	6.4 g/kWh	6.4 g/kWh	1.7	N/A	15,810 gal/yr
	CO	3.5 g/kWh	3.5 g/kWh	1.0	N/A	15,810 gal/yr
	VOC	1.3 g/kWh	1.3 g/kWh	0.35	N/A	15,810 gal/yr
	SO_2	0.0015 lb/MMBtu	0.0015 lb/MMBtu	0.0017	N/A	15,810 gal/yr
	Max HAP	N/A	N/A	**8.76e-05**	N/A	15,810 gal/yr
	Total HAPs	N/A	N/A	**1.76e-03**	N/A	15,810 gal/yr
	CO_2	162.3 lb/MMBtu	162.3 lb/MMBtu	**180**	N/A	15,810 gal/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. 4 Fuel Used ULSD fuel oil	PM	0.42	0.42	0.06	N/A	15,810 gal/yr
	$PM_{2.5}$	0.42	0.42	0.06	N/A	15,810 gal/yr
	PM_{10}	0.42	0.42	0.06	N/A	15,810 gal/yr
	NO_x	11.6	11.6	1.7	N/A	15,810 gal/yr
	CO	6.4	6.4	1.0	N/A	15,810 gal/yr
	VOC	2.4	2.4	0.35	N/A	15,810 gal/yr
	SO_2	0.011 lb/hr	0.011 lb/hr	0.0017	N/A	15,810 gal/yr
	Max HAP	N/A	N/A	**8.76e-05**	N/A	15,810 gal/yr
	Total HAPs	N/A	N/A	**1.76e-03**	N/A	15,810 gal/yr
	CO_2	N/A	N/A	**180**	N/A	15,810 gal/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. 5 Fuel Used ULSD fuel oil	PM	0.232 g/kWh	0.232 g/kWh	0.02	N/A	5,760 gal/yr
	$PM_{2.5}$	0.232 g/kWh	0.232 g/kWh	0.02	N/A	5,760 gal/yr
	PM_{10}	0.232 g/kWh	0.232 g/kWh	0.02	N/A	5,760 gal/yr
	NO_x	4.0 g/kWh	4.0 g/kWh	0.4	N/A	5,760 gal/yr
	CO	3.5 g/kWh	3.5 g/kWh	0.3	N/A	5,760 gal/yr
	VOC	1.3 g/kWh	1.3 g/kWh	0.12	N/A	5,760 gal/yr
	SO_2	0.0015 lb/MMBtu	0.0015 lb/MMBtu	0.0006	N/A	5,760 gal/yr
	Max HAP	N/A	N/A	4.76e-04	N/A	5,760 gal/yr
	Total HAPs	N/A	N/A	1.57e-03	N/A	5,760 gal/yr
	CO_2	162.3 lb/MMBtu	162.3 lb/MMBtu	66	N/A	5,760 gal/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Table 9B

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. 5 Fuel Used ULSD fuel oil	PM	0.14	0.14	0.02	N/A	5,760 gal/yr
	$PM_{2.5}$	0.14	0.14	0.02	N/A	5,760 gal/yr
	PM_{10}	0.14	0.14	0.02	N/A	5,760 gal/yr
	NO_x	2.4	2.4	0.4	N/A	5,760 gal/yr
	CO	2.1	2.1	0.3	N/A	5,760 gal/yr
	VOC	0.79	0.79	0.12	N/A	5,760 gal/yr
	SO_2	0.004 lb/hr	0.004 lb/hr	0.0006	N/A	5,760 gal/yr
	HAP	N/A	N/A	4.76e-04	N/A	5,760 gal/yr
	Total HAPs	N/A	N/A	1.57e-03	N/A	5,760 gal/yr
	CO_2	N/A	N/A	66	N/A	5,760 gal/yr

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D. Best Available Control Technology (BACT) Emissions (continued)

Note: If you are proposing more additional Emissions Units or fuels, complete additional copies of these tables.

Table 9C

Emission Unit No. & Fuel Used	Air Contaminant	Uncontrolled Emissions (Pounds per Hour [lbs/hr], Pounds per 1 Million British Thermal Units [lb/MMBtu] or Parts per Million Dry Volume Corrected Basis [ppmvd@ %O_2 or CO_2])	Proposed BACT Emissions (lbs/hr, lb/MMBtu or ppmvd@ %O_2 or CO_2)	Proposed Consecutive 12-Month Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Monthly Time Period Emissions Restrictions (Tons, if Any)[5]	Proposed Fuel Usage Limit(s) (if Any)[5]
Unit No. Fuel Used	PM					
	$PM_{2.5}$					
	PM_{10}					
	NO_x					
	CO					
	VOC					
	SO_2					
	HAP					
	Total HAPs					
	CO_2					

Note: Top-Case BACT is the emission rate identified via the MassDEP BACT Guidance or a pre-application meeting with MassDEP.

2. Are proposed BACT emission limits in the tables above Top-Case BACT as referenced in 310 CMR 7.02(8)(a)2.a? ☒ Yes ☐ No*

*If No, you must submit form BWP AQ BACT to demonstrate that this project meets BACT as provided in 310 CMR 7.02(8)(a)2 or 310 CMR 7.02(8)(a)2.c..

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E. Monitoring Procedures

Complete the table below to summarize the details of the proposed project's monitoring procedures.

Table 10

Emission Unit No.	Type or Method of Monitoring (e.g. CEMS[1], Fuel Flow)	Parameter/Emission Monitored	Frequency of Monitoring
1, 2	CEMS, Fuel Flow, SCR parameters	NOx, CO, NH3, O2, opacity	Continuous
3	Fuel flow, hours of operation	Fuel flow, hours of operation	Continuous
4	Hour meter	Hours of operation	Continuous
5	Hour meter	Hours of operation	Continuous

[1] CEMS = Continuous Emissions Monitoring System

F. Record Keeping Procedures

Complete the table below to summarize the details of the proposed project's record keeping procedures. Proposed record keeping procedures need to be able to demonstrate your compliance status with regard to all limitations/restrictions proposed herein. Record keeping may include, but is not limited to, hourly or daily logs, meter charts, time logs, fuel purchase receipts, CEMS records, etc.

Table 11

Emission Unit No.	Parameter/Emission (e.g. Temperature, Material Usage, Air Contaminant)	Record Keeping Procedures (e.g. Data Logger or Manual)	Frequency of Data Record (e.g. Hourly, Daily)
1, 2	CEMS, Fuel Flow, SCR parameters	CEMS	Hourly
3	Fuel flow, hours of operation	Fuel flow	Daily
4	Hour meter	Hours of operation	Daily
5	Hour meter	Hours of operation	Daily

Examples of emissions calculations for record keeping purposes:

NOx: {(0.085 pounds per 1,000,000 British thermal units (MMBtu)*(X cubic feet)*(1,000 Btu per cubic feet) + (0.10 pounds per MMBtu)*(Y gallons of fuel oil)*(130,000 Btu per gallon)}* 1 ton per 2000 pounds = NOx in tons per consecutive twelve month time period

CO: {(0.035 pounds per MMBtu)*(X cubic feet)*(1000 Btu per cubic feet) + (0.035 pounds per MMBtu)*(Y gallons of fuel oil)*(130,000 Btu per gallon}*1 ton per 2000 pounds = CO in tons per consecutive twelve month time period

VOC: {(0.035 pounds per MMBtu)*(X cubic feet)*(1000 Btu per cubic feet) + (0.035 pounds per MMBtu)*(Y gallons of fuel oil)*(130,000 Btu per gallon}*1 ton per 2000 pounds= VOC in tons per consecutive twelve month time period

SO_2: {(0.0015 lb per MMBtu)*(Y gallons of fuel oil)*(130,000 Btu per gallon)}*1 ton per 2000 pounds = SO_2 in tons per consecutive twelve month time period

Where: X = cubic feet of natural gas burned per consecutive twelve month time period
Y = gallons of ULSD oil burned per consecutive twelve month time period

G. Additional Information Checklist

Attach a specific facility description and the following required additional information that MassDEP needs to process your application. Check the box next to each item to ensure that your application is complete.

- ☒ Plot Plan
- ☒ Combustion Equipment Manufacturer Specifications, Including but not Limited to Emissions Data
- ☐ Combustion Equipment Standard Operating Procedures
- ☐ Combustion Equipment Standard Maintenance Procedures, Including Cleaning Method & Frequency
- ☒ Calculations to Support This Plan Application
- ☐ Air pollution control device manufacturer specifications, if applicable
- ☐ Air pollution control device standard operating procedures, if applicable
- ☐ Air pollution control device standard maintenance procedures, if applicable
- ☐ BWP AQ BACT Form, if not proposing Top-Case BACT
- ☒ Air quality dispersion modeling demonstration documenting that National Ambient Air Quality Standards (NAAQS) are not exceeded
- ☐ Process flow diagram for the proposed equipment and any PCD, if applicable, including relevant parameters (e.g. flow rate, pressure and temperature)

Note: Pursuant to 310 CMR 7.02(5)(c), MassDEP may request additional information.

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H. Other Regulatory Considerations

Indicate below whether the proposed project is subject to any additional regulatory requirements.

310 CMR 7.00: Appendix A Nonattainment Review, or is netting used to avoid review under 310 CMR 7.00 Appendix A or 40 CFR 52.21? ☒ Yes ☐ No

40 CFR 60: New Source Performance Standards (NSPS)? ☒ Yes ☐ No

If Yes: Which subpart? **See text** Applicable emission limitation(s): **See text**

40 CFR 61: National Emission Standards for Hazardous Air Pollutants (NESHAPS) ☐ Yes ☒ No

If Yes: Which subpart? Applicable emission limitation(s):

40 CFR 63: NESHAPS for Source Categories – Maximum Achievable (MACT) or Generally Available (GACT) Control Technology ☒ Yes ☐ No
Emergency diesel generator and fire pump only

If Yes: Which subpart? **ZZZZ** Applicable emission limitation(s): **NSPS IIII**

301 CMR 11.00: Massachusetts Environmental Policy Act (MEPA)? ☒ Yes ☐ No

If Yes: EOEA No.: **14937**

Other Applicable Requirements? ☐ Yes ☐ No

If Yes: Specify:

Facility-Wide Potential-to-Emit Hazardous Air Pollutants (HAPS): ☐ Major* ☒ Non-Major

*A Major source has a facility-wide potential-to-emit of 25 tons per year or more of the sum of all hazardous air pollutants or 10 tons per year or more of any individual hazardous air pollutant.

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I. Professional Engineer's Stamp

The seal or stamp and signature of a Massachusetts Registered Professional Engineer (P.E.) must be entered below. Both the seal or stamp impression and the P.E. signature must be original. This is to certify that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice.

George S. Lipka
P.E. Name (Type or Print)

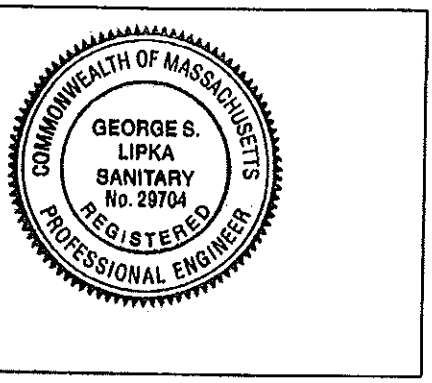
P.E. Signature

Consulting Engineer
Position/Title

Tetra Tech
Company

12/21/2012
Date (MM/DD/YYYY)

29704
P.E. Number



J. Certification by Responsible Official

The signature below provides the affirmative demonstration pursuant to 310 CMR 7.02(5)(c)8 that any facility(ies) in Massachusetts, owned or operated by the proponent for this project (or by an entity controlling, controlled by or under common control with such proponent) that is subject to 310 CMR 7.00, et seq., is in compliance with, or on a MassDEP approved compliance schedule to meet, all provisions of 310 CMR 7.00, et seq., and any plan approval, order, notice of noncompliance or permit issued thereunder. This Form must be signed by a Responsible Official working at the location of the proposed new or modified facility. Even if an agent has been designated to fill out this Form, the Responsible Official must sign it. (Refer to the definition given in 310 CMR 7.00.)

I certify that I have personally examined the foregoing and am familiar with the information contained in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment.

Scott G. Silverstein
Responsible Official Name (Type or Print)

Responsible Official Signature

President & COO
Responsible Official Title

Footprint Power LLC
Responsible Official Company/Organization Name

12-20-2012
Date (MM/DD/YYYY)

K. Energy Efficiency Evaluation Survey

1. Do you know where your electricity and/or fuel and/or water and/or heat and/or compressed air is being used/consumed? ☐ Yes ☐ No

2. Has your facility had an energy audit performed by your utility supplier (or other) in the past two years?[1] ☐ Yes ☐ No

   a. Did the audit include evaluations for heat loss, lighting load, cooling requirements and compressor usage? ☐ Yes ☐ No

   b. Did the audit influence how this project is configured? ☐ Yes ☐ No

3. Does your facility have an energy management plan? ☐ Yes ☐ No

   a. Have you identified and prioritized energy conservation opportunities? ☐ Yes ☐ No

   b. Have you identified opportunities to improve operating and maintenance procedures by employing an energy management plan? ☐ Yes ☐ No

4. Has each emission unit proposed herein been evaluated for energy consumption including average and peak electrical use; efficiency of electric motors and suitability of alternative motors such as variable speed; added heat load and/or added cooling load as a result of the operation of the proposed process; added energy load due to building air exchange requirements as a result of exhausting heat or emissions to the ambient air; and/or use of compressors? ☐ Yes ☐ No

5. Has your facility considered alternative energy methods such as solar, geothermal or wind power as a means of supplementing all or some of the facility's energy demand? ☐ Yes ☐ No

6. Does your facility comply with Leadership in Energy & Environmental Design (LEED) Green Building Rating System design recommendations?[2] ☐ Yes ☐ No

[1]A facility wide energy audit would include an inspection of such things as lighting, air-conditioning, heating, compressors and other energy-demand equipment. It would also provide you with information on qualifying equipment rebates and incentive programs; analysis of your energy consumption patterns and written cost-savings recommendations and estimated cost savings for installing new, high-efficiency equipment.

[2]To understand the LEED Rating System, it is important to become familiar with its comprising facets. To be considered for LEED New Construction and Major Renovations, a building must meet specific prerequisites and additional credit areas within six categories:

- Sustainable Sites
- Indoor Environmental Quality
- Materials and Resources
- Energy and Atmosphere
- Water Efficiency
- Innovation and Design

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality

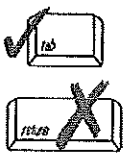
BWP AQ Selective Catalytic Reduction

Submit with Form CPA-FUEL and/or CPA-PROCESS whenever construction, substantial reconstruction or alteration of a Selection Catalytic Reduction system is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Inlet Operating Conditions

1. Complete the table below with information on inlet gas flow(s).

Table 1a

Emission Unit No(s). Being Controlled	Average Inlet Gas Flow (Actual Cubic Feet Per Minute)	Inlet Temperature (Degrees Fahrenheit (°F))	Moisture Content in the Inlet (Pounds Per Minute)
1, 2 (per unit)	2,536,034 (max)	760 °F (max)	5,344 (max)
Totals:			

2. Which metals/elements are present in gas stream? ☐ Potassium ☐ Arsenic ☐ Lead ☐ Zinc ☐ Sodium ☐ Phosphorus

3. Are there any other catalyst binding agents present in the gas stream? ☐ Yes – Describe Below ☒ No

4. Complete the table below to provide the maximum oxides of nitrogen (NOx) emissions:

Table 2

Emission Unit No(s). Being Controlled	Inlet NOx (Pounds Per Hour)	Inlet NOx (Parts Per Million by Volume, Dry Basis)
1, 2 (per unit)	81.5	9 ppmvd @ 15% O2

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BWP AQ Selective Catalytic Reduction

Submit with Form CPA-FUEL and/or CPA-PROCESS whenever construction, substantial reconstruction or alteration of a Selection Catalytic Reduction system is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

B. Specifications

1. Manufacturer of Selective Catalytic Reduction (SCR) system: TBD (Company)
2. Model Number (or Equivalent): BASF VNX NOxCat or similar (Number)
3. Location of SCR unit relative to other pieces of equipment: ☐ High Dust ☒ Low Dust ☐ Tail End
4. Information about the catalyst used:
   a. Description of catalyst: Vanadia/titania type (Description)
   b. Operating temperature range of catalyst: from 600 (Degrees Fahrenheit (°F)) to 760 (Degrees Fahrenheit (°F))
   c. Pressure drop across the catalyst: 1.8 (Inches of Water)

5a. Number of catalyst layers the system can accommodate: 2 (Number)

5b. Number of catalyst layers that will be installed: 1 (Number)

6. Does the SCR system employ a guard bed for catalyst protection? ☐ Yes ☒ No*

   *If No, explain:

   Not necessary for natural gas combustion

7. Expected catalyst life: 3 years (Years)
8. Operating hours per layer of catalyst: N/A (Hours)
9. Can the catalyst be reactivated? ☐ Yes * ☒ No

   *If Yes, describe how:

10. Catalyst cleaning method: ☐ Compressed Air Soot Blower ☐ Steam Soot Blower ☐ Sonic Horns ☒ Other – Describe: N/A

11. Describe SCR system dust management technologies and strategies being used, if any (e.g. ash screens):

    None.

BWP AQ Selective Catalytic Reduction

Submit with Form CPA-FUEL and/or CPA-PROCESS whenever construction, substantial reconstruction or alteration of a Selection Catalytic Reduction system is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

B. Specifications (continued)

12. Are you proposing a by-pass stack? ☐ Yes * ☒ No

*If Yes, describe:

C. Description of Reducing Agent

1. Type and form of reducing agent proposed: ☐ Gaseous ☐ Liquid ☐ Anhydrous Ammonia ☒ Aqueous Ammonia ☐ Urea ☐ Other – Describe:

2. If liquid, provide weight percent in solution: 19
Weight Percent

3. Method of reducing agent injection: ☐ Direct Injection ☒ Injection Grid

4. Describe in detail how the concentration and usage rate of the reducing agent were determined. Continue on a separate attachment, if necessary.
19 percent aqueous ammonia has become accepted in the industry by precedent.

5. Describe the process controls for proper mixing of the reducing agent in the gas stream. Continue on a separate attachment, if necessary.
SCR OEM supplier provides system for metering liquid, evaporation to vapor, and injection and distribution in the gas stream by injection grid with multiple orifices vertically and horizontally distributed across duct.

6. Describe storage of the reagent, including details about any storage containment (e.g. dimension of berms, evaporative mitigation). Continue on a separate attachment, if necessary.
19% solution stored in pressure vessel provided with spill containment per attached details.

7. Is the reagent subject to 42 U.S.C. 7401, Section 112(r)? ☐ Yes * ☒ No

*If Yes, attach a copy of the Risk Management Plan to this form.

8. You MUST attach to this form a copy of an analysis of possible impacts to off-property locations from a catastrophic release of the reducing agent, in comparison with American Industrial Hygiene Association Emergncy Response Planning Guidelines.

D. Emissions Data

1. Complete the table below to provide maximum oxides of nitrogen (NOx) and ammonia (NH_3) slip concentrations and emission rates:

Table 3		
Air Contaminant	**Outlet** (Pounds Per Hour)	**Outlet**[1] (Parts Per Million By Volume, Dry Basis)
NOx	18.1	2 ppmvd at 15% O2
NH_3	6.6	2 ppmvd at 15% O2

[1]Boilers at 3% oxygen; combustion turbines at 15% oxygen; engines at 15% oxygen.

2. Explain how the above NOx and NH_3 emissions data were obtained. Attach appropriate calculations and documentation.

   Emission rates are based on guaranteed outlet concentrations from turbine vendor. See Appendix B of this application for detailed emission calculations and Appendix C for vendor performance data.

E. Drawing of Selective Catalytic Reduction System

You must attach to this form a schematic drawing of the proposed Selective Catalytic Reduction system. At a minimum, it must show the location(s) of the catalyst bed(s), bypass damper(s) if applicable, bypass stack if applicable, and normal stack. Sampling ports for emissions testing must also be shown.

F. Monitoring, Record Keeping & Failure Notification

Note: You must notify the BWP Compliance & Enforcement Chief in the appropriate MassDEP regional office by telephone as soon as possible, within but no later than one (1) business day after you discover any upset or malfunction to facility equipment that results in excess emissions to the air and/or a condition of air pollution. You must submit written notice within seven (7) days thereafter.

1. Provide the manufacturer, make and model number of the proposed continuous emissions and opacity monitoring systems:

   Make and model of CEMS not yet selected

2. Identify the air contaminants that will be continuously monitored and recorded (e.g. NOx, NH_3, opacity)

   NOx, CO, NH3, opacity, O2

3. Describe any proposed process monitors (e.g. ammonia injection, fuel combustion) and frequency of data recording:

   Plant control system and data logger will record fuel flow rate, MW load, and ammonia injection rate; 1-minute data recording and 1-hour data averaging.

F. Monitoring, Record Keeping & Failure Notification (continued)

4. Are there any alarms associated with the monitoring equipment? ☒ Yes – Complete Table 4 ☐ No – Explain Below

Table 4

Operating Parameter Monitored	Describe Alarm Trigger	Monitoring Device or Alarm Type	Does the Alarm Initiate an Automated Response?
NOx	Out of compliance detected by CEMS	☒ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other – Describe:	☐ Yes ☒ No If Yes, Describe:
CO	Out of compliance detected by CEMS	☒ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other – Describe:	☐ Yes ☒ No If Yes, Describe:
NH3	Out of compliance detected by CEMS	☒ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other – Describe:	☐ Yes ☒ No If Yes, Describe:

5. Describe the operating conditions that are monitored to determine the reducing agent injection rate:

Ammonia solution mass flow

6. How often will the catalyst be tested and by what test method (e.g. core sample)?

TBD

7. List and explain all of the operating and safety controls associated with the SCR system. Continue on a separate attachment, if necessary.

If inlet temperatures exceed allowable limits, alarm will sound. Operator will reduce load or shut down unit. Ammonia injection is maintained only when acceptable gas temperature is maintained.

8. List the SCR system emergency procedures to be used during system upsets. Continue on a separate attachment, if necessary.

TBD

F. Monitoring, Record Keeping & Failure Notification (continued)

9. Explain the typical fluctuations in SCR system operation, such as changes in effluent temperatures, flow rates, pollutant concentrations, etc., which may affect operation of the unit. Also explain the means by which control efficiency will be maintained throughout these fluctuations. Continue on a separate attachment, if necessary.

   SCR control logic automatically meters ammonia injection to maintain stack exit concentration set points.

10. Describe the record keeping procedures to be used in identifying the cause, duration and resolution of each system failure/emission(s) exceedance. Continue on a separate attachment, if necessary.

    TBD

11. How will the SCR system be designed so as to allow for emissions testing using MassDEP-sanctioned test methods?

    The exhaust stack will be fitted with platforms and test ports to allow stack testing using MassDEP-sanctioned test methods.

G. Standard Operating & Maintenance Procedures

Attach to this form the standard operating and maintenance procedures for the proposed Selective Catalytic Reduction system, as well as a list of the spare parts inventory that you will maintain on site, as recommended by the equipment vendor.

Continue to Next Page ▶

H. Professional Engineer's Stamp

The seal or stamp and signature of a Massachusetts Registered Professional Engineer (P.E.) must be entered below. Both the seal or stamp impression and the P.E. signature must be original. This is to certify that the information contained in this Form has been checked for accuracy, and that the design represents good air pollution control engineering practice.

George S. Lipka
P.E. Name (Type or Print)

George S. Lipka
P.E. Signature

Consulting Engineer
Position/Title

Tetra Tech
Company

12/21/2012
Date (MM/DD/YYYY)

29704
P.E. Number

I. Certification by Responsible Official

The signature below provides the affirmative demonstration pursuant to 310 CMR 7.02(5)(c)8 that any facility(ies) in Massachusetts, owned or operated by the proponent for this project (or by an entity controlling, controlled by or under common control with such proponent) that is subject to 310 CMR 7.00, et seq., is in compliance with, or on a MassDEP approved compliance schedule to meet, all provisions of 310 CMR 7.00, et seq., and any plan approval, order, notice of noncompliance or permit issued thereunder. This Form must be signed by a Responsible Official working at the location of the proposed new or modified facility. Even if an agent has been designated to fill out this Form, the Responsible Official must sign it. (Refer to the definition given in 310 CMR 7.00.)

I certify that I have personally examined the foregoing and am familiar with the information contained in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment.

Scott G. Silverstein
Responsible Official Name (Type or Print)

Responsible Official Signature

President & COO
Responsible Official Title

Footprint Power LLC
Responsible Official Company/Organization Name

12-20-2012
Date (MM/DD/YYYY)

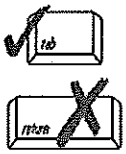
BWP AQ Afterburner/Oxidizer

Submit with Form CPA-PROCESS whenever construction, substantial reconstruction or alteration of an Afterburner/Oxidizer is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Inlet Operating Conditions

1. Complete the tables below with information on inlet gas flow(s).

Table 1a				
Emission Unit No(s). Being Controlled	**Average Inlet Gas Flow** (Actual Cubic Feet Per Minute)	**Moisture Content In the Inlet** (Pounds Per Minute)	**Inlet Temperature** (Degrees Fahrenheit (°F))	**Inlet Velocity** (Feet Per Second)
1, 2 (per unit)	3,554,605 (max)	5,344 (max)	> 550	TBD

Table 1b			
Provide the Maximum Gaseous Emissions			
Emission Unit No(s). Being Controlled	**Air Contaminant** (e.g. VOC, HAP, PM)*	**Air Contaminant Range Before Control** (Pounds Per Hour)	**Air Contaminant Range Before Control** (Parts Per Million, Dry Basis)
1, 2 (per unit)	CO	68.8 (max)	12.5 ppmvd @ 15% O2
1, 2 (per unit)	VOC	6.4 -8.0 (max)	2-2.5 ppmvd @ 15% O2

*VOC = Volatile Organic Compounds; HAP = Hazardous Air Pollutant(s)' PM = Particulate Matter

2. Provide the capture efficiency of the ventilation system serving the Afterurner/Oxidizer. The presumption is that the capture efficiency of the system meets the criteria of the Permanent Total Enclosure (PTE) detailed in EPA Method 204.

   100
   Weight Percent (%)

3. If the proposed system does not meet the PTE criteria, explain:

   N/A

BWP AQ Afterburner/Oxidizer

Submit with Form CPA-PROCESS whenever construction, substantial reconstruction or alteration of an Afterburner/Oxidizer is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

B. Specifications

1. Manufacturer of Afterburner/Oxidizer: TBD (Company)
2. Model Number (or Equivalent): BASF Camet or similar (Number)
3. Type of Afterburner/Oxidizer: ☐ Recuperative ☐ Regenerative ☒ Catalytic ☐ Direct Flame

4a. If Regenerative, will there be a "puff" chamber? ☐ Yes ☐ No

4b. If Regenerative, describe how efficiency will be maintained when switching beds:

N/A

5a. If Catalytic, describe the unit:

TBD

5b. If Catalytic, provide dimensions of the bed:
TBD (Height (Inches)) TBD (Width (Inches))
TBD (Depth (Inches)) TBD (Weight (Pounds))

5c. If Catalytic, pressure drop range across the bed: 1.4 (Inches of Water)

6. Capacity of the Afterburner/Oxidizer: TBD (Standard Cubic Feet Per Minute)
7. Temperature at the Afterburner/Oxidizer outlet: TBD (Degrees Fahrenheit (°F))
8. Outlet gas exhaust flow rate: 2,536,034 (max) (Actual Cubic Feet Per Minute, Wet)
9. Proposed minimum operating temperature of the Afterburner/Oxidizer, as measured at the downstream end of the combustion chamber: 550 °F (Degrees Fahrenheit (°F))
10. Combustion chamber temperature control mechanism: N/A (Describe)
11. Minimum residence time of gases in combustion chamber at the minimum temperature: TBD (Seconds)
12. Explain the design and operation of any heat recovery system associated with this Afterburner/Oxidizer system. Continue on a separate attachment, if necessary.

Each combustion turbine (units 1 and 2) is equipped with a heat recovery steam generator, which will direct steam to a steam turbine generator.

Notes:
- The burner must be able to maintain this minimum operating temperature without the benefit of the heating value of contaminants in the waste stream.
- Design calculations must be submitted that incorporate fuel, air and waste stream supply rates as well as heat transfer phenomena (including heat recovery systems) used to determine the minimum gas temperature and residence time in the combustion chamber.

C. Fuel & Burner Data

1. Provide the burner manufacturer(s) and model number(s):

   N/A (no burner with this system) — Manufacturer(s)
   N/A — Model Number(s)

2. Type of Gaseous Fuel Used:
   ☐ Natural Gas ☐ Propane
   ☒ Other - Specify: N/A

3a. Gas firing rate:
   N/A — Maximum Cubic Feet Per Hour
   N/A — Minimum Cubic Feet Per Hour

3b. Maximum heat input rate:
   N/A — British Thermal Units (Btu) Per Hour

4. Describe burner design and explain how proper mixing of fuel and combustion air will be achieved:

   N/A

5. Describe the burner modulation system (e.g. full modulating, high/low, on/off):

   N/A

6. If on/off modulation will be used, describe how the minimum operating temperature will be maintained at all times:

   N/A

7. Describe what portion of the contaminant stream will bypass the burner to be mixed with the flame downstream:

   N/A

Continue to Next Page ▶

D. Emissions Data

1. Describe air contaminant emissions after control by the proposed Afterburner/Oxidizer:

Table 2			
Provide the Maximum Gaseous Emission Rate			
Emission Unit No(s). Being Controlled	**Air Contaminant**	**Air Contaminant Emission Range After Control (Pounds Per Hour)**	**Air Contaminant Emission Range After Control (Parts Per Million by Volume, Dry Basis)**
1, 2 (per unit)	CO	11.0 (max)	2 ppmvd @ 15% O2
1, 2 (per unit)	VOC	6.4 (max)	2 ppmvd @ 15% O2

2. Explain how the above air contaminant emissions data were obtained. Attach appropriate calculations and documentation.

Emission rates are based on guaranteed outlet concentrations from turbine vendor. See Appendix B of this application for detailed emission calculations and Appendix C for vendor performance data.

3a. Design destruction efficiency of organic compounds (as carbon) in the Afterburner/ Oxidizer: 84% CO; < 25% expected for VOC
Weight Percent (%)

3b. Explain how this efficiency was calculated or determined:

Based on guaranteed emission rates from turbine vendor.

4a. Design destruction efficiency for inorganic hazardous air pollutants in the Afterburner/ Oxidizer: N/A
Weight Percent (%)

4b. Explain how this efficiency was calculated or determined:

N/A

E. Catalytic Units Only

1. Estimated useful life of the catalyst: 3 years
   Amount of Time (e.g. Months or Years)

2. Describe how catalyst performance will be monitored, including the test method and frequency of testing:

   TBD

F. Drawing of Afterburner/Oxidizer Control System

You must attach to this form a schematic drawing of the proposed Afterburner/Oxidizer. At a minimum, it must show the location(s) of the burner(s), catalyst bed(s), bypass damper(s), bypass stack and normal stack. Clearly indicate the gas circulation pattern through preheat and burner chambers, and through heat recovery unit(s) prior to ambient discharge. Sampling ports for emissions testing, and location of each pressure and temperature indicator must also be shown.

G. Monitoring, Record Keeping & Failure Notification

Note: You must notify the BWP Compliance & Enforcement Chief in the appropriate MassDEP regional office by telephone as soon as possible, within but no later than one (1) business day after you discover any upset or malfunction to facility equipment that results in excess emissions to the air and/or a condition of air pollution. You must submit written notice within seven (7) days thereafter.

1. Describe the parameters that will be monitored as a surrogate for control device efficiency, and the frequency of monitoring. Continue on a separate attachment, if necessary.

   CO concetrations will be continuously monitored by a CEMS as a direct indication of compliance.

2. Describe the monitoring methods and warning/alarm system that protect against operation when the unit is not meeting design efficiency (e.g. visual monitoring, audible alarm, flashing lights, temperature indicator, pressure indicator). Continue on a separate attachment, if necessary.

   A visual alarm will be triggered by the CEMS if CO is detected to be out of compliance with emission limits.

3. Describe the record keeping procedures to be used to verify monitoring and to identify the cause, duration and resolution of each failure. Continue on a separate attachment, if necessary.

   Electronic and/or manual logbook records will be kept for each incident of missing data, excess emissions, or equipment malfunction.

Continue to Next Page ▶

G. Monitoring, Record Keeping & Failure Notification (continued)

4. Describe how failure of the Afterburner/Oxidizer will be made known to the operator during normal operations (e.g. visual monitoring, audible alarm, flashing lights, time indicator, pressure indicator). Continue on a separate attachment, if necessary.

   A visual alarm will be triggered by the CEMS if CO is detected to be out of compliance with emission limits.

5. List and explain all operating and safety controls associated with this system, including interlock systems that prevent introduction of the air contaminant(s) stream until the Afterburner/Oxidizer is operating properly. Continue on a separate attachment, if necessary.

   The oxidation catalyst is passive, and there is no bypass for the exhaust stream. During unit startups, heat from the exhaust will warm the catalyst to its required operating temperature range.

6. Describe the Afterburner/Oxidizer's emergency procedures during system upsets. Continue on a separate attachment, if necessary.

   The oxidation catalyst is passive, and therefore no emergency procedures are required during system upsets.

7. Describe features of the system design that will allow for emissions testing and operation using MassDEP-sanctioned test methods. Continue on a separate attachment, if necessary.

   The exhaust stack will be fitted with platforms and test ports to allow stack testing using MassDEP-sanctioned test methods.

H. Standard Operating & Maintenance Procedures

Attach to this form the standard operating and maintenance procedures for the proposed Afterburner/Oxidizer, as well as a list of the spare parts inventory that you will maintain on site, as recommended by the equipment vendor(s).

Continue to Next Page ▶

BWP AQ Afterburner/Oxidizer

Submit with Form CPA-PROCESS whenever construction, substantial reconstruction or alteration of an Afterburner/Oxidizer is proposed unless exempt per 310 CMR 7.02(2)(b).

X254064
Transmittal Number

N/A
Facility ID (if known)

I. Professional Engineer's Stamp

The seal or stamp and signature of a Massachusetts Registered Professional Engineer (P.E.) must be entered below. Both the seal or stamp impression and the P.E. signature must be original. This is to certify that the information contained in this Form has been checked for accuracy, and that the design represents good air pollution control engineering practice.

George S. Lipka
P.E. Name (Type or Print)

P.E. Signature

Consulting Engineer
Position/Title

Tetra Tech
Company

12/21/2012
Date (MM/DD/YYYY)

29704
P.E. Number

COMMONWEALTH OF MASSACHUSETTS
GEORGE S. LIPKA
SANITARY
No. 29704
REGISTERED PROFESSIONAL ENGINEER

J. Certification by Responsible Official

The signature below provides the affirmative demonstration pursuant to 310 CMR 7.02(5)(c)8 that any facility(ies) in Massachusetts, owned or operated by the proponent for this project (or by an entity controlling, controlled by or under common control with such proponent) that is subject to 310 CMR 7.00, et seq., is in compliance with, or on a MassDEP approved compliance schedule to meet, all provisions of 310 CMR 7.00, et seq., and any plan approval, order, notice of noncompliance or permit issued thereunder. This Form must be signed by a Responsible Official working at the location of the proposed new or modified facility. Even if an agent has been designated to fill out this Form, the Responsible Official must sign it. (Refer to the definition given in 310 CMR 7.00.)

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Scott G. Silverstein
Responsible Official Name (Type or Print)

Responsible Official Signature

President & COO
Responsible Official Title

Footprint Power LLC
Responsible Official Company/Organization Name

12-20-2012
Date (MM/DD/YYYY)

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality

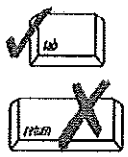
BWP AQ Sound

Submit alone and/or with Form CPA-FUEL and/or CPA-PPROCESS whenever the construction or alteration of stationary equipment (e.g. electrical generating equipment, motors, fans, process handling equipment or similar sources of sound) has the potential to cause noise, or in response to a MassDEP enforcement action citing noise as a condition of air pollution.

X254064
Transmittal Number

N/A
Facility ID (if known)

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Introduction

When proposing sound suppression/mitigation measures, similar to the traditional "top-down" BACT process, the "top case" sound suppression/mitigation measures which deliver the lowest sound level increase above background are required to be implemented, unless these measures can be eliminated based upon technological or economic infeasibility. An applicant cannot "model out" of the use of the "top case" sound suppression/ mitigation measures by simply demonstrating that predicted sound levels at the property line when employing a less stringent sound suppression/mitigation strategy will result in a sound level increase of less than or equal to the 10 dBA (decibel, A –Weighted) above background sound level increase criteria contained in the MassDEP Noise Policy. A 10 dBA increase is the maximum increase allowed by MassDEP; it is not the sound level increase upon which the design of sound suppression/mitigation strategies and techniques should be based. Also, take into consideration that the city or town that the project is located in may have a noise ordinance (or similar) that may be more stringent than the criteria in the MassDEP Noise Policy

A. Sound Emission Sources & Abatement Equipment/Mitigation Measures

1. Provide a description of the source(s) of sound emissions and associated sound abatement equipment and/or mitigation measures. Also include details of sound emission mitigation measures to be taken during construction activities.

Please refer to Section 9 of this CPA application.

B. Manufacturer's Sound Emission Profiles & Sound Abatement Equipment

Please attach to this form the manufacturer's sound generation data for the equipment being proposed for installation, or the existing equipment as applicable. This data must specify the sound pressure levels for a complete 360° circumference of the equipment and at given distance from the equipment. Also attach information provided by the sound abatement manufacturer detailing the expected sound suppression to be provided by the proposed sound suppression equipment. Please refer to Section 9 of this CPA application.

C. Plot Plan

Provide a plot plan and aerial photo(s) (e.g. GIS) that defines: the specific location of the proposed or existing source(s) of sound emissions; the distances from the source(s) to the property lines; the location, distances and use of all inhabited buildings (residences, commercial, industrial, etc) beyond the property lines; identify any areas of possible future construction beyond the property line; and sound monitoring locations used to assess noise impact on the surrounding community. All information provided in the sound survey shall contain sufficient data and detail to adequately assess any sound impacts to the surrounding community, including elevated receptors as applicable, not necessarily receptors immediately outside the facility's property line. Please refer to Figure 9-2 and the maps and drawings in Appendix D of this CPA application.

Continue to Next Page ▶

BWP AQ Sound

Submit alone and/or with Form CPA-FUEL and/or CPA-PPROCESS whenever the construction or alteration of stationary equipment (e.g. electrical generating equipment, motors, fans, process handling equipment or similar sources of sound) has the potential to cause noise, or in response to a MassDEP enforcement action citing noise as a condition of air pollution.

X254064
Transmittal Number

N/A
Facility ID (if known)

D. Community Sound Level Criteria

Approval of the proposed new equipment or proposed corrective measures will **not** be granted if the installation:

1. Increases off-site broadband sound levels by more than 10 dBA.above "ambient" sound levels. Ambient is defined as the lowest one-hour background A-weighted sound pressure level that is exceeded 90 percent of the time measured during equipment operating hours. Ambient may also be established by other means with the consent of MassDEP.

2. Produces off-site a "pure tone" condition. "Pure tone" is defined as when any octave band center frequency sound pressure level exceeds the two adjacent frequency sound pressure levels by 3 decibels or more.

3. Creates a potential condition of air pollution as defined in 310 CMR 7.01 and the MassDEP Noise Policy.

Note: These criteria are measured both at the property line and at the nearest inhabited building.

For equipment that operates, or will be operated intermittently, the ambient or background noise measurements shall be performed during the hours that the equipment will operate and at the quietest times of the day. The quietest time of the day is usually between 1:00 a.m. and 4:00 a.m. on weekend nights. The nighttime sound measurements must be conducted at a time that represents the lowest ambient sound level expected during all seasons of the year.

For equipment that operates, or will operate, continuously and is a significant source of sound, such as a proposed power plant, background shall be established via a minimum of seven consecutive days of continuous monitoring at multiple locations with the dBA L 90 data and pure tone data reduced to one-hour averages.

In any case, consult with the appropriate MassDEP Regional Office before commencing noise monitoring in order to establish a sound monitoring protocol that will be acceptable to MassDEP.

E. Full Octave Band Analysis

The following community sound profiles will require the use of sound pressure level measuring equipment in the neighborhood of the installation. An ANSI S1.4 Type 1 sound monitor or equivalent shall be use for all sound measurements. A detailed description of sound monitor calibration methodology shall be included with any sound survey.

1. Lowest **ambient** sound pressure levels during operating hours of the equipment.

   a. At property line:

A-Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Closest noise sensitive areas (i.e., inhabited buildings) are located across the street from the property line. See Table 1b for lowest ambient sound pressure levels at those locations.										

E. Full Octave Band Analysis (continued)

b. At the nearest inhabited building and if applicable at buildings at higher elevation:

Receptor ID (see Sec 9 of text)	A-Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
3	39	45	44	44	38	38	32	26	19	14	15
4	39	52	49	48	40	37	31	23	19	15	16
5	41	45	55	48	41	38	37	27	15	13	14
9	39	56	51	46	41	38	33	25	20	17	19
10	36	43	41	37	37	35	30	21	16	14	15

Note: You are required to complete sound profiles 2a and 2b only if you are submitting this form in response to a MassDEP enforcement action citing a noise nuisance condition. If this is an application for new equipment, Skip to 3.

2. Neighborhood sound pressure levels with source operating without sound abatement equipment.

a. At property line:

A- Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

b. At the nearest inhabited building and if applicable at buildings at higher elevation:

A- Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Continue to Next Page ▶

E. Full Octave Band Analysis (continued)

3. **Expected** neighborhood sound pressure levels after installation of sound abatement equipment.

a. At property line:

A- Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Closest noise sensitive areas (i.e., inhabited buildings) are located across the street from the property line. See Table 3b for expected sound pressure levels after installation of sound abatement equipment at those locations.										

b. At nearest inhabited building and if applicable at buildings at higher elevations:

Receptor ID (see Sec 9 of text)	A-Weighted	31.5	63.0	125	250	500	1K	2K	4K	8K	16K
3	44	61	59	55	45	40	34	27	20	14	-
4	45	63	61	57	47	42	36	27	20	15	-
5	46	62	61	56	47	42	39	29	16	13	-
9	44	63	58	54	46	42	37	27	20	17	-
10	42	60	56	52	44	39	34	24	16	14	-

Note: MassDEP may request that actual measurements be taken after the installation of the noise abatement equipment to verify compliance at all off-site locations.

F. Professional Engineers Stamp

The seal or stamp and signature of a Massachusetts Registered Professional Engineer (P.E.) must be entered below. Both the seal or stamp impression and the P.E. signature must be original. This is to certify that the information contained in this Form has been checked for accuracy, and that the design represents good air pollution control engineering practice.

George S. Lipka
P.E. Name (Type or Print)

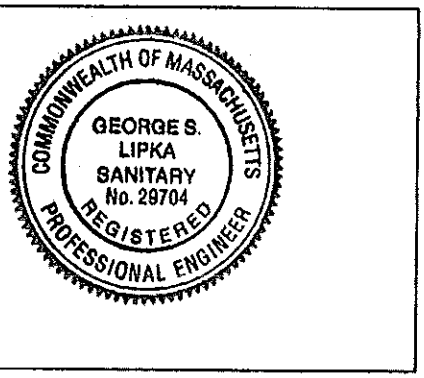
P.E. Signature

Consulting Engineer
Position/Title

Tetra Tech
Company

12/21/2012
Date (MM/DD/YYYY)

29704
P.E. Number



BWP AQ Sound

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X254064
Transmittal Number

N/A
Facility ID (if known)

G. Certification by Responsible Official

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I certify that I have personally examined the foregoing and am familiar with the information contained in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including possible fines and imprisonment.

Scott G. Silverstein
Responsible Official Name (Type or Print)

Responsible Official Signature

President & COO
Responsible Official Title

Footprint Power LLC
Responsible Official Company/Organization Name

12-20-2012
Date (MM/DD/YYYY)

This Space Reserved for MassDEP Approval Stamp

APPENDIX B

Emission Calculations

Appendix B

Footprint Air Emissions Calculations

Potential Emissions

Gas Turbines

Appendices C-1a and C-1b provide a matrix of performance data for normal operating loads provided by Siemens and Appendix C-2 provides similar data for GE. Based on this data, a set of specific load cases were selected in order to characterize emissions for calculating potential emissions (and also for identifying an appropriate range of cases for dispersion modeling). Additional vendor data for startup/shutdown (SUSD) conditions is also included (Appendices C-3 and C-4).

Calculation Sheet 1 presents the potential to emit (PTE) calculations for one turbine. Two operating cases are used to calculate potential emissions (PTE) are 100% load at 50 °F for baseload operation (8,040 hours/year) and 100% load at 90 °F with the duct burners and evaporative coolers on (720 hours per year). Siemens has higher firing rates for both these cases so Siemens heat input rates are used for PTE. Siemens Case 11 is 100% load at 50 °F, with a heat input of (102,344 lb/hr of fuel) *(23,079 Btu/lb HHV) = 2,362 MMBtu/hr. Siemens Case 4 is 100% load at 90 °F with the duct burners and evaporative coolers on with a heat input of (94,870 + 11,386 lb/hr of fuel) *(23,079 Btu/lb HHV) = 2,452.3 MMBtu/hr. The GE cases for these same conditions have higher particulate emission rates (expressed directly as lb/hr) so those values are used: GE Case 7 (12 lb/hr of PM) and 11 (16.1 lb/hr PM). Except for particulates, emissions are calculated directly using the proposed LAER/BACT limits in lb/MMBtu as shown on Sheet 1. Siemens reported lb/hr values may differ slightly based on rounding of emission factors. The CPA values are based on the direct calculation with the exact lb/MMBtu values shown on Sheet 1.

For CO and VOC, Sheet 1 shows the PTE based on 8,760 hours of operation, but the worst case PTE is based on separate calculations using startup and shutdown (SUSD) emissions and an assumed operating scenario. These calculations are provided on Sheet 2 (GE) and Sheet 3 (Siemens) and have a higher PTE compared to those in Sheet 1. Therefore, the maximum SUSD scenario values for CO and VOC PTE are used.

Calculation Sheets 4, 5, and 6 present emission calculations for the emergency generator, emergency diesel fire pump, and auxiliary cooling tower respectively.

Calculation Sheet 7 presents the overall summary of potential-to-emit (PTE) for the facility.

For dispersion modeling, the combustion turbine load cases in Table 6-3 of the Application are based on selecting turbine loads to bracket the range of emissions and gas flow for both GE and Siemens, as follows:

Siemens 100%: Siemens Case 4 (Overall Maximum Firing Case)

GE 100%: GE Case 12 (GE Max Fire)

GE 75%: GE Case 5 (Mid load conditions – GE has lower gas flow so GE is used)

GE 46%: GE Case 6 (Low load conditions – GE has lower gas flow so GE used used)

GE SUSD: GE has higher SUSD emissions

Emissions (lb/hr) for modeling were determined the same way as described above for potential emissions. HRSG exhaust temperatures are taken directly from the vendor data.

Calculation Sheet 1
Potential Emissions for Combustion Turbines and Auxiliary Boiler

	One Combustion Turbine at 100% Load			Auxiliary Boiler	
	50 deg F	90 deg F	Annual	Gas	Annual
	No DF	DF, EC	tpy	lb/MMBtu	tpy
Hours per Year	8040	720	8760	6570 (FLE)	6570 (FLE)
MMBtu/hr	2362	2452.3		80	
NOx (lb/MMBtu)	0.0074	0.0074	76.8	0.011	2.9
CO (lb/MMBtu)	0.0045	0.0045	46.7	0.035	9.2
VOC (lb/MMBtu)	0.0013	0.0026	14.6	0.005	1.3
SO2 (lb/MMBtu)	0.0015	0.0015	15.6	0.0015	0.4
PM/PM-10 (lb/hr)	12.0	16.1	54.0	0.005	1.3
PM-2.5 (lb/hr)	12.0	16.1	54.0	0.005	1.3
NH3 (lb/MMBtu)	0.0027	0.0027	28.0	--	--
H2SO4 (lb/MMBtu)	0.001	0.001	10.4	0.00012	0.03
Lead (lb/MMBtu)	--	--	--	4.90E-07	0.00013
Formaldehyde (lb/MMBtu)	0.00035	0.00035	3.6	7.40E-05	0.019
Total HAP (lb/MMBtu)	0.000667	0.000667	6.9	1.90E-03	0.5
CO2 (lb/MMBtu)	118.9	118.9	1,233,952.3	118.9	31,247
CO2e (lb/MMBtu)	119.0	119.0	1,235,142.0	119.0	31,277
Notes:					
1. DF = Duct Firing					
2. EC = Evaporative Coolers					
3. FLE = Full Load Equivalent					

Calculation Sheet 2
GE Emissions for CO and VOC Including Startup Shutdown Scenario

Emissions for Normal Load Cases	MMBtu/hr	CO (lb/hr)	VOC (lb/hr)
Spring/Fall Normal Load Case 7 (50 deg)	2130	9.6	2.8
Summer Case 13 except for 720 hours (90 deg)	1980	8.9	2.6
Summer Case 12 for 720 hours (90 deg)	2417	10.9	6.3
Winter Case 4 (20 deg)	2250	10.1	2.9

	ASSUMED OPERATING SCENARIOS										SIEMENS STARTUP/SHUTDOWN EMISSIONS						Normal Load Cases Emissions for Each Season	
	Assumed Operating Profile Normal Loads					starts/wk			starts/yr			CO			VOC			
	days/ week	hrs/ day	hrs/ week	Weeks/ yr	hrs/yr	cold	warm	hot	cold	warm	hot	cold	warm	hot	cold	warm	hot	
	Combined startup/shutdown pounds of emissions per single event											*1021*	*790*	*780*	*81*	*66*	*65*	
												Annual SUSD emissions for each category and season (lbs)						
Spring/Fall	5	12	60	20	1200	1	4	0	20	80	0	20420	63200	0	1620	5280	0	
																	Case 7	11502	3323
Summer	7	24	168	2	336	0	2	0	0	4	0	0	3160	0	0	264	0	
	5	16	80	8	640	0	5	0	0	40	0	0	31600	0	0	2640	0	
	5	12	60	2	120	0	5	0	0	10	0	0	7900	0	0	660	0	
					1096												Case 13	3350	968
																	Case 12	7831	4525
Winter	7	24	168	2	336	1	0	0	2	0	0	2042	0	0	162	0	0	
	5	16	80	8	640	1	4	0	8	32	0	8168	25280	0	648	2112	0	
					976												Case 4	9882	2855
TOTAL RUN HRS				42	3272														
Planned outage	7	24	168	4	672				6			6126	0	0	486	0	0		
Not Dispatched (includes time in SUSD)					4457														
Unplanned FO	4.1%				359						4			3120			260		
ANNUAL HRS					8760														
Total Tons in Each Category												85.5			7.1			16.3	5.8
																		CO	VOC
																	Total Emissions per unit	101.8	12.9

Calculation Sheet 3
Siemens Emissions for CO and VOC Including Startup Shutdown Scenario

Emissions for Normal Load Cases	lb fuel/hr	Btu/lb	MMBtu/hr	CO (lb/hr)	VOC (lb/hr)
Spring/Fall Normal Load Case 11 (50 deg)	102344	23079	2362	10.6	3.1
Summer Case 2 except for 720 hours (90 deg)	91494	23079	2112	9.5	2.7
Summer Case 4 for 720 hours (90 deg)	106256	23079	2452	11.0	6.4
Winter Case 14 (20 deg)	100192	23079	2312	10.4	3.0

	ASSUMED OPERATING SCENARIOS										SIEMENS STARTUP/SHUTDOWN EMISSIONS							
	Assumed Operating Profile Normal Loads					starts/wk			starts/yr			CO			VOC			Normal Load Cases Emissions for Each Season	
	days/ week	hrs/ day	hrs/ week	Weeks/ yr	hrs/yr	cold	warm	hot	cold	warm	hot	cold	warm	hot	cold	warm	hot		
	Combined startup/shutdown pounds of emissions per single event											*420*	*306*	*245*	*143*	*121*	*97*		
												Annual SUSD emissions for each category and season (lbs)							
Spring/Fall	5	12	60	20	1200	1	4	0	20	80	0	8400	24480	0	2860	9680	0		
																	Case 11	12755	3685
Summer	7	24	168	2	336	0	2	0	0	4	0	0	1224	0	0	484	0		
	5	16	80	8	640	0	5	0	0	40	0	0	12240	0	0	4840	0		
	5	12	60	2	120	0	5	0	0	10	0	0	3060	0	0	1210	0		
					1096														
																	Case 2	3573	1032
																	Case 4	7945	4591
Winter	7	24	168	2	336	1	0	0	2	0	0	840	0	0	286	0	0		
	5	16	80	8	640	1	4	0	8	32	0	3360	9792	0	1144	3872	0		
					976														
																	Case 14	10156	2934
TOTAL RUN HRS				42	3272														
Planned outage	7	24	168	4	672				6			2520	0	0	858	0	0		
Not Dispatched (includes time in SUSD)					4457														
Unplanned FO	4.1%				359						4			980			388		
ANNUAL HRS					8760														
Total Tons in Each Category												33.4			12.8			17.2	6.1
																		CO	VOC
																	Total Emissions per unit	50.7	18.9

Calculation Sheet 4
Emergency Generator Emissions

Footprint Power Emergency Generator Emissions							
based on EPA Tier 2 Requirements							
40 CFR 60, Part 89							
Emissions based on Cummins 750DQFAA Diesel Generator Set							
Emergency Generator is nominal 750 Kwe							
Heat Input Rate is 7.4 MMBtu/hr							
Brake horsepower (bhp) rating is 1102							
Mechanical kW rating is 1102 bhp/(1.34 kW/bhp) =				822.4			
EPA Tier 2 emission requirements are based on mechanical kW							
Tier 2 Requirements							
	grams/Kwh						
NOx + HC	6.4						
CO	3.5						
PM	0.2						
For Potential Emissions, assume worst case NOx is 6.4 gm/Kwh							
and worst case VOC is the Tier 1 limit of 1.3 gm/Kwh.							
These cannot occur simultaneously but are considered the worst case							
for each pollutant individually							
	A	B	C	D			
	grams/Kwh	lbs/hr	tpy	grams/sec			
					B = A*822.4 Kw/(453.6 grams/lb)		
NOx	6.4	11.6	1.7	1.46	C = B*300 hrs/yr/(2000 lb/ton)		
					D = B*453.6 grams/lb/(3600 sec/hr)		
CO	3.5	6.35	1.0	0.80			
VOC	1.3	2.36	0.35	0.30			
PM	0.232	0.42	0.06	0.053			
Note: PM PTE and modeling inlcudes allowance for condensables based on AP-42							
	D	E	F	G			
	lb/MMBtu	lbs/hr	tpy	grams/sec	E = D*7.4 MMBtu/hr		
SO2	0.0015	0.011	0.0017	0.001	F = E*300 hrs/yr/(2000 lb/ton)		
H_2SO_4 mist	1.20E-04	8.88E-04	1.33E-04	1.12E-04			
Lead	7.69E-07	5.69E-06	8.54E-07	7.17E-07			
Formaldehyde	7.89E-05	5.84E-04	8.76E-05	7.36E-05			
Total HAP	1.59E-03	1.18E-02	1.76E-03	1.48E-03			
CO_2	162.3	1201	180	151.329			
CO_2e	162.85	1205	181	151.841			

Calculation Sheet 5
Emergency Diesel Fire Pump
Emissions

Footprint Power Emergency Fire Pump Emissions							
based on EPA Tier 3 Requirements							
40 CFR 60, Part 89							
Emissions based on Cummins CFP9E-F50 Diesel Fire Pump							
Heat Input Rate is 2.7 MMBtu/hr							
Brake horsepower (bhp) rating is 371							
Mechanical kW rating is 371 bhp/(1.34 kW/bhp) =				276.9			
EPA Tier 3 emission requirements are based on mechanical kW							
Tier 3 Requirements							
	grams/Kwh						
NOx + HC	4.0						
CO	3.5						
PM	0.2						
For Potential Emissions, assume worst case NOx is 4.0 gm/Kwh							
and worst case VOC is the Tier 1 limit of 1.3 gm/Kwh.							
These cannot occur simultaneously but are considered the worst case							
for each pollutant individually							
	A	B	C	D			
	grams/Kwh	lbs/hr	tpy	grams/sec			
					B = A*276.9 Kw/(453.6 grams/lb)		
NOx	4.0	2.4	0.4	0.31	C = B*300 hrs/yr/(2000 lb/ton)		
					D = B*453.6 grams/lb/(3600 sec/hr)		
CO	3.5	2.14	0.3	0.27			
VOC	1.3	0.79	0.12	0.10			
PM	0.232	0.14	0.02	0.018			
Note: PM PTE and modeling inlcudes allowance for condensables based on AP-42							
	D	E	F	G			
	lb/MMBtu	lbs/hr	tpy	grams/sec	E = D*2.7 MMBtu/hr		
SO2	0.0015	0.004	0.0006	0.001	F = E*300 hrs/yr/(2000 lb/ton)		
H_2SO_4 mist	1.20E-04	3.24E-04	4.86E-05	4.08E-05			
Lead	7.69E-07	2.08E-06	3.12E-07	2.62E-07			
Formaldehyde	1.18E-03	3.19E-03	4.78E-04	4.01E-04			
Total HAP	3.9E-03	1.05E-02	1.58E-03	1.33E-03			
CO_2	162.3	438	66	55.214			
CO_2e	162.85	440	66	55.402			

Calculation Sheet 6
Auxiliary Cooling Tower PM Emissions

Auxiliary Cooling Tower PM Emission Calculations

Using the methods proposed by Reisman and Frisbie in their AWMA presentation
"Calculating Realistic PM10 Emissions from Cooling Towers," #216, Orlando Florida June 2001
Basis: each droplet evaporates to form a single particle of dissolved solids.

Assume each droplet is spherical (conservative): volume = 4/3*pi*(diameter/2)^3
Assume each particle is spherical (conservative): volume = 4/3*pi*(diameter/2)^3

1.00E-06	ug/um^3	density of liquid droplets (density of water)
2.20E-06	ug/um^3	density of solid particles (density of sodium chloride)
1,500	ppmw	concentration Total Dissolved Solids (note ppmw = milligrams/l) (l = liter)

Drift Eliminator Droplet size distribution

Size Distribution		Droplet size	Droplet volume	Droplet mass	Particle mass	Particle volume	Particle diameter	Percent by mass
total % by mass	% in range by mass	microns	um^3	ug	ug	um^3	microns	<2.5 microns
0.2%	0.2%	525	75766379	76	0.11	51659	46.2	
1%	0.8%	275	10889218	11	0.02	7424	24.2	
5%	4.0%	230	6370626	6	0.01	4344	20.2	
10%	5.0%	170	2572441	3	0.004	1754	15.0	
20%	10.0%	115	796328	0.8	0.001	543	10.1	
40%	20.0%	65	143793	0.14	0.00022	98	5.7	
60%	20.0%	35	22449	0.02	0.00003	15	3.1	
80%	20.0%	15	1767	0.0018	2.6507E-06	1	1.3	20.0%
88%	8.0%	10	524	0.0005	7.854E-07	0	0.9	8.0%
100%	12.0%	0	0	0.0	0	0	0.0	12.0%
						Total percent of particles <2.5 microns:		40.0%

Total mass of PM, PM-10 and PM-2.5 emitted from auxiliary cooling tower
Tower design parameters based on SPX/Marley NC8412VAN3
Circulating Water Flow 13,000 gpm (total for 3 cells)
Drift rate 0.001% of circ flow

Mass of PM per cell = (13,000 gpm)(1500 mg/l)(3.785 l/gal)(0.001/100 l drift/l circ flow)/[(1000 mg/g)(3 cells)(60 sec/min)]

= 0.0041 grams/sec/cell

Conservatively assume PM-10 = PM

PM-2.5 is 40% of PM per above; PM-2.5 per cell = 0.00164 grams/sec/cell

TPY for facitly PTE (based on 8760 hours per year for all 3 cells):

tpy = (grams/sec/cell)(3 cells)(31,536,000 sec/yr)/(907,200 grams/ton)

PM/PM-10:	0.43	tpy
PM-2.5:	0.17	tpy

Calculation Sheet 7
Summary of Facility Potential to Emit (PTE) in tons per year (tpy)

Pollutant	Annual emissions, tons/year						
	CT Unit 1 (GT + DB)	CT Unit 2 (GT + DB)	Aux Boiler	Emergency Generator	Fire Pump	Aux Cooling Tower	Facility Totals
NO_x	76.8	76.8	2.9	1.7	0.4	0	158.6
CO	101.8	101.8	9.2	1.0	0.3	0	214.1
VOC	18.9	18.9	1.3	0.35	0.12	0	39.6
SO_2	15.6	15.6	0.4	0.0017	0.0006	0	31.5
PM_{10}	54.0	54.0	1.3	0.06	0.02	0.43	109.9
$PM_{2.5}$	54.0	54.0	1.3	0.06	0.02	0.17	109.6
NH_3	28.0	28.0	0	0	0	0	56.0
H_2SO_4 mist	10.4	10.4	0.03	1.33E-04	4.84E-05	0	20.8
Lead	0	0	0.00013	8.54E-07	3.10E-07	0	0.00013
Formaldehyde	3.6	3.6	0.019	8.76E-05	4.76E-04	0	7.3
Total HAP	6.9	6.9	0.5	1.76E-03	1.57E-03	0	14.3
CO_2	1,233,952	1,233,952	31,247	180	66	0	2,499,397
CO_2e	1,235,142	1,235,142	31,277	181	66	0	2,501,808

APPENDIX C

Equipment Specifications and Vendor Performance Data

Appendix C-1a

Siemens SCC6-5000F(5) 1x1 Flex-Plant 30 - Manufacturer's Emissions Data - Natural Gas

Siemens Performance Data - Base Reference Conditions 1-11

Case		1	2	3	4	5	6	7	8	9	10	11
GT Load Level	%	100	100	100	100	75	50	100	100	75	50	100
Evaporative Cooler Status	--	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
Duct Burner Status	--	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Siemens Performance Data - Fuel Composition

Methane	Vol. %	98	98	98	98	98	98	98	98	98	98	98
Ethane	Vol. %	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Nitrogen	Vol. %	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Sulfur in fuel at 68 °F, 14.7 psia	gr/100 scf	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Siemens Emissions Data - Plant Conditions

Gross Fuel Heating Value (HHV)	Btu/lb	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079
Ambient Dry Bulb Temperature	°F	90	90	90	90	90	90	70	70	70	70	50
Ambient Relative Humidity	%	60	60	60	60	60	60	50	50	50	50	50
Barometric Pressure	psia	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69
GT Fuel Flow (single Unit)	lb/hr	91,473	91,494	94,884	94,870	72,220	55,246	97,664	100,974	76,208	57,898	102,344
DB Fuel Flow (single Unit)	lb/hr	12,505			11,386							

Siemens Emissions Data - Exhaust Gas Composition (Single Unit)

Exhaust Flow	lb/hr	4,352,658	4,340,160	4,461,665	4,473,049	3,340,639	2,697,916	4,643,327	4,760,985	3,518,769	2,824,201	4,828,502
Exhaust Temperature	°F	211	211	214	213	196	191	215	218	195	187	218
Oxygen	Vol. %	11.31	12.36	12.23	11.31	12.24	12.73	12.66	12.53	12.50	13.00	12.70
Carbon Dioxide	Vol. %	4.13	3.66	3.68	4.10	3.71	3.49	3.67	3.70	3.74	3.52	3.71
Water	Vol. %	10.91	9.98	10.37	11.19	10.09	9.65	8.45	8.84	8.59	8.14	7.91
Nitrogen	Vol. %	72.79	73.14	72.86	72.54	73.10	73.27	74.35	74.07	74.30	74.47	74.80
Argon	Vol. %	0.85	0.86	0.85	0.85	0.86	0.86	0.87	0.87	0.87	0.87	0.88
Molecular Weight	lb/lbmol	28.13	28.19	28.15	28.10	28.19	28.22	28.36	28.32	28.35	28.38	28.42

Siemens Emissions Data - Exhaust Stack Emissions

NOx	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2
NH3	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2
CO	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2
VOC (as CH4)	ppmvd @ 15% O2	2	1	1	2	1	1	1	1	1	1	1
Particulates (front and back half)	lb/hr	14	11	11	14	8	8	11	12	9	8	12

Appendix C-1b

Siemens SCC6-5000F(5) 1x1 Flex-Plant 30 - Manufacturer's Emissions Data - Natural Gas

Siemens Performance Data - Base Reference Conditions 12-21

		12	13	14	15	16	17	18	19	20	21
Case		75	50	100	75	50	100	75	50	100	100
GT Load Level	%	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Evaporative Cooler Status	--	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Duct Burner Status	--										

Siemens Performance Data - Fuel Composition

Methane	Vol. %	98	98	98	98	98	98	98	98	98	98
Ethane	Vol. %	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Nitrogen	Vol. %	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Sulfur in fuel at 68 °F, 14.7 psia	gr/100 scf	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Siemens Emissions Data - Plant Conditions

Gross Fuel Heating Value (HHV)	Btu/lb	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079	23,079
Ambient Dry Bulb Temperature	°F	50	50	20	20	20	0	0	0	59	54
Ambient Relative Humidity	%	50	50	50	50	50	25	25	25	60	50
Barometric Pressure	psia	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69
GT Fuel Flow (Single Unit)	lb/hr	79,574	60,303	100,192	79,526	60,421	99,644	79,579	60,567	101,133	102,716
DB Fuel Flow (Single Unit)	lb/hr										

Siemens Emissions Data - Exhaust Gas Composition (Single Unit)

Exhaust Flow	lb/hr	3,649,610	2,918,529	4,647,905	3,635,293	2,915,220	4,580,762	3,624,494	2,912,186	4,790,091	4,861,203
Exhaust Temperature	°F	197	188	215	196	190	214	196	190	218	219
Oxygen	Vol. %	12.55	13.05	12.64	12.60	13.11	12.59	12.59	13.10	12.66	12.71
Carbon Dioxide	Vol. %	3.78	3.55	3.78	3.80	3.57	3.81	3.81	3.58	3.69	3.70
Water	Vol. %	8.05	7.60	7.63	7.67	7.21	7.57	7.57	7.11	8.27	7.98
Nitrogen	Vol. %	74.74	74.92	75.07	75.06	75.23	75.15	75.15	75.33	74.51	74.73
Argon	Vol. %	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.87	0.88
Molecular Weight	lb/lbmol	28.42	28.44	28.46	28.46	28.49	28.47	28.47	28.50	28.38	28.42

Siemens Emissions Data - Exhaust Stack Emissions

NOx	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2
NH3	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2
CO	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2
VOC (as CH4)	ppmvd @ 15% O2	1	1	1	1	1	1	1	1	1	1
Particulates (front and back half)	lb/hr	9	8	12	9	8	11	9	8	12	12

Appendix C-2a

GE Energy 107FA.05 Rapid Response Combined Cycle Plant - Manufacturer's Emissions Data - Natural Gas

GE Energy Performance Data - Site Conditions

Operating Point		1	2	3	4	5	6	7	8	9	10	11	12	13
Case Description		Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	10% DB firing	100% DB firing	Unfired
Ambient Temperature	°F	0	0	0	20	20	20	50	50	50	90	90	90	90
Ambient Pressure	psia	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Ambient Relative Humidity	%	60	60	60	60	60	60	60	60	60	60	60	60	60

GE Energy Performance Data - Plant Status

HRSG Duct Burner (On/Off)		Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Unfired	Fired	Fired	Unfired
Evaporative Cooler state (On/Off)		Off	Off	Off	Off	Off	Off	Off	Off	Off	On	On	On	Off
Gas Turbine Load	%	BASE	75%	50%	BASE	75%	46%	BASE	75%	46%	BASE	BASE	BASE	BASE
Gas Turbines Operating		1	1	1	1	1	1	1	1	1	1	1	1	1

GE Energy Performance Data - Fuel Data

HHV	Btu/lb	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6
Fuel Mol. Wt.	lb/mole	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247
Fuel Sulfur Content	ppmw	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
GT Heat Consumption	MMbtu/hr, HHV	2300	1850	1460	2250	1790	1360	2130	1700	1310	2040	2040	2040	1980
Duct Burner Heat Consumption	MMbtu/hr, HHV	0	0	0	0	0	0	0	0	0	0	37.7	377	0

GE Energy Performance Data - HRSG Exit Exhaust Gas

Composition:														
Ar	mol %	0.8900	0.8900	0.8901	0.8900	0.8901	0.8900	0.8900	0.8899	0.8900	0.8699	0.8693	0.8639	0.8700
CO2	mol %	3.8900	3.8200	3.8004	3.8900	3.8104	3.8000	3.8900	3.8796	3.6700	3.8096	3.8768	4.4769	3.7800
H2O	mol %	7.6200	7.4700	7.4307	7.7500	7.5908	7.5500	8.2400	8.2092	7.8000	10.4790	10.6080	11.7612	10.0700
N2	mol %	75.0700	75.1300	75.1475	74.9700	75.0375	75.0500	74.5800	74.5925	74.7500	72.7727	72.7229	72.2776	73.0700
O2	mol %	12.5300	12.6900	12.7313	12.5000	12.6713	12.7100	12.4000	12.4288	12.8900	12.0688	11.9230	10.6204	12.2100
Exhaust Gas Molecular Wt	lb/mole	28.4797	28.4898	28.4923	28.4655	28.4755	28.4794	28.4125	28.415	28.4408	28.1602	28.1522	28.0803	28.2020
Temperature	°F	194.5	186.5	175.0	190.1	183.4	175.0	187.4	177.1	175.0	215.0	208.6	198.8	212.0
Mass Flow	lb/hr	4,490,000	3,680,000	2,930,000	4,390,000	3,560,000	2,730,000	4,150,000	3,320,000	2,730,000	4,030,000	4,030,000	4,050,000	3,940,000

GE Energy Performance Data - HRSG Exit Exhaust Gas Emissions

NOx	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2	2	2
VOC	ppmvd @ 15% O2	1	1	1	1	1	1	1	1	1	1	2	2	1
NH3	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2	2	2
Particulates - Filterable + Condensible, Including Sulfates	lb/hr	12.2	11.7	11.2	12.1	11.6	11.1	12.0	11.4	11.0	11.9	15.7	16.1	11.8

Appendix C-2b

GE Energy 107FA.05 Rapid Response Combined Cycle Plant - Manufacturer's Emissions Data - Natural Gas

GE Energy Performance Data - Site Conditions

Operating Point		14	15	16	17	18	19	20	21	22	23	24	25
Case Description		10% DB firing	100% DB firing	Unfired	Unfired	Unfired	10% DB firing	100% DB firing	Unfired	10% DB firing	100% DB firing	Unfired	Unfired
Ambient Temperature	°F	90	90	90	90	105	105	105	105	105	105	105	105
Ambient Pressure	psia	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Ambient Relative Humidity	%	60	60	60	60	50	50	50	50	50	50	50	50

GE Energy Performance Data - Plant Status

HRSG Duct Burner (On/Off)		Fired	Fired	Unfired	Unfired	Unfired	Fired	Fired	Unfired	Fired	Fired	Unfired	Unfired
Evaporative Cooler state (On/Off)		Off	Off	Off	Off	On	On	On	Off	Off	Off	Off	Off
Gas Turbine Load	%	BASE	BASE	75%	47%	BASE	BASE	BASE	BASE	BASE	BASE	75%	49%
Gas Turbines Operating		1	1	1	1	1	1	1	1	1	1	1	1

GE Energy Performance Data - Fuel Data

HHV	Btu/lb	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6	22,923.6
Fuel Mol. Wt.	lb/mole	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247	16.8247
Fuel Sulfur Content	ppmw	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
GT Heat Consumption	MMbtu/hr, HHV	1980	1980	1590	1260	1990	1990	1990	1880	1880	1880	1520	1240
Duct Burner Heat Consumption	MMbtu/hr, HHV	37.7	377	0	0	0	37.7	377	0	37.7	377	0	0

GE Energy Performance Data - HRSG Exit Exhaust Gas

Composition:													
Ar	mol %	0.8694	0.8639	0.8700	0.8700	0.8600	0.8594	0.8539	0.8601	0.8595	0.8538	0.8600	0.8601
CO2	mol %	3.8488	4.4638	3.9100	3.5400	3.8000	3.8688	4.4834	3.7504	3.8220	4.4623	3.8500	3.4703
H2O	mol %	10.2025	11.3865	10.3200	9.6000	11.4900	11.6214	12.7960	10.8911	11.0284	12.2552	11.0600	10.3510
N2	mol %	73.0187	72.5607	72.9700	73.2500	71.9800	71.9295	71.4786	72.4172	72.3644	71.8920	72.3500	72.6273
O2	mol %	12.0606	10.7252	11.9300	12.7400	11.8700	11.7209	10.3881	12.0812	11.9257	10.5368	11.8800	12.6913
Exhaust Gas Molecular Wt	lb/mole	28.1937	28.1198	28.1866	28.2317	28.0485	28.0403	27.9674	28.1088	28.1003	28.0240	28.0999	28.1424
Temperature	°F	205.6	196.9	189.4	184.7	223.9	218.1	209.3	219.0	213.2	206.2	199.1	196.0
Mass Flow	lb/hr	3,940,000	3,960,000	3,060,000	2,680,000	3,920,000	3,920,000	3,940,000	3,770,000	3,770,000	3,790,000	2,970,000	2,680,000

GE Energy Performance Data - HRSG Exit Exhaust Gas Emissions

NOx	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2	2
CO	ppmvd @ 15% O2	2	2	2	2	2	2	2	1	2	2	1	1
VOC	ppmvd @ 15% O2	2	2	1	1	1	2	2	2	2	2	2	2
NH3	ppmvd @ 15% O2	2	2	2	2	2	2	2	2	2	2	2	2
Particulates - Filterable + Condensible, Including Sulfates	lb/hr	15.6	16.0	11.3	10.9	11.8	15.6	16.0	11.7	15.5	15.9	11.2	10.9

Appendix C-3

Siemens SCC6-5000F(5) 1x1 Flex-Plant 30
Manufacturer's Emissions Data - Natural Gas - Startup and Shutdown Conditions - Single Unit Basis

Mode	Time (min)	Total Pounds per Event					
		NOX	CO	VOC	SO2	PM	Fuel Use
Cold Startup (GT Ignition to Emissions Compliance @ 60% GT Load)	45	83	327	104	1.1	6.4	30,980
Warm Startup (GT Ignition to Emissions Compliance @ 60% GT Load)	45	79	230	89	1.1	6	31,145
Hot Startup (GT Ignition to Emissions Compliance @ 60% GT Load)	35	58	172	66	0.9	5.1	24,613
Shutdown (70% GT Load to Fuel Cut Off)	10	20	61	24	0.2	1.8	6,865

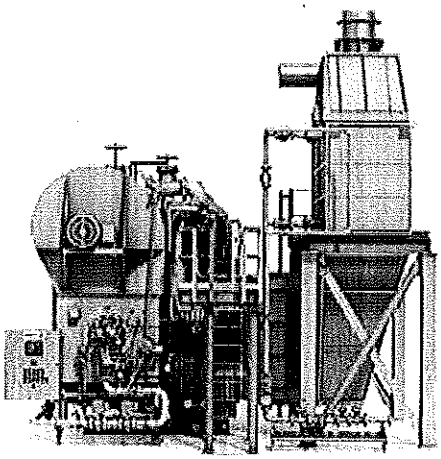
Appendix C-4

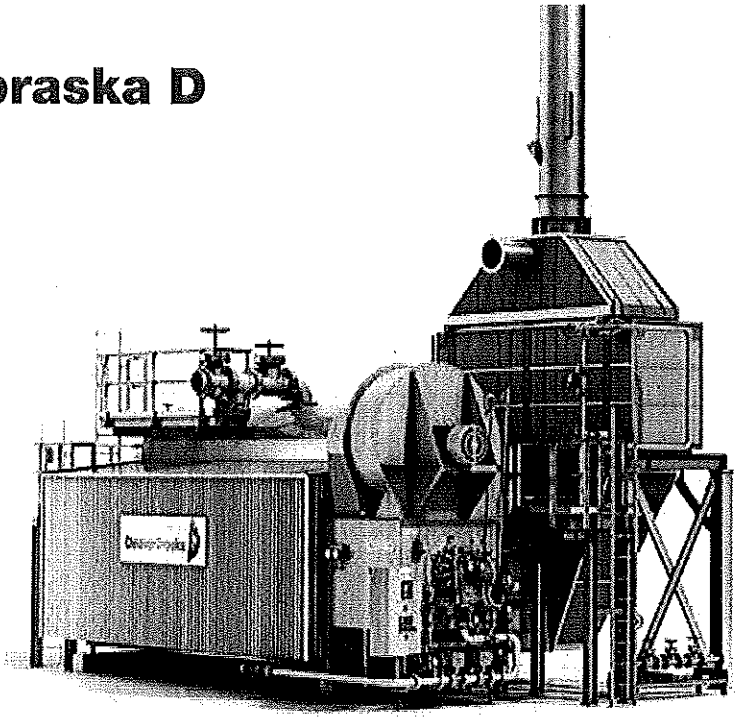
GE Energy 107FA.05 Rapid Response Combined Cycle Plant
Manufacturer's Emissions Data - Natural Gas - Startup and Shutdown Conditions - Single Unit Basis

	NOx (lb)	CO (lb)	VOC (lb)	PM10 (lb)	Duration (min)
Cold Start (GT Fire to HRSG Stack Emissions Compliance with Base Load Hold)	88	491	35	7.3	45
Warm Start (GT Fire to HRSG Stack Emissions Compliance with Base Load Hold)	45	260	20	5.0	30
Hot Start (GT Fire to HRSG Stack Emissions Compliance with Base Load Hold)	26	250	19	2.6	15
Shutdown (HRSG Stack EC to GT Flame Off)	60	530	46	5.8	30

CleaverBrooks

Cleaver-Brooks Nebraska D
Steam-Ready 300D Series





Capacities and Specifications

Boiler Dimensions	CBND-70E-300D-55	CBND-80E-300D-65	CBND-90E-300D-70
Capacity	70,000 lb/h	80,000 lb/h	90,000 lb/h
Upper Drum	42 in	42 in	42 in
Lower Drum	24 in	24 in	24 In
Length Over Casing	20 ft	23 ft 4 in	25 ft
Width, Gas Outlet	36 3/4 In	40 1/2 In	44 3/4 In
Height, Gas Outlet	88 1/2 in	88 1/2 in	88 1/2 In
Front to CL Gas Outlet	24 5/8 In	26 5/8 In	28 5/8 In
Shipping Height	14 ft 6 in	14 ft 6 in	14 ft 6 in
Overall Width	11 ft 5 in	11 ft 5 in	11 ft 5 In
Min Operating Pressure	100 psig	100 psig	100 psig

Economizer

E3 Economizers	CBND-70E-300D-55	CBND-80E-300D-65	CBND-90E-300D-70
Fin Height	0.75 in	0.75 in	0.75 in
Transverse Pitch	4.5 in	4.5 in	4.5 in
Longitudinal Pitch	4.5 in	4.5 in	4.5 in
Segment	0.172 in	0.172 in	0.172 in
Fin Thickness	0.05 in	0.05 in	0.05 in
Effective Length	12 ft	12 ft	12 ft
Material	Carbon Steel	Carbon Steel	Carbon Steel
Fins	Serrated	Serrated	Serrated
Bends	Cold Bent	Cold Bent	Cold Bent
Fuel	NG & #2 oil	NG & #2 oil	NG & #2 oil
Economizer Trim			
Economizer feedwater bypass	2.5 in	3 in	3 in
Header vent valve	1 in	1 in	1 in
Header drain valve	1 in	1 in	1 in

STANDARD EQUIPMENT ALSO INCLUDED

Temperature gauges – feedwater inlet/outlet

Temperature thermowell – feedwater inlet/outlet

Temperature gauges – flue gas inlet/outlet

Temperature thermowell – flue gas inlet/outlet

Standard Features

	CBND-70E-300D-55 (Capacity 70,000 lb/h)	CBND-80E-300D-65 (Capacity 80,000 lb/h)	CBND-90E-300D-70 (Capacity 90,000 lb/h)
Pressure Vessel			
Design Pressure 250	•	•	•
Tubes 2 in 178-A.105 Wall	•	•	•
Steam Quality 0.5% Moist	•	•	•
RH - Right Hand	•	•	•
LH - Left Hand	•	•	•
AL - Aluminum Casing	•	•	•
Operating Pressure - 100–200 psig	•	•	•
Auxiliary Equipment			
Steam Trim	•	•	•
Feedwater Trim	•	•	•
Boiler Platform Clips	•	•	•
Economizer	•	•	•
Stack - 40 ft, 50 ft, 60 ft	◊	◊	◊
Controls			
Hawk 5000 Control	•	•	•
Single Point (SP)	•	•	•
Feedwater - Single Element	•	•	•
Burner			
NATCOM NXT (See NXT Burner technical data sheet for detailed information)	•	•	•

Optional Features

	CBND-70E-300D-55 (Capacity 70,000 lb/h)	CBND-80E-300D-65 (Capacity 80,000 lb/h)	CBND-90E-300D-70 (Capacity 90,000 lb/h)
Pressure Vessel			
Design Pressure up to 375 psig	•	•	•
Hinged Manways	•	•	•
Lower Drum Heating Coil (LDHC)	•	•	•
Tubes 2 in 178-A.120 Wall-PV	•	•	•
Tubes 2 in 178-A.135 Wall-PV	•	•	•
Operating Pressure - 200–325 psig	•	•	•
Auxiliary Equipment			
Platforms & Ladders - Boiler	•	•	•
Platforms & Ladders - Stack	◊	◊	◊
Platform & Ladder - Economizer	◊	◊	◊
Sootblowers	•	•	•
Variable Frequency Drive	•	•	•
Selective Catalytic Reduction	◊	◊	◊
Controls			
Parallel Positioning (PP)	•	•	•
Fully Metered (FM)	•	•	•
Eye-Hye® Remote Drum Level Transmitter	•	•	•
Feedwater 2- or 3-Element	•	•	•
O_2 Trim	•	•	•
O_2 Analyzer	•	•	•

◊ *Contact us for details.*

Power Generation

Exhaust Emission Data Sheet
750DQFAA
60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc. QST30-G5 NR2	Bore:	5.51 in. (139 mm)
Type:	4 Cycle, 50°V, 12 Cylinder Diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and Low Temperature aftercooled	Displacement:	1860 cu. in. (30.4 liters)
Compression Ratio:	14.7:1		
Emission Control Device:	Aftercooled (Air-to-Air)		

	1/4	1/2	3/4	Full	Full	
PERFORMANCE DATA	**Standby**	**Standby**	**Standby**	**Standby**	**Prime**	
BHP @ 1800 RPM (60 Hz)	276	551	827	1102	999	
Fuel Consumption (gal/Hr)	14.8	27.1	39.8	52.7	47.9	
Exhaust Gas Flow (CFM)	2350	3620	4930	6310	5880	
Exhaust Gas Temperature (°F)	553	686	770	816	798	
EXHAUST EMISSION DATA						
HC (Total Unburned Hydrocarbons)	0.22	0.11	0.10	0.09	0.09	
NOx (Oxides of Nitrogen as NO2)	5.81	4.50	3.83	3.97	3.88	
CO (carbon Monoxide)	1.38	0.48	0.37	0.46	0.43	
PM (Particular Matter)	0.19	0.17	0.14	0.12	0.13	
SO2 (Sulfur Dioxide)	0.12	0.11	0.10	0.10	0.10	
Smoke (Bosch)	0.65	0.84	0.79	0.79	0.80	

All Values are Grams/HP-Hour, Smoke is Bosch #

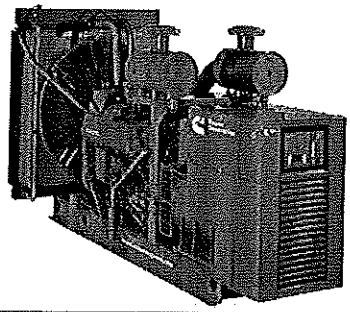
TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

Diesel generator set
QST30 series engine



> Specification sheet
680 kW - 1000 kW 60 Hz

Our energy working for you.™

Cummins Power Generation

Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications. Codes or standards compliance may not be available with all model configurations – consult factory for availability.

ISO 9001 — This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.

The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.

All low voltage models are CSA certified to product class 4215-01.

The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.

U.S. EPA — Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.

Features

Cummins® heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating		Prime rating		Continuous rating		Data sheets	
Model	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DQFAA	750 (938)		680 (850)				D-3329	
DQFAB	800 (1000)		725 (907)				D-3330	
DQFAC	900 (1125)		818 (1023)				D-3331	
DQFAD	1000 (1250)		900 (1125)				D-3332	

S-1508h (6/11)

Generator set specifications

Governor regulation class	ISO8328 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5; MIL STD 461C, Part 9

Engine specifications

Bore	140 mm (5.51 in)
Stroke	165.0 mm (6.5 in)
Displacement	30.5 litres (1860 in^3)
Configuration	Cast Iron, V 12 cylinder
Battery capacity	1800 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	150 °C standby at 40 °C
Exciter type	PMG (permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Available voltages

60 Hz line-neutral/line-line				50 Hz line-neutral/line-line			
• 120/208	• 220/380	• 240/416	• 347/600				
• 139/240	• 230/400	• 277/480					

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- ☐ 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)

Control panel
- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Paralleling configuration
- ☐ Remote fault signal package
- ☐ Run relay package

Alternator
- ☐ 80 °C rise
- ☐ 105 °C rise
- ☐ 125 °C rise
- ☐ 120/240 V 300 W, anti-condensation heater
- ☐ Temperature sensor - RTDs, 2/phase
- ☐ Temperature sensor – alternator bearing RTD
- ☐ Differential current transformers

Exhaust system
- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer
- ☐ Critical grade exhaust silencer

Cooling system
- ☐ Remote radiator

Generator set
- ☐ AC entrance box
- ☐ Battery
- ☐ Battery rack with hold-down - floor standing
- ☐ Circuit breaker - set mounted
- ☐ Disconnect switch - set mounted
- ☐ PowerCommand Network
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ 2 year warranty
- ☐ 5 year warranty
- ☐ 10 year major components warranty

* Note: Some options may not be available on all models - consult factory for availability.

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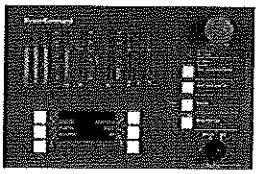
www.cummnspower.com

S-1508h (6/11)

Power Generation

Control system PCC 3201



PowerCommand control is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.
- Optional Echelon® LONWORKS® network interface.

Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Exercise switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating not in auto, common warning, common shutdown, remote start
- Configurable for local language

Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature
- Engine speed
- Engine ECM data

AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down

Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA
- Bus voltage and frequency (with paralleling options)

Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (accessible with InPower)

Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode

Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Single and three phase fault regulation
- Configurable torque matching

Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

Options

- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)
- ☐ Paralleling
- ☐ Power transfer control

For further detail see document S-1444.

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www.cumminspower.com

S-1508h (6/11)

Power Generation

Ratings definitions

Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-time running power (LTP):

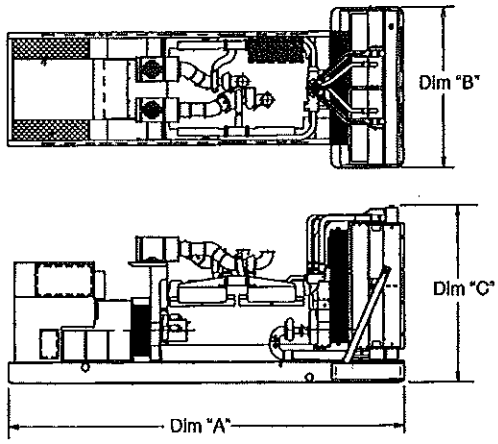
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQFAA	4338 (170.7)	2000 (79)	2353 (93)	6673 (14707)	6971 (15363)
DQFAB	4338 (170.7)	2000 (79)	2353 (93)	6696 (15199)	7194 (15855)
DQFAC	4338 (170.7)	2000 (79)	2353 (93)	7375 (16254)	7672 (16910)
DQFAD	4338 (170.7)	2000 (79)	2353 (93)	7633 (16824)	7931 (17480)

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Telephone: 763 574 5000
Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

Our energy working for you.™

www.cumminspower.com

S-1508h (6/11)

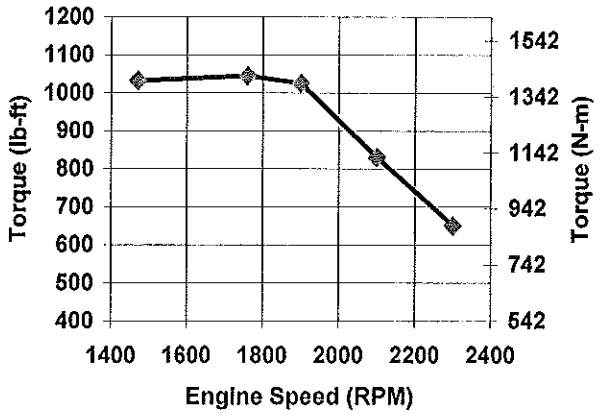
Power Generation

Fire Power	Engine Performance Curve	Basic Engine Model
	Cummins Fire Power	CFP9E-F50
	De Pere, WI 54115	Curve Number: FR - 91518
	http://www.cumminsfirepower.com	Revision Date: July 2010

Engine Family:	Industrial	CPL Code:	8641
Displacement - in.3 (litre):	543 (8.9)	Emission Certification:	EPA/CARB Tier 3
Compression Ratio:	17.8:1	Aspiration:	Turbocharged, Chrg Air Cooled
No. of Cylinders:	6	Engine Configuration:	D563004CX03
Fuel System:	CCR	Minimum rating:	285 HP @ 2300 RPM
		Maximum rating:	371 HP @ 1900 RPM

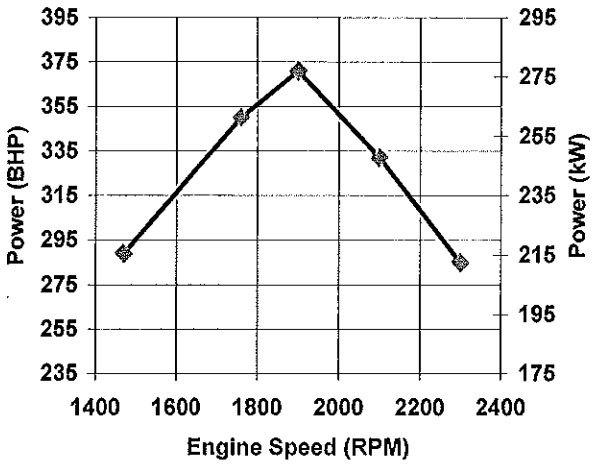
Torque Output

RPM	lb-ft	N-m
1470	1033	1400
1760	1044	1416
1900	1026	1390
2100	830	1126
2300	651	882



Horsepower Output

RPM	BHP	kW
1470	289	216
1760	350	261
1900	371	277
2100	332	248
2300	285	213



1. Curves shown above represent mature gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions of 29.61 in Hg (100 kPa) barometric pressure [300 ft. (91.4 m) altitude], 77 °F (25 °C) inlet air temperature, and 0.30 in. Hg (1 kPa) water vapor pressure with No. 2 diesel fuel.

2. The engine may be operated without changing the fuel setting up to 300 ft. (91.4 m) altitude and up to 77°F (25 °C) ambient temperature. For sustained operation at high altitudes, the fuel rate of the engine should be adjusted to limit performance by 3% per 1,000 ft. (305 m) above 300 ft. (91.4 m) altitude. For sustained operation at high ambient temperatures, the fuel rate of the engine should be adjusted to limit performance by 1% per 10 °F above 77 °F (2% per 11 °C above 25 °C).

3. Engine is certified at any speed between 1470 and 2300 RPM.

Jim Vanden Boogard
Director of Engineering

Certified Within 5%

Fire Power	Engine Data Sheet Cummins Fire Power De Pere, WI 54115 http://www.cumminsfirepower.com	Basic Engine Model CFP9E-F10,F20,F30,F40, F50, F60 Curve Number: FR - 91518 CPL Code: 8641
Configuration Number: D563004CX03 Installation Drawing: 15550		Engine Family: Industrial Revision Date: July 2011

General Engine Data

Type	4 Cycle; In-Line; 6 Cylinder	
Aspiration	Turbocharged, Chrg Air Cooled	
Bore & Stroke - in. (mm)	4.49 x 5.69	(114 x 145)
Displacement - $in.^3$ (litre)	543	(8.9)
Compression Ratio	17.8:1	
Valves per Cylinder - Intake	2	
- Exhaust	2	
Maximum Allowable Bending Moment @ Rear Face of Block - lb.-ft. (N-m)	1000	(1356)

Air Induction System

Max. Temperature Rise Between Ambient Air and Engine Air Inlet - °F (°C)	30	(16.7)
Maximum Inlet Restriction with Dirty Filter - in. H_2O (mm H_2O)	25	(635)
Recommended Air Cleaner Element - (Standard) FLG Industrial	AH19220	

Lubrication System

Oil Pressure Range at Rated - PSI (kPa)	40-60	(276-414)
Oil Capacity of Pan (High - Low) - U.S. quarts (litre)	24-20	
Total System Capacity - U.S. Gal. (litre)	6.5	(24.6)
Recommended Lube Oil Filter Fleetguard (Cummins)	LF9009	(3401544)

Cooling System

Raw Water Working Pressure Range at Heat Exchanger - PSI (kPa)	60	(413) MAX
Recommended Min. Water Supply Pipe Size to Heat Exchanger - in. (mm)	1	(25.40)
Recommended Min. Water Disch. Pipe Size From Heat Exchanger - in. (mm)	1.25	(31.75)
Coolant Water Capacity (Engine Side) - U.S. gal. (litre)	2.9	(11.0)
Standard Thermostat - Type	Modulating	
- Range - deg F (deg C)	180-199	(82-93)
Minimum Raw Water Flow		
with Water Temperatures to 50 °F (10 °C) - U.S. GPM (litre/s)	20	(1.26)
with Water Temperatures to 75 °F (24 °C) - U.S. GPM (litre/s)	25	(1.58)
with Water Temperatures to 90 °F (32 °C) - U.S. GPM (litre/s)	30	(1.89)
Recommended Cooling Water Filter Fleetguard (Cummins)	WF2074	-3100307

A jacket water heater is mandatory on this engine. The recommended heater wattage is 2250 down to 40 °F (4 °C).

Exhaust System

Max. Back Pressure Imposed by Complete Exhaust System in in. H_2O (kPa)	40.8	(10.2)
Exhaust Pipe Size Normally Acceptable - in. (mm)	5.0	(127)

Noise Emissions

Top	97.2 dBa
Right Side	97.2 dBa
Left Side	97.2 dBa
Front	97.2 dBa
Exhaust	119.5 dBa

The noise emission values are estimated sound pressure levels at 3.3 ft. (1 m.).

Fuel Supply / Drain System

Fuel Consumption	1470	1760	1900	2100	2300
CFP9E-F60 Gal/hr (L/hr)	15.8 (59.7)	18.6 (70.2)	20.2 (76.3)	18.6 (70.4)	16.3 (61.6)
CFP9E-F50 Gal/hr (L/hr)	14.9 (56.5)	18.1 (68.5)	19.2 (72.8)	17.4 (65.8)	15.3 (57.7)
CFP9E-F40 Gal/hr (L/hr)	14.0 (53.0)	16.9 (64.0)	18.0 (68.1)	16.3 (61.7)	14.3 (54.1)
CFP9E-F30 Gal/hr (L/hr)	13.0 (49.3)	15.8 (59.7)	16.7 (63.4)	15.1 (50.2)	13.3 (50.2)
CFP9E-F20 Gal/hr (L/hr)	12.0 (45.6)	14.6 (55.2)	15.5 (58.7)	14.0 (53.2)	12.3 (46.6)
CFP9E-F10 Gal/hr (L/hr)	11.1 (42.1)	13.4 (50.9)	11.3 (54.0)	12.9 (48.8)	11.3 (43.0)

Fuel Type	Number 2 Diesel Only	
Minimum Supply Line Size - in. (mm)	0.5	(12.70)
Minimum Drain Line Size - in. (mm)	0.375	(9.53)
Maximum Fuel Height above C/L Fire Pump ft (m)	20	(6)
Recommended Fuel Filter - Primary ... Fleetguard (Cummins)	FF5580	(3976312)
- Secondary	TBD	
Maximum Restriction @ Lift Pump-Inlet - With Clean Filter.- in. Hg (mm Hg)	6.0	(152)
Maximum Restriction @ Lift Pump-Inlet - With Dirty Filter - in. Hg (mm Hg)	10.0	(254)
Maximum Return Line Restriction - Without Check Valves - in. Hg (mm Hg)	20.4	(518)
Minimum Fuel Tank Vent Capability - ft^3/hr (m^3/hr)	7	(0.21)
Maximum Fuel Temperature @ Lift Pump Inlet - °F (°C)	160	(71)

Starting and Electrical System

	12V	24V
Min. Recommended Batt. Capacity - Cold Soak at 0°F (-18°C) or Above		
Engine Only - Cold Cranking Amperes - (CCA)	1500	900
Engine Only - Reserve Capacity - Minutes	430	430
Battery Cable Size (Maximum Cable Length Not to Exceed 5 ft. [1.5 m] AWG)	00	00
Maximum Resistance of Starting Circuit - Ohms	0.002	0.002
Typical Cranking Speed - RPM	130	130
Alternator (Standard), Internally Regulated - Ampere	95	45
Wiring for Automatic Starting (Negative Ground)	Standard	
Reference Wiring Diagram	16260	

Performance Data

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment, and driven components. Data is based on operation at SAE standard J1394 conditions of 300 ft. (91.4 m) altitude, 29.61 in. (752 mm) Hg dry barometer, and 77 °F (25 °C) intake air temperature, using No.2 diesel or a fuel corresponding to ASTM-D2.

Altitude Above Which Output Should be Limited - ft. (m)	300	(91.4)
Correction Factor per 1000 ft. (305 m) above Altitude Limit	3%	
Temperature Above Which Output Should be Limited - °F (°C)	77	(25)
Correction Factor per 10 °F (11 °C) Above Temperature Limit	1%	(2%)

Exhaust Emissions (EPA Tier T3) [Reference Emissions Data Doc. 9814]	g/kW-hr	g/BHP-hr
Hydrocarbons (HC/OMHCE)	0.250	0.19
Oxides of Nitrogen (NOx)	3.550	2.65
Non-Methane Hydrocarbons + NOx (NMHC+NOx)	3.800	2.83
Carbon Monoxide (CO)	3.20	2.39
Particulate	0.16	0.12

FM Approved and UL Listed Ratings for CFP9E-F10, F20, F30, F40, F50, F60

Engine Speed - RPM	1470	1760	1900	2100	2300
CFP9E-F60 Output - BHP (kW)	**305 (227)**	**359 (268)**	**389 (290)**	**355 (265)**	**304 (227)**
Ventilation Air CFM (litre/sec) ...	580 (274)	723 (341)	738 (348)	788 (372)	827 (391)
Exhaust Flow - CFM (litre/sec) ..	1615 (762)	2041 (963)	2077 (980)	2133 (1,007)	2090 (986)
Exhaust Temp.- °F (°C)	1074 (579)	1049 (565)	1106 (597)	1077 (581)	991 (533)
Heat Rejection					
To Coolant BTU/min. (kW)	4810 (85)	6517 (115)	6705 (118)	6690 (118)	6155 (108)
To Ambient BTU/min (kW)	1223 (21)	1302 (23)	1350 (24)	1305 (23)	1279 (22)
CFP9E-F50 Output - BHP (kW)	**289 (216)**	**350 (261)**	**371 (277)**	**332 (248)**	**285 (213)**
Ventilation Air CFM (litre/sec) ...	584 (276)	686 (324)	736 (347)	785 (371)	824 (389)
Exhaust Flow - CFM (litre/sec) ..	1621 (765)	1918 (905)	2053 (969)	2107 (995)	2065 (975)
Exhaust Temp.- °F (°C)	1076 (580)	1083 (584)	1097 (592)	1064 (573)	979 (526)
Heat Rejection					
To Coolant BTU/min. (kW)	4849 (85)	6157 (108)	6815 (120)	6530 (115)	6008 (106)
To Ambient BTU/min (kW)	1186 (21)	1263 (22)	1310 (23)	1266 (22)	1241 (22)
CFP9E-F40 Output - BHP (kW)	**271 (202)**	**327 (244)**	**347 (259)**	**311 (232)**	**267 (199)**
Ventilation Air CFM (litre/sec) ...	557 (263)	685 (323)	735 (347)	783 (370)	822 (388)
Exhaust Flow - CFM (litre/sec) ..	1584 (748)	1899 (896)	2036 (961)	2084 (984)	2042 (964)
Exhaust Temp.- °F (°C)	1083 (584)	1076 (580)	1088 (587)	1052 (567)	1030 (554)
Heat Rejection					
To Coolant BTU/min. (kW)	4885 (86)	5988 (105)	6386 (112)	6417 (113)	5904 (104)
To Ambient BTU/min (kW)	1151 (20)	1225 (22)	1270 (22)	1228 (22)	1203 (21)
CFP9E-F30 Output - BHP (kW)	**252 (188)**	**305 (227)**	**323 (241)**	**289 (216)**	**248 (185)**
Ventilation Air CFM (litre/sec) ...	558 (263)	681 (321)	727 (343)	781 (369)	820 (387)
Exhaust Flow - CFM (litre/sec) ..	1574 (743)	1863 (879)	1973 (931)	2056 (970)	2015 (951)
Exhaust Temp.- °F (°C)	1075 (579)	1057 (569)	1058 (570)	1037 (558)	954 (512)
Heat Rejection					
To Coolant BTU/min. (kW)	4809 (85)	5807 (102)	6049 (106)	6328 (111)	5822 (102)
To Ambient BTU/min (kW)	1116 (20)	1188 (21)	1232 (22)	1191 (21)	1167 (21)
CFP9E-F20 Output - BHP (kW)	**233 (174)**	**282 (210)**	**299 (223)**	**268 (200)**	**230 (172)**
Ventilation Air CFM (litre/sec) ...	555 (262)	674 (318)	720 (340)	776 (366)	815 (385)
Exhaust Flow - CFM (litre/sec) ..	1527 (721)	1813 (856)	1927 (910)	2019 (953)	1979 (934)
Exhaust Temp.- °F (°C)	1033 (556)	1030 (554)	1036 (558)	1018 (548)	937 (503)
Heat Rejection					
To Coolant BTU/min. (kW)	4486 (79)	5591 (98)	5880 (103)	6189 (109)	5694 (100)
To Ambient BTU/min (kW)	1083 (19)	1153 (20)	1195 (21)	1155 (20)	1132 (20)
CFP9E-F10 Output - BHP (kW)	**215 (160)**	**260 (194)**	**275 (205)**	**246 (183)**	**212 (158)**
Ventilation Air CFM (litre/sec) ...	544 (257)	665 (314)	712 (336)	763 (360)	801 (378)
Exhaust Flow - CFM (litre/sec) ..	1432 (676)	1751 (826)	1872 (884)	1922 (907)	1884 (889)
Exhaust Temp.- °F (°C)	971 (522)	997 (536)	1008 (542)	968 (520)	891 (477)
Heat Rejection					
To Coolant BTU/min. (kW)	4259 (75)	5340 (94)	5679 (100)	5781 (102)	5319 (93)
To Ambient BTU/min (kW)	1050 (18)	1118 (20)	1159 (20)	1121 (20)	1098 (19)

All Data is Subject to Change Without Notice.

Director of Engineering: ***Jim Vanden Boogard***

Cummins Fire Power, De Pere, WI 54115 U.S.A.

Fire Power

EPA Tier 3 Emission Data
Fire Pump NSPS Compliant

CFP9E-F50 Fire Pump Driver

Type: 4 Cycle; In-Line; 6 Cylinder
Aspiration: Turbocharged, Charge Air Cooled

15 PPM Diesel Fuel																
		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	289	14.9	56.4											1076	580	1621	765
1760	350	18.1	68.5											1083	584	1918	905
1900	371	19.2	72.7	0.123	2.200	2.323	1.417	0.118	0.165	2.950	3.116	1.900	0.158	1097	592	2053	969
2100	332	17.4	65.9											1064	573	2107	995
2300	285	15.3	57.9											979	526	2065	975

The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

300-4000 PPM Diesel Fuel																
		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	289	14.9	56.4											1076	580	1621	765
1760	350	18.1	68.5											1083	584	1918	905
1900	371	19.2	72.7	0.149	2.386	2.535	1.417	0.134	0.2	3.200	3.400	1.900	0.180	1097	592	2053	969
2100	332	17.4	65.9											1064	573	2107	995
2300	285	15.3	57.9											979	526	2065	975

QSL9 Base Model Manufactured by Cummins Inc.
- Using fuel rating 91518

Reference EPA Standard Engine Family: ACEXL0540AAB
Reference CARB Executive Order: U-R-002-0521

No special options needed to meet current regulation emissions for all 50 states

Test Methods:

EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A, for Constant Spee Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications:

Cetane Number: 40-48
Reference: ASTM D975 No. 2-D

Reference Conditions:

Air Inlet Temperature: 25°C (77°F)
Fuel Inlet Temperature: 40°C (104°F)
Barometric Pressure: 100 kPa (29.53 in Hg)
Humidity: 10.7 g/kg (75 grains H_2O/lb) of dry air; required for NOx correction

Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

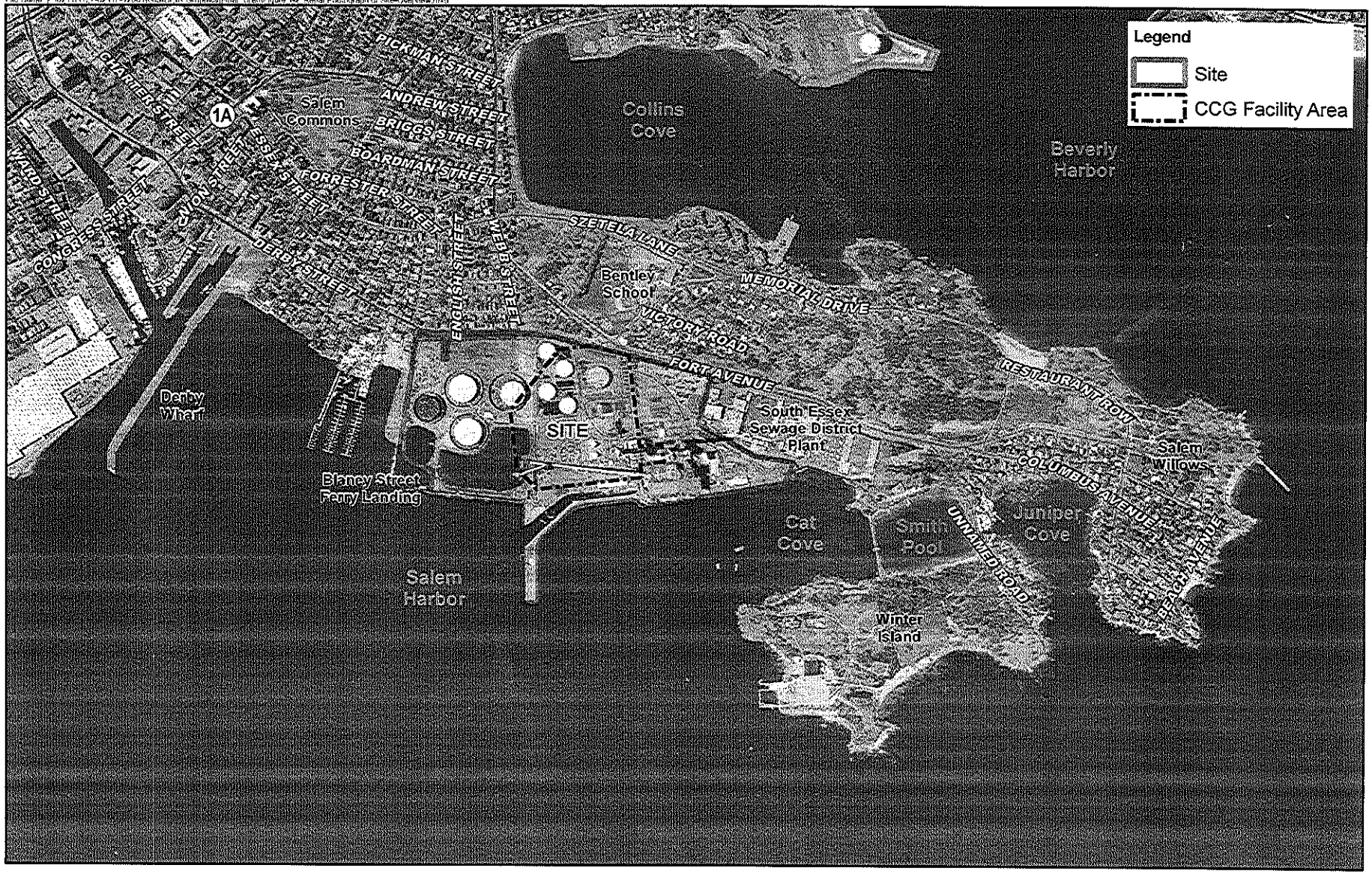
Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Revision Date: 16JUL2010

APPENDIX D

Facility and Site Drawings

Date Printed: 12/13/2012
File Name: P:\62117\27-62117-12001\GIS\DEIR Graphics\Final Draft\Figure 1-2 Aerial Photograph of Site-Overview.mxd



Salem Harbor Station Redevelopment Project
Salem, Massachusetts

TETRA TECH

0 500 1,000
Feet

Base Map:MaGIS
2008 Aerial

Aerial Photograph of Site (Overview)

Date Printed: 12/13/2012
File Name: P:\62117\127-62117-12001\GIS\DEIR Graphics\Final Draft\Figure 1-3 Aerial Photograph of Site-Detail View.mxd

Notes: Proposed SHR Facility Area +/- 20 Acres

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

TETRA TECH

0 200 400
Feet

Base Map:Bing
June 2010 Airphoto

Aerial Photograph of Site
(Detail View)

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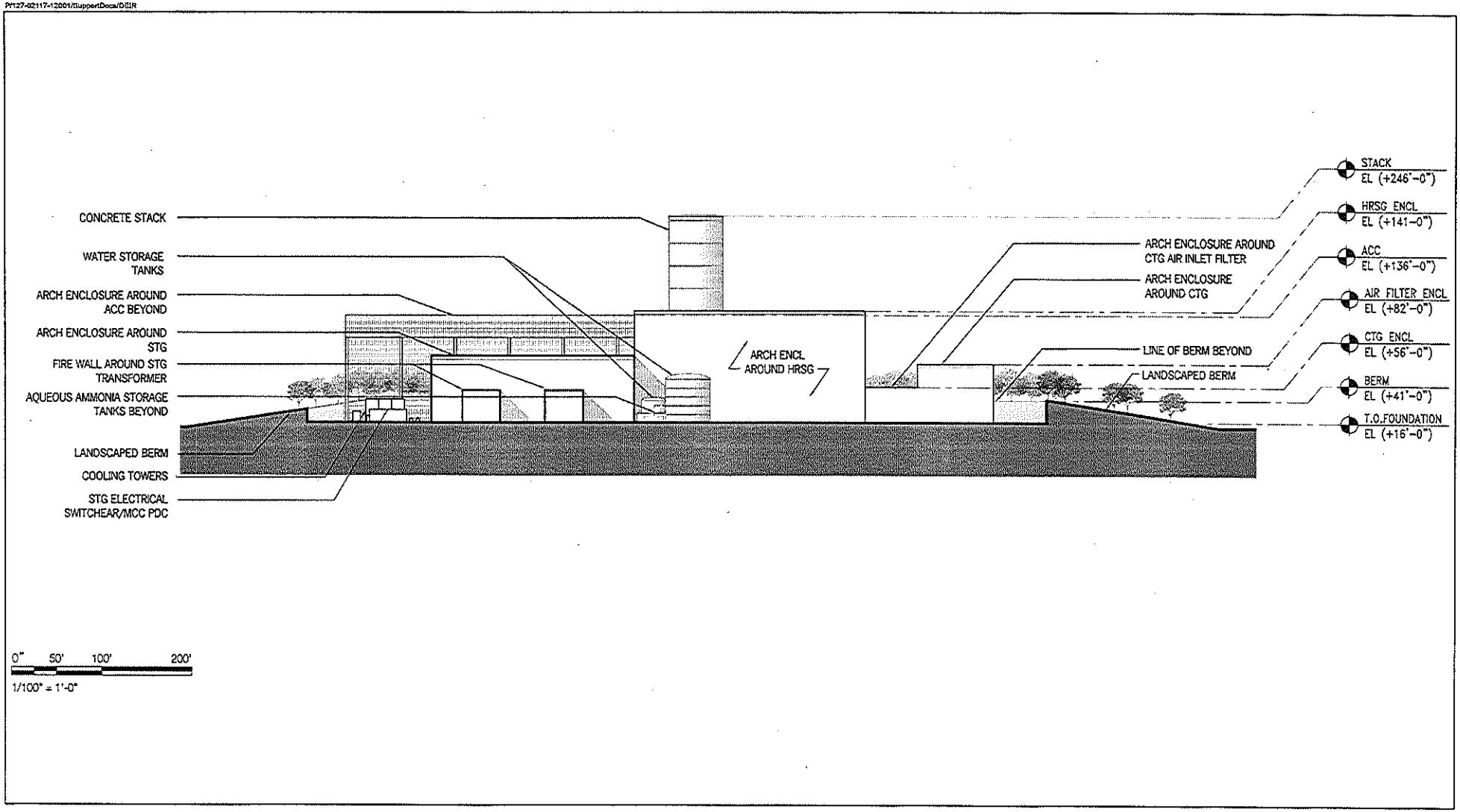


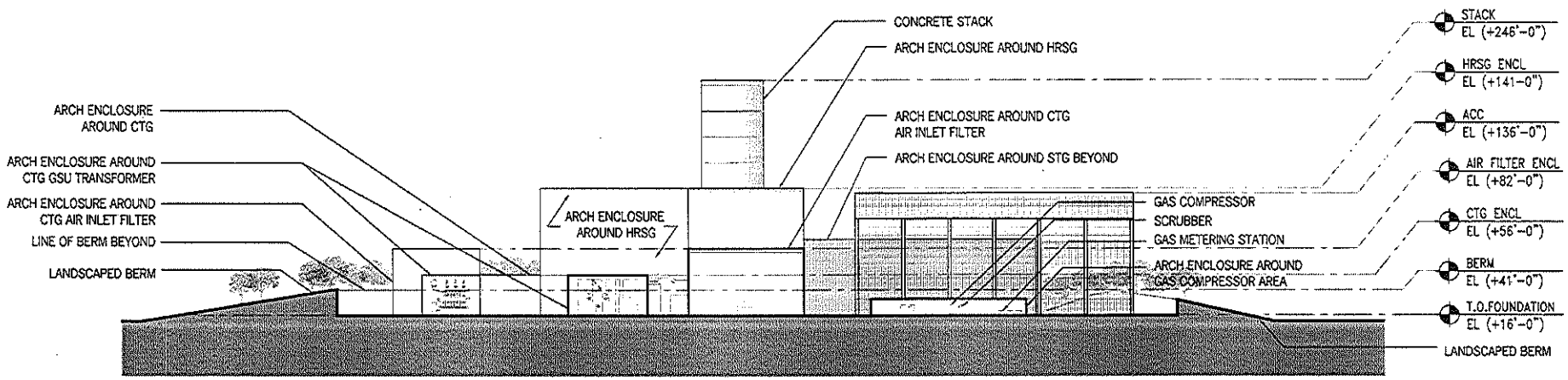
Footprint Power

TETRA TECH

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

SHR Facility
North Elevation

P:\27-62117-12001\SupportDocs\DEIR



0" 50' 100' 200'

1/100" = 1'-0"

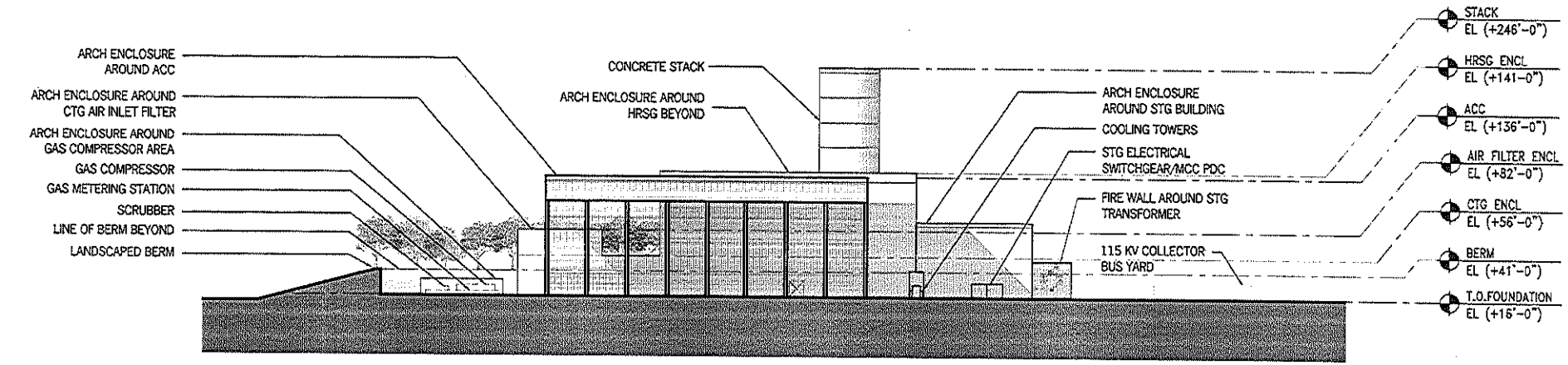
Footprint Power

TETRA TECH

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

SHR Facility
South Elevation

P:\27-62117-12001\SupportDocs\DEIR



0" 50' 100' 200'

1/100" = 1'-0"

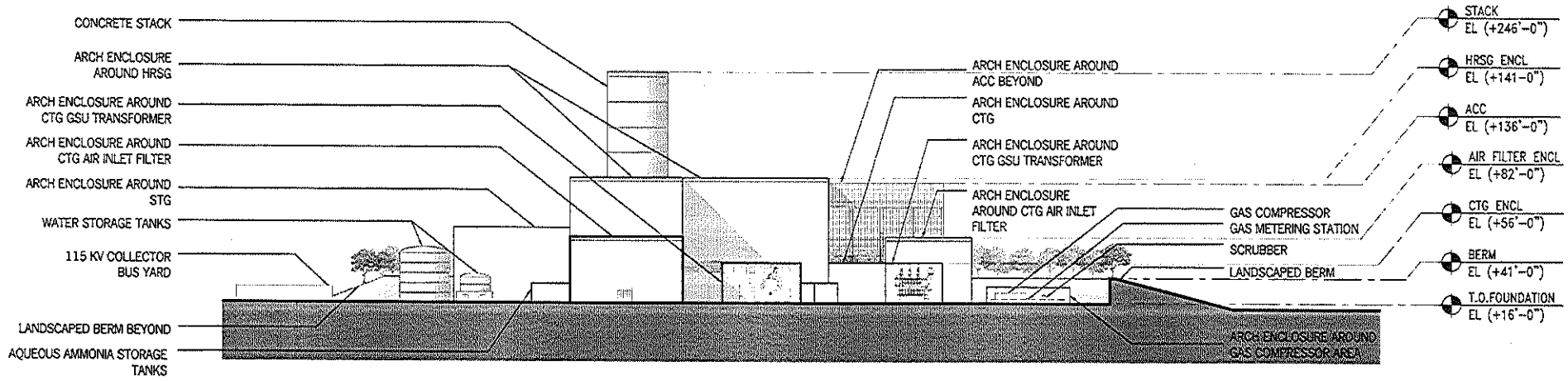
Footprint Power

TETRA TECH

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

SHR Facility
East Elevation

P:\127-62117-12001\SupportDocs\DEIR



0" 50' 100' 200'

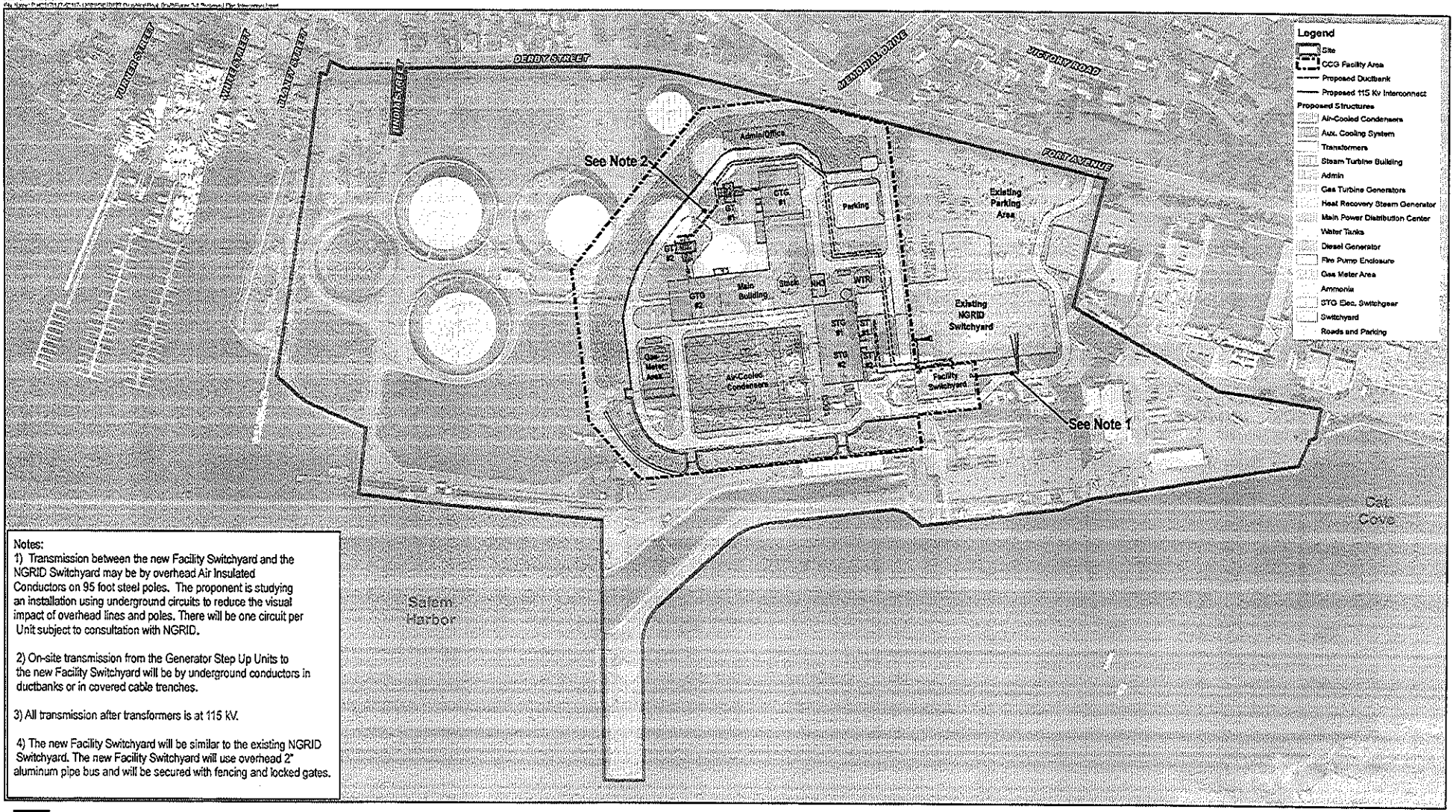
1/100" = 1'-0"

Footprint Power

TETRATECH

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

SHR Facility
West Elevation



Notes:
1) Transmission between the new Facility Switchyard and the NGRID Switchyard may be by overhead Air Insulated Conductors on 95 foot steel poles. The proponent is studying an installation using underground circuits to reduce the visual impact of overhead lines and poles. There will be one circuit per Unit subject to consultation with NGRID.

2) On-site transmission from the Generator Step Up Units to the new Facility Switchyard will be by underground conductors in ductbanks or in covered cable trenches.

3) All transmission after transformers is at 115 kV.

4) The new Facility Switchyard will be similar to the existing NGRID Switchyard. The new Facility Switchyard will use overhead 2" aluminum pipe bus and will be secured with fencing and locked gates.

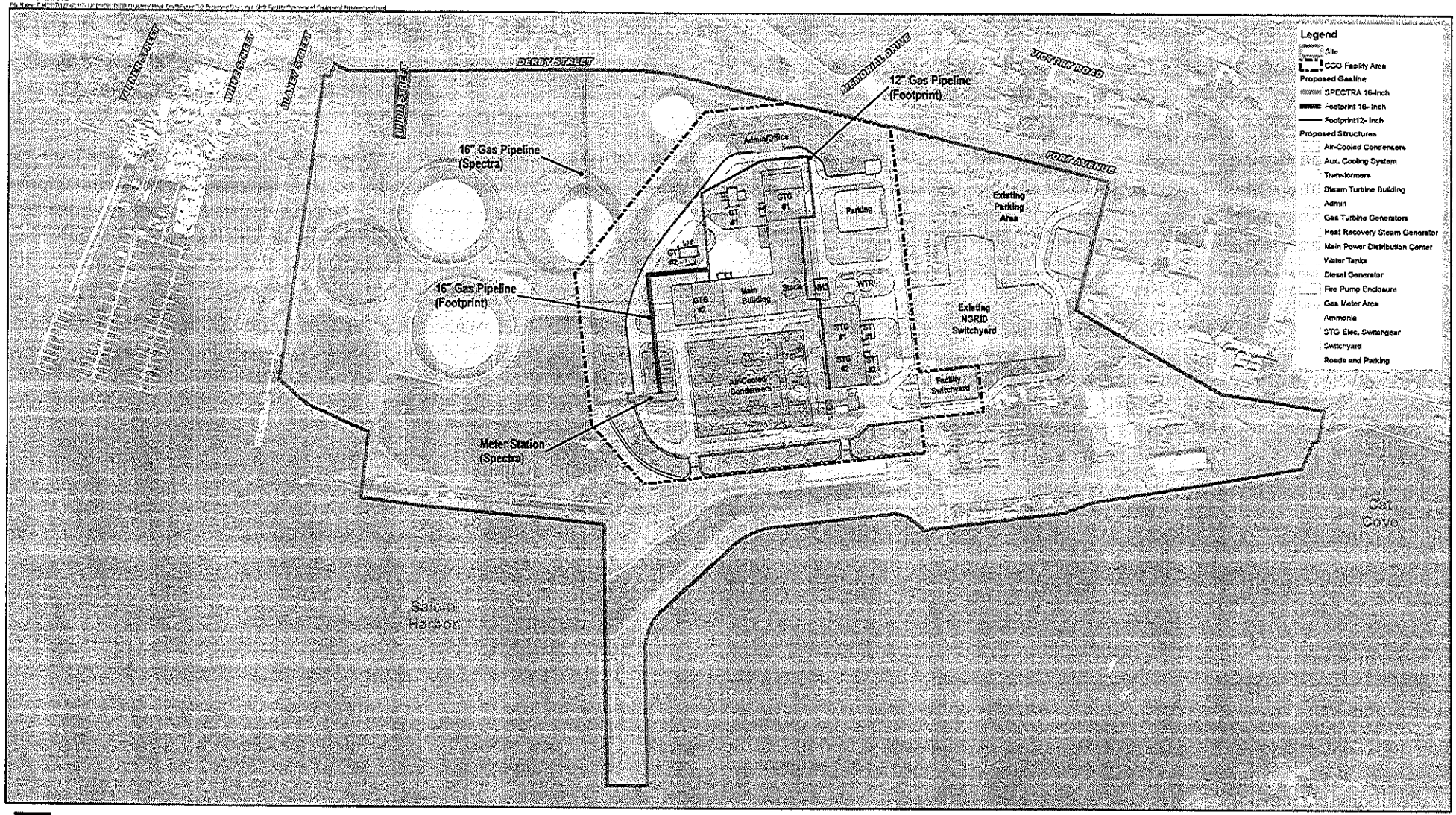
TETRA TECH

0 125 250
Feet

Base Map:Bing
2010 Aerial

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Proposed On-Site
Electric Interconnection



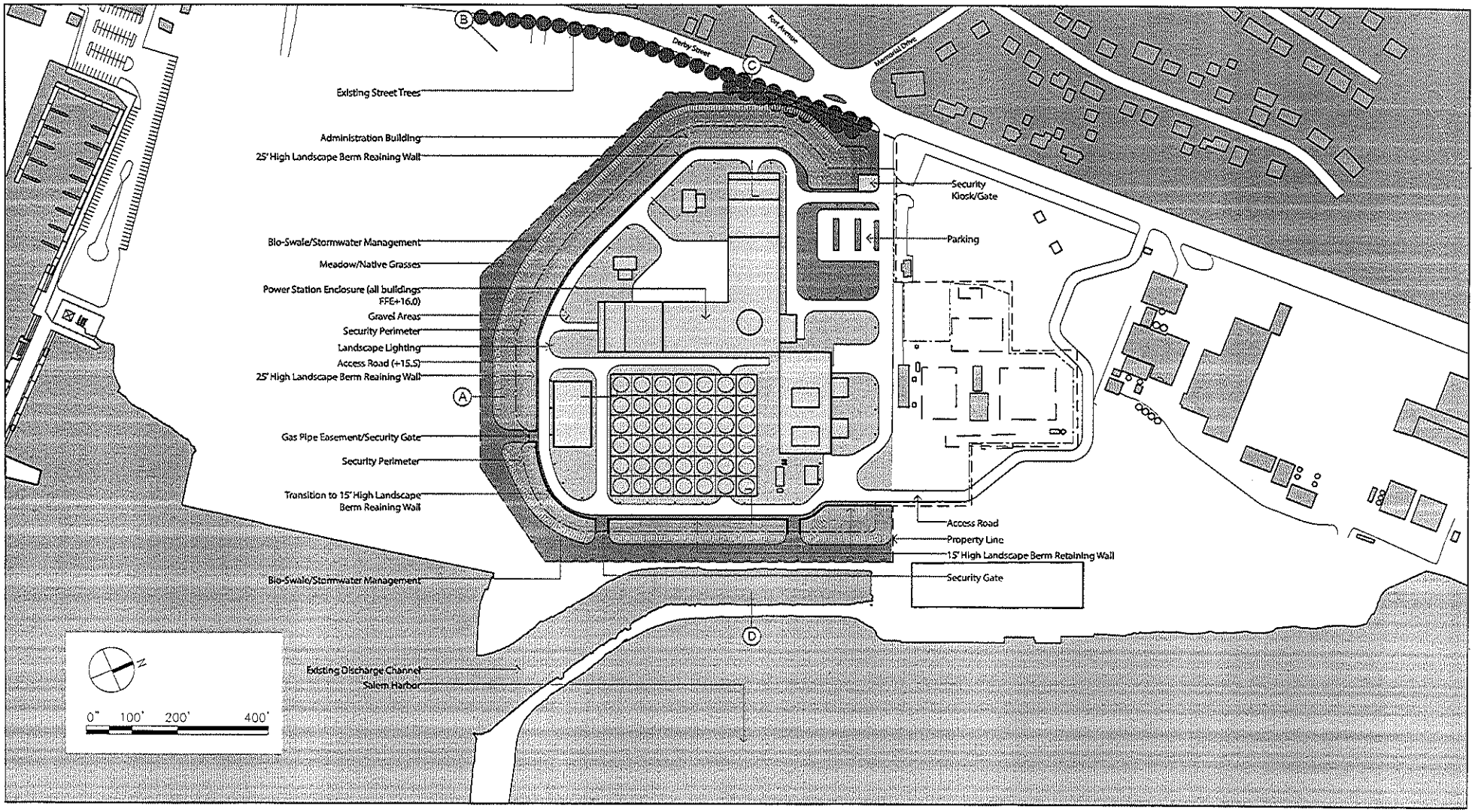
TETRA TECH

0 125 250
Feet

Base Map:Bing
2010 Aerial

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Proposed On-Site
Gas Interconnection

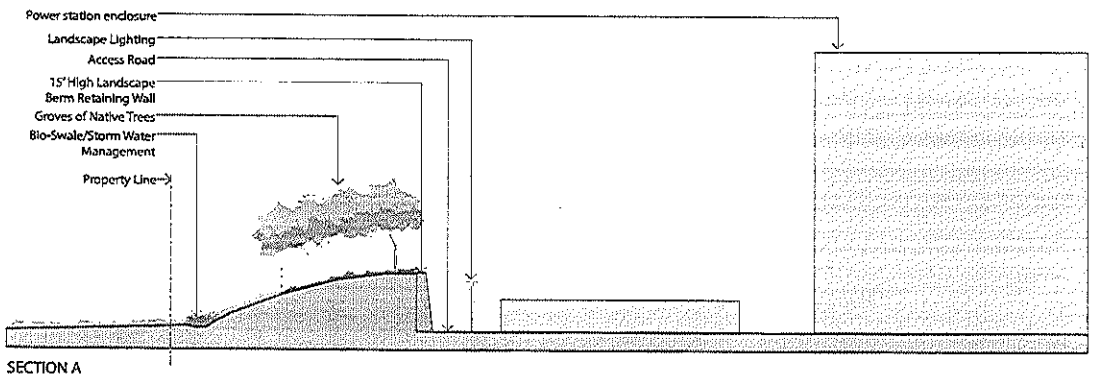


Footprint Power

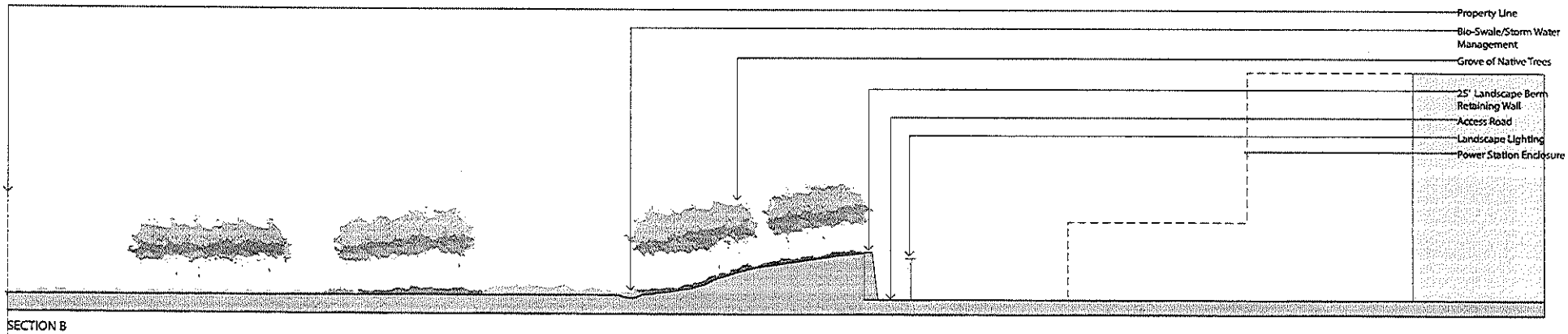
terrain

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Conceptual Landscape Plan



SECTION A
1"=50'-0"



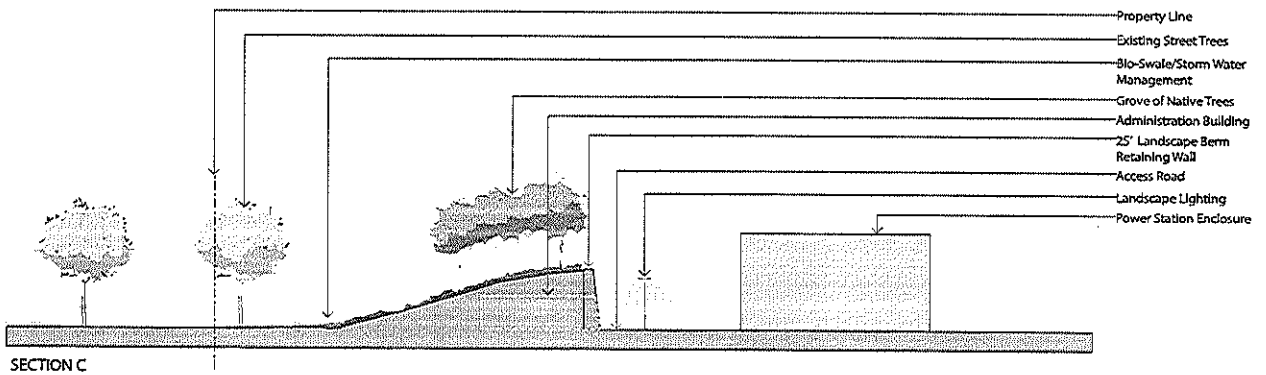
SECTION B
1"=50'-0"

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

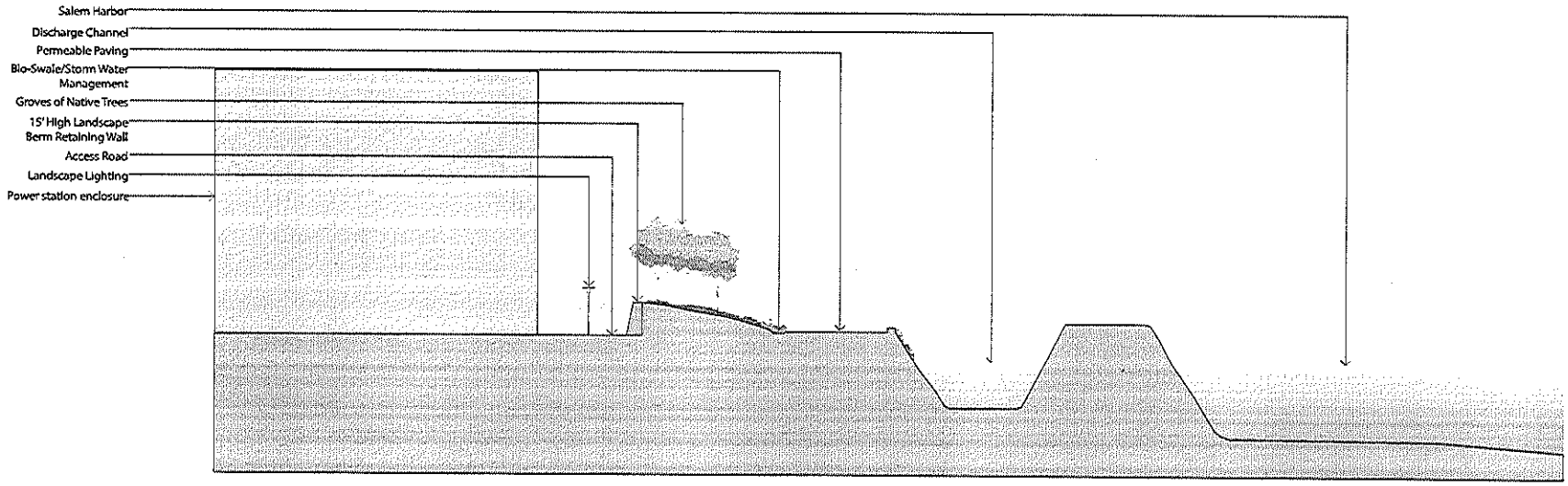
Footprint Power

terrain

Sections A and B



SECTION C
1"=50'-0"



SECTION D
1"=50'-0"

Footprint Power

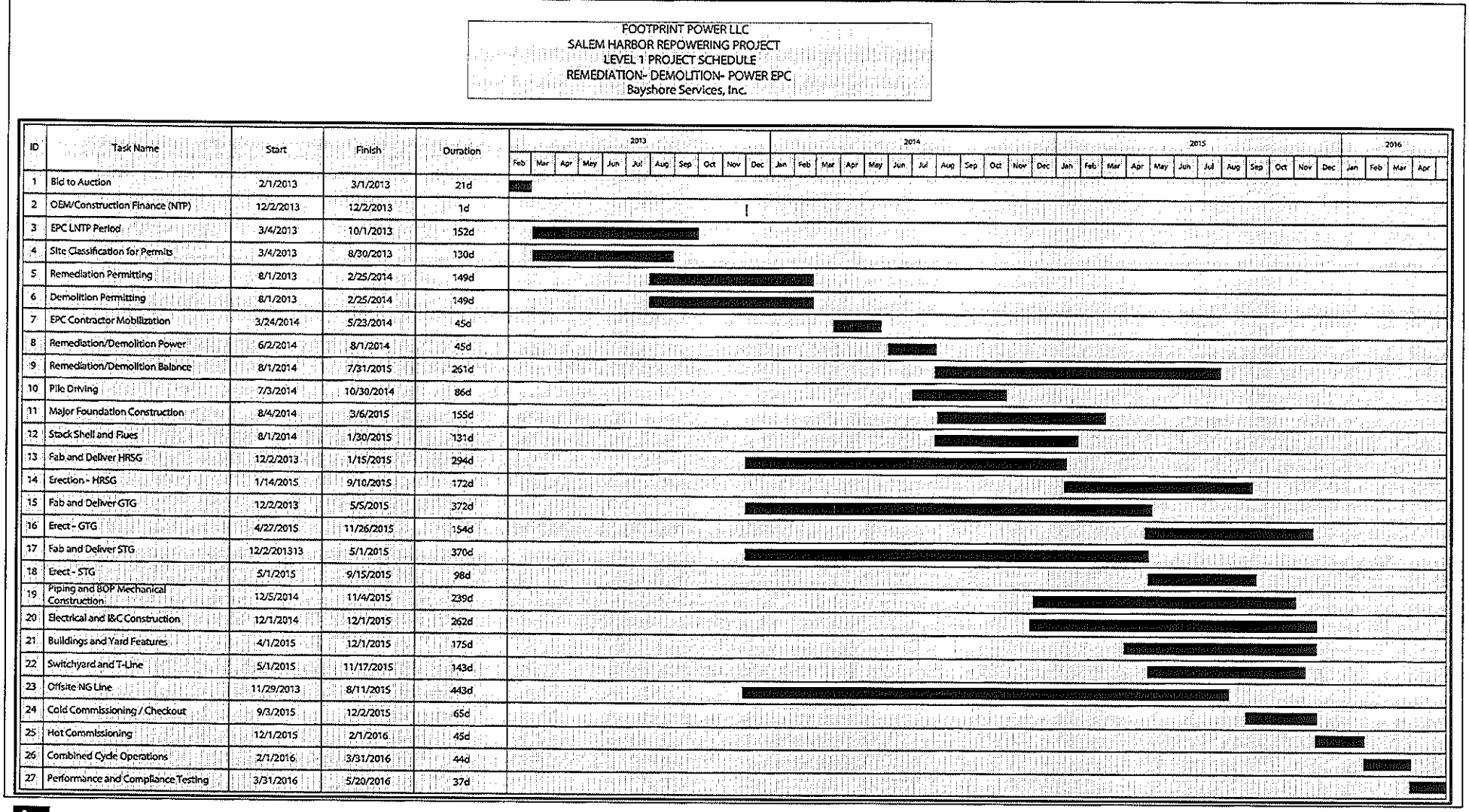
terrain

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Sections C and D

FOOTPRINT POWER LLC
SALEM HARBOR REPOWERING PROJECT
LEVEL 1 PROJECT SCHEDULE
REMEDIATION- DEMOLITION- POWER EPC
Bayshore Services, Inc.

ID	Task Name	Start	Finish	Duration
1	Bid to Auction	2/1/2013	3/1/2013	21d
2	OEM/Construction Finance (NTP)	12/2/2013	12/2/2013	1d
3	EPC LNTP Period	3/4/2013	10/1/2013	152d
4	Site Classification for Permits	3/4/2013	8/30/2013	130d
5	Remediation Permitting	8/1/2013	2/25/2014	149d
6	Demolition Permitting	8/1/2013	2/25/2014	149d
7	EPC Contractor Mobilization	3/24/2014	5/23/2014	45d
8	Remediation/Demolition Power	6/2/2014	8/1/2014	45d
9	Remediation/Demolition Balance	8/1/2014	7/31/2015	261d
10	Pile Driving	7/3/2014	10/30/2014	86d
11	Major Foundation Construction	8/4/2014	3/6/2015	155d
12	Stack Shell and Flues	8/1/2014	1/30/2015	131d
13	Fab and Deliver HRSG	12/2/2013	1/15/2015	294d
14	Erection - HRSG	1/14/2015	9/10/2015	172d
15	Fab and Deliver GTG	12/2/2013	5/5/2015	372d
16	Erect - GTG	4/27/2015	11/26/2015	154d
17	Fab and Deliver STG	12/2/201313	5/1/2015	370d
18	Erect - STG	5/1/2015	9/15/2015	98d
19	Piping and BOP Mechanical Construction	12/5/2014	11/4/2015	239d
20	Electrical and I&C Construction	12/1/2014	12/1/2015	262d
21	Buildings and Yard Features	4/1/2015	12/1/2015	175d
22	Switchyard and T-Line	5/1/2015	11/17/2015	143d
23	Offsite NG Line	11/29/2013	8/11/2015	443d
24	Cold Commissioning / Checkout	9/3/2015	12/2/2015	65d
25	Hot Commissioning	12/1/2015	2/1/2016	45d
26	Combined Cycle Operations	2/1/2016	3/31/2016	44d
27	Performance and Compliance Testing	3/31/2016	5/20/2016	37d



Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Construction Schedule

APPENDIX E

Operating and Maintenance Plans

Operating and Maintenance Plans are specific to the selected equipment vendors. These will be provided upon vendor selection.

APPENDIX F

Supporting Data for Air Dispersion Modeling Analysis

Appendix F-1

BPIP Input and Output Data

BPIP Input Data:

```
'C:\Documents and Settings\Ted.Guertin\Desktop\Footprint
Salem\aermod\final\SH_PM10_2010_SIA_230.BST BEESTWin BPIP-Prime Files 11/30/2012 3:43:01 PM'
'P'
'METERS'      1.0
'UTMY'        0
 8
'MAIN'         4            4.88
 6            12.19
345677.6      4709746.9
345714.5      4709826
345635.4      4709862.9
345649.8      4709893.8
345759.9      4709842.5
345708.5      4709732.5
 4            20.12
345677.6      4709746.9
345688.5      4709770.3
345719.5      4709755.9
345708.5      4709732.5
 4            20.12
345635.4      4709862.9
345649.8      4709893.8
345673.2      4709882.9
345658.8      4709852
 6            38.10
345696.1      4709786.7
345714.5      4709826
345675.2      4709844.4
345689.6      4709875.3
345759.9      4709842.5
345727.1      4709772.3
'ACC'          1            4.88
 4            36.58
345725.7      4709733.6
345767        4709822
345841.7      4709787.2
345800.4      4709698.8
'STG'          1            4.88
 4            23.16
345759.9      4709842.5
345774.7      4709874.4
345837        4709845.3
345822.2      4709813.5
'AUXCT'        1            4.88
 4            5.78
345829.8      4709807.8
345832.6      4709814
345844.3      4709808.5
345841.4      4709802.3
'FP'           1            4.88
 4            4.57
345745.6      4709875.4
345750.2      4709885.4
345753.8      4709883.7
345749.2      4709873.7
'NH3'          1            4.88
 4            12.19
345736.7      4709853.3
345741.8      4709864.4
345758.4      4709856.7
345753.2      4709845.6
'WATER'        1            4.88
 32           12.19
345770.32     4709889.1
345770.17     4709890.59
345769.74     4709892.02
345769.04     4709893.33
```

```
345768.09       4709894.49
345766.93       4709895.44
345765.62       4709896.14
345764.19       4709896.57
345762.7        4709896.72
345761.21       4709896.57
345759.78       4709896.14
345758.47       4709895.44
345757.31       4709894.49
345756.36       4709893.33
345755.66       4709892.02
345755.23       4709890.59
345755.08       4709889.1
345755.23       4709887.61
345755.66       4709886.18
345756.36       4709884.87
345757.31       4709883.71
345758.47       4709882.76
345759.78       4709882.06
345761.21       4709881.63
345762.7        4709881.48
345764.19       4709881.63
345765.62       4709882.06
345766.93       4709882.76
345768.09       4709883.71
345769.04       4709884.87
345769.74       4709886.18
345770.17       4709887.61
'DEMIN'          1                4.88
 32             9.14
345770.87       4709870.2
345770.78       4709871.09
345770.52       4709871.95
345770.1        4709872.74
345769.53       4709873.43
345768.84       4709874
345768.05       4709874.42
345767.19       4709874.68
345766.3        4709874.77
345765.41       4709874.68
345764.55       4709874.42
345763.76       4709874
345763.07       4709873.43
345762.5        4709872.74
345762.08       4709871.95
345761.82       4709871.09
345761.73       4709870.2
345761.82       4709869.31
345762.08       4709868.45
345762.5        4709867.66
345763.07       4709866.97
345763.76       4709866.4
345764.55       4709865.98
345765.41       4709865.72
345766.3        4709865.63
345767.19       4709865.72
345768.05       4709865.98
345768.84       4709866.4
345769.53       4709866.97
345770.1        4709867.66
345770.52       4709868.45
345770.78       4709869.31
 7
'TURBSLOW230 '
'AUXMAX      '                  4.8768          70.104          345732.6        4709832.6
'EGENMAX     '                  4.8768          38.1            345761.8        4709852.4
'FP          '                  4.8768          26.2128         345839.4        4709846.9
'CT1         '                  4.8768          7.62            345747.1        4709873.7
'CT2         '                  4.8768          7.112           345833.1        4709810.
'CT3         '                  4.8768          7.112           345837.         4709808.2
                                4.8768          7.112           345841.         4709806.3
```

BPIP Output Data:

SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	TURBSLOW230	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDWID	TURBSLOW230	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	TURBSLOW230	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	TURBSLOW230	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDWID	TURBSLOW230	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	TURBSLOW230	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	TURBSLOW230	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDLEN	TURBSLOW230	94.92	83.96	80.22	83.76	84.74	83.15
SO	BUILDLEN	TURBSLOW230	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	TURBSLOW230	94.93	103.01	107.95	109.61	107.95	103.00
SO	BUILDLEN	TURBSLOW230	94.92	83.96	80.22	83.76	84.74	83.15
SO	BUILDLEN	TURBSLOW230	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	TURBSLOW230	94.93	103.01	107.95	109.61	107.95	103.00
SO	XBADJ	TURBSLOW230	-60.34	-58.54	-58.00	-58.62	-57.46	-54.56
SO	XBADJ	TURBSLOW230	-50.00	-54.48	-57.40	-58.58	-57.97	-58.59
SO	XBADJ	TURBSLOW230	-60.39	-60.35	-58.48	-54.83	-49.52	-42.70
SO	XBADJ	TURBSLOW230	-34.58	-25.42	-22.22	-25.13	-27.28	-28.59
SO	XBADJ	TURBSLOW230	-29.04	-28.60	-27.30	-25.17	-22.27	-25.39
SO	XBADJ	TURBSLOW230	-34.55	-42.66	-49.47	-54.78	-58.43	-60.30
SO	YBADJ	TURBSLOW230	16.71	17.85	16.60	12.92	8.85	4.50
SO	YBADJ	TURBSLOW230	0.02	-4.46	-8.80	-12.88	-16.56	-17.89
SO	YBADJ	TURBSLOW230	-16.75	-15.09	-12.98	-10.48	-12.94	-15.05
SO	YBADJ	TURBSLOW230	-16.71	-17.85	-16.60	-12.92	-8.85	-4.50
SO	YBADJ	TURBSLOW230	-0.02	4.46	8.80	12.88	16.56	17.89
SO	YBADJ	TURBSLOW230	16.75	15.09	12.98	10.48	12.94	15.05
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	AUXMAX	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDWID	AUXMAX	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	AUXMAX	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	AUXMAX	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDWID	AUXMAX	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	AUXMAX	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	AUXMAX	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDLEN	AUXMAX	94.92	83.96	80.22	83.76	84.74	83.15
SO	BUILDLEN	AUXMAX	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	AUXMAX	94.93	103.01	107.95	109.61	107.95	103.00
SO	BUILDLEN	AUXMAX	94.92	83.96	80.22	83.76	84.74	83.98
SO	BUILDLEN	AUXMAX	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	AUXMAX	94.93	103.01	107.95	109.61	107.95	103.00
SO	XBADJ	AUXMAX	-84.91	-87.14	-89.75	-92.56	-92.56	-89.75
SO	XBADJ	AUXMAX	-84.21	-86.67	-86.60	-83.90	-78.64	-73.98
SO	XBADJ	AUXMAX	-70.03	-63.95	-55.93	-46.21	-35.09	-22.90
SO	XBADJ	AUXMAX	-10.01	3.17	9.52	8.81	7.82	6.60
SO	XBADJ	AUXMAX	5.17	3.59	1.90	0.15	-1.60	-10.00
SO	XBADJ	AUXMAX	-24.91	-39.06	-52.02	-63.40	-72.86	-80.10
SO	YBADJ	AUXMAX	42.02	38.52	31.99	22.56	12.45	1.96
SO	YBADJ	AUXMAX	-8.59	-18.88	-28.60	-37.45	-45.16	-49.64
SO	YBADJ	AUXMAX	-50.68	-50.19	-48.17	-44.69	-45.13	-44.25
SO	YBADJ	AUXMAX	-42.02	-38.52	-31.99	-22.56	-12.45	-1.96
SO	YBADJ	AUXMAX	8.59	18.88	28.60	37.45	45.16	49.64
SO	YBADJ	AUXMAX	50.68	50.19	48.17	44.69	45.13	44.25
SO	BUILDHGT	EGENMAX	36.58	36.58	36.58	36.58	38.10	38.10
SO	BUILDHGT	EGENMAX	38.10	38.10	38.10	38.10	23.16	23.16
SO	BUILDHGT	EGENMAX	23.16	23.16	23.16	36.58	36.58	36.58
SO	BUILDHGT	EGENMAX	36.58	36.58	36.58	36.58	38.10	38.10
SO	BUILDHGT	EGENMAX	36.58	36.58	36.58	36.58	23.16	23.16
SO	BUILDHGT	EGENMAX	23.16	23.16	23.16	36.58	36.58	36.58
SO	BUILDWID	EGENMAX	104.93	90.67	90.53	104.78	103.01	107.95
SO	BUILDWID	EGENMAX	109.61	107.95	103.00	94.92	40.98	40.97
SO	BUILDWID	EGENMAX	51.70	60.86	68.17	127.34	123.55	116.00

SO	BUILDWID	EGENMAX	104.93	90.67	90.53	104.78	103.01	107.95
SO	BUILDWID	EGENMAX	127.19	127.13	176.50	154.58	40.98	40.97
SO	BUILDWID	EGENMAX	51.70	60.86	68.17	127.34	123.55	116.00
SO	BUILDLEN	EGENMAX	115.53	104.35	104.42	115.62	84.74	83.15
SO	BUILDLEN	EGENMAX	79.04	83.08	84.70	83.74	71.49	71.59
SO	BUILDLEN	EGENMAX	75.53	77.18	76.49	127.19	127.13	123.20
SO	BUILDLEN	EGENMAX	115.53	104.35	104.42	115.62	84.74	83.15
SO	BUILDLEN	EGENMAX	127.34	123.55	166.50	173.90	71.49	71.59
SO	BUILDLEN	EGENMAX	75.53	77.18	76.49	127.19	127.13	123.20
SO	XBADJ	EGENMAX	-152.62	-152.51	-154.97	-159.88	-148.47	-154.20
SO	XBADJ	EGENMAX	-155.25	-162.14	-164.20	-161.27	-73.20	-69.78
SO	XBADJ	EGENMAX	-67.24	-62.65	-56.17	-1.36	11.95	24.90
SO	XBADJ	EGENMAX	37.09	48.16	50.55	44.25	63.73	71.05
SO	XBADJ	EGENMAX	18.26	8.10	-2.30	-12.63	1.71	-1.80
SO	XBADJ	EGENMAX	-8.29	-14.53	-20.33	-125.83	-139.08	-148.10
SO	YBADJ	EGENMAX	39.83	22.76	4.99	-12.93	66.54	45.52
SO	YBADJ	EGENMAX	23.11	0.01	-23.10	-45.51	-16.78	-23.07
SO	YBADJ	EGENMAX	-28.62	-33.30	-36.96	-81.93	-69.87	-55.70
SO	YBADJ	EGENMAX	-39.83	-22.76	-4.99	12.93	-66.54	-45.52
SO	YBADJ	EGENMAX	62.23	75.51	59.85	75.33	16.78	23.07
SO	YBADJ	EGENMAX	28.62	33.30	36.96	81.93	69.87	55.70
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	23.16
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	23.16
SO	BUILDHGT	FP	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDWID	FP	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	FP	109.61	107.95	103.00	94.92	83.96	40.97
SO	BUILDWID	FP	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDWID	FP	83.74	80.24	83.98	94.93	103.01	107.95
SO	BUILDWID	FP	109.61	107.95	103.00	94.92	83.96	40.97
SO	BUILDWID	FP	83.76	84.74	83.15	79.04	83.08	84.70
SO	BUILDLEN	FP	94.92	83.96	80.22	83.76	84.74	83.15
SO	BUILDLEN	FP	79.04	83.08	84.70	83.74	80.24	71.59
SO	BUILDLEN	FP	94.93	103.01	107.95	109.61	107.95	103.00
SO	BUILDLEN	FP	94.92	83.96	80.22	83.76	84.74	83.15
SO	BUILDLEN	FP	79.04	83.08	84.70	83.74	80.24	71.59
SO	BUILDLEN	FP	94.93	103.01	107.95	109.61	107.95	103.00
SO	XBADJ	FP	-103.33	-102.13	-100.84	-99.43	-94.99	-87.67
SO	XBADJ	FP	-77.68	-75.90	-71.90	-65.72	-57.54	23.55
SO	XBADJ	FP	-45.08	-38.19	-30.14	-21.17	-11.56	-1.60
SO	XBADJ	FP	8.41	18.16	20.62	15.67	10.25	4.51
SO	XBADJ	FP	-1.36	-7.19	-12.80	-18.02	-22.70	-95.14
SO	XBADJ	FP	-49.86	-64.82	-77.82	-88.44	-96.39	-101.40
SO	YBADJ	FP	23.85	17.42	8.61	-2.39	-13.32	-23.84
SO	YBADJ	FP	-33.64	-42.41	-49.90	-55.87	-60.14	-0.13
SO	YBADJ	FP	-57.55	-52.62	-46.09	-38.16	-34.35	-29.55
SO	YBADJ	FP	-23.85	-17.42	-8.61	2.39	13.32	23.84
SO	YBADJ	FP	33.64	42.41	49.90	55.87	60.14	0.13
SO	YBADJ	FP	57.55	52.62	46.09	38.16	34.35	29.55
SO	BUILDHGT	CT1	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT1	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	CT1	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT1	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT1	38.10	38.10	38.10	36.58	36.58	38.10
SO	BUILDHGT	CT1	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDWID	CT1	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT1	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	CT1	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDWID	CT1	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT1	109.61	107.95	103.00	115.53	104.35	80.22
SO	BUILDWID	CT1	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDLEN	CT1	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT1	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	CT1	104.78	115.85	123.39	127.19	127.13	123.20
SO	BUILDLEN	CT1	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT1	79.04	83.08	84.70	104.93	90.67	83.98
SO	BUILDLEN	CT1	104.78	115.85	123.39	127.19	127.13	123.20
SO	XBADJ	CT1	-115.19	-115.68	-119.86	-127.56	-131.38	-131.21
SO	XBADJ	CT1	-136.71	-149.53	-157.90	-161.47	-160.14	-156.92

SO	XBADJ	CT1	-58.35	-51.68	-43.44	-33.88	-23.30	-12.00
SO	XBADJ	CT1	-0.34	11.33	15.45	11.94	8.07	3.95
SO	XBADJ	CT1	57.67	66.44	73.20	-12.43	-15.88	72.95
SO	XBADJ	CT1	-46.43	-64.17	-79.95	-93.31	-103.83	-111.20
SO	YBADJ	CT1	40.04	29.46	17.98	5.96	-6.24	-18.25
SO	YBADJ	CT1	55.63	35.25	13.80	-8.07	-29.70	-48.57
SO	YBADJ	CT1	-69.75	-69.72	-67.58	-63.39	-57.26	-49.40
SO	YBADJ	CT1	-40.04	-29.46	-17.98	-5.96	6.24	18.25
SO	YBADJ	CT1	-55.63	-35.25	-13.80	57.42	63.50	48.57
SO	YBADJ	CT1	69.75	69.72	67.58	63.38	57.26	49.40
SO	BUILDHGT	CT2	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT2	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	CT2	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT2	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT2	38.10	38.10	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT2	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDWID	CT2	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT2	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	CT2	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDWID	CT2	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT2	109.61	107.95	123.20	115.53	104.35	104.42
SO	BUILDWID	CT2	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDLEN	CT2	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT2	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	CT2	104.78	115.85	123.39	127.19	127.13	123.20
SO	BUILDLEN	CT2	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT2	79.04	83.08	116.00	104.93	90.67	90.53
SO	BUILDLEN	CT2	104.78	115.85	123.39	127.19	127.13	123.20
SO	XBADJ	CT2	-114.09	-115.32	-120.26	-128.69	-133.21	-133.69
SO	XBADJ	CT2	-139.76	-153.06	-161.80	-165.63	-164.42	-161.20
SO	XBADJ	CT2	-62.49	-55.57	-46.95	-36.91	-25.75	-13.80
SO	XBADJ	CT2	-1.43	10.97	15.84	13.07	9.90	6.43
SO	XBADJ	CT2	60.72	69.97	-4.70	-8.28	-11.60	-23.00
SO	XBADJ	CT2	-42.28	-60.28	-76.44	-90.28	-101.38	-109.40
SO	YBADJ	CT2	44.19	33.74	22.26	10.10	-2.36	-14.75
SO	YBADJ	CT2	58.66	37.70	15.60	-6.98	-29.34	-48.96
SO	YBADJ	CT2	-70.88	-71.56	-70.06	-66.43	-60.79	-53.30
SO	YBADJ	CT2	-44.19	-33.74	-22.26	-10.10	2.36	14.75
SO	YBADJ	CT2	-58.66	-37.70	47.80	56.33	63.15	68.05
SO	YBADJ	CT2	70.88	71.56	70.06	66.43	60.79	53.30
SO	BUILDHGT	CT3	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT3	38.10	38.10	38.10	38.10	38.10	38.10
SO	BUILDHGT	CT3	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT3	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT3	38.10	38.10	36.58	36.58	36.58	36.58
SO	BUILDHGT	CT3	36.58	36.58	36.58	36.58	36.58	36.58
SO	BUILDWID	CT3	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT3	109.61	107.95	103.00	94.92	83.96	80.22
SO	BUILDWID	CT3	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDWID	CT3	104.93	90.67	90.53	104.78	115.85	123.39
SO	BUILDWID	CT3	109.61	107.95	123.20	115.53	104.35	104.42
SO	BUILDWID	CT3	115.62	123.31	127.26	127.34	123.55	116.00
SO	BUILDLEN	CT3	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT3	79.04	83.08	84.70	83.74	80.24	83.98
SO	BUILDLEN	CT3	104.78	115.85	123.39	127.19	127.13	123.20
SO	BUILDLEN	CT3	115.53	104.35	104.42	115.62	123.31	127.26
SO	BUILDLEN	CT3	79.04	83.08	116.00	104.93	90.67	90.53
SO	BUILDLEN	CT3	104.78	115.85	123.39	127.19	127.13	123.20
SO	XBADJ	CT3	-112.92	-114.90	-120.61	-129.80	-135.06	-136.20
SO	XBADJ	CT3	-142.87	-156.67	-165.80	-169.90	-168.83	-165.62
SO	XBADJ	CT3	-66.78	-59.59	-50.60	-40.06	-28.31	-15.70
SO	XBADJ	CT3	-2.61	10.56	16.19	14.18	11.74	8.94
SO	XBADJ	CT3	63.83	73.58	-0.70	-4.01	-7.19	-18.59
SO	XBADJ	CT3	-38.00	-56.25	-72.80	-87.13	-98.82	-107.50
SO	YBADJ	CT3	48.46	38.15	26.67	14.39	1.67	-11.10
SO	YBADJ	CT3	61.81	40.27	17.50	-5.80	-28.92	-49.31
SO	YBADJ	CT3	-71.99	-73.40	-72.57	-69.54	-64.40	-57.30
SO	YBADJ	CT3	-48.46	-38.15	-26.67	-14.39	-1.67	11.10
SO	YBADJ	CT3	-61.81	-40.27	45.90	55.15	62.73	68.40
SO	YBADJ	CT3	71.99	73.40	72.57	69.54	64.40	57.30

Appendix F-2

Source Parameters for Interactive Sources

Source Parameters for Interactive Modeling

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)	NO2 (g/s)
PH1	GE Lynn Boiler No. 1 - 198.75 mmBtu/hr	337671	4701578	3.3	33.5	472.04	11.4	1.83	7.513254
PH2	GE Lynn Boiler No. 2 - 195 mmBtu/hr	337659	4701560	3.3	41.3	465.93	10	1.83	7.370876
PH3	GE Lynn Boiler No. 3 - 382.8 mmBtu/hr	337649	4701572	3.3	41.7	422.04	9.9	2.44	13.50445
PH5	GE Lynn Boiler No. 5 - 249 mmBtu/hr	337656	4701596	3.3	53.3	422.04	17.98	1.53	9.412042
PH4	GE Lynn Gas Turbine 8 - 270 mmBtu/hr	337627	4701541	3.3	31.7	504.82	36.4	2.44	8.595575
TC2	GE Lynn Gas Turbine Test Cell 2	337406	4701764	3.24	10.97	529.87	10	2.33	12.49899
TC5	GE Lynn Gas Turbine Test Cell 5	337351	4701777	3.42	15.24	529.87	15.37	1.88	12.49899
TC114	GE Lynn Gas Turbine Test Cell 114	337573	4701573	2.93	13.7	478.15	32.2	4.12	221.7563
TC115	GE Lynn Gas Turbine Test Cell 115	337560	4701581	2.93	13.7	478.15	32.2	4.12	221.7563
WHEEL12	Wheelabrator - Two 325 mmBtu/hr Mass Burn Incinerators	337153	4701373	5	87.25	418.59	19.78	3.05	27.84553

Appendix F-3

VISCREEN Results

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              Visual Effects Screening Analysis for
                Source: Footprint Salem
                Class I Area: Presidential Range NH


                   ***   Level-1 Screening   ***
Input Emissions for

   Particulates      4.19  G  /S
   NOx (as NO2)     23.34  G  /S
   Primary NO2        .00  G  /S
   Soot               .00  G  /S
   Primary SO4        .00  G  /S


    **** Default Particle Characteristics Assumed

             Transport Scenario Specifications:

    Background Ozone:                    .04 ppm
    Background Visual Range:           60.00 km
    Source-Observer Distance:         185.00 km
    Min. Source-Class I Distance:     185.00 km
    Max. Source-Class I Distance:     215.00 km
    Plume-Source-Observer Angle:       11.25 degrees
    Stability:   6
    Wind Speed:   1.00 m/s

                          R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

          Maximum Visual Impacts INSIDE  Class I Area
           Screening Criteria ARE NOT Exceeded
                                          Delta E       Contrast
                                       ============   ============
Backgrnd Theta Azi Distance Alpha Crit  Plume   Crit  Plume
======== ===== === ======== ===== ====  =====   ====  =====
 SKY      10.  84.   185.0    84.  2.00   .042    .05   .000
 SKY     140.  84.   185.0    84.  2.00   .012    .05  -.000
 TERRAIN  10.  84.   185.0    84.  2.00   .006    .05   .000
 TERRAIN 140.  84.   185.0    84.  2.00   .002    .05   .000


          Maximum Visual Impacts OUTSIDE Class I Area
           Screening Criteria ARE NOT Exceeded
                                          Delta E       Contrast
                                       ============   ============
Backgrnd Theta Azi Distance Alpha Crit  Plume   Crit  Plume
======== ===== === ======== ===== ====  =====   ====  =====
 SKY      10.  70.   175.9    99.  2.00   .044    .05   .000
 SKY     140.  70.   175.9    99.  2.00   .012    .05  -.001
 TERRAIN  10.  60.   169.2   109.  2.00   .007    .05   .000
 TERRAIN 140.  60.   169.2   109.  2.00   .002    .05   .000
```

Appendix F-4

Electronic Files for Dispersion Modeling Analysis
Note: Included on disk on MassDEP copy

APPENDIX G

Evaluation of Worst-Case Ammonia Release

EVALUATION OF WORST CASE AMMONIA RELEASE

The SHR Facility will use a 19% solution of aqueous ammonia for the SCR systems, which are pollution control devices located in the turbine HRSGs for reduction of NO_x emissions. The 19% aqueous ammonia will be stored in an above-ground 34,000 gallon steel tank. The storage tank will be a vertical cylindrical tank, with a diameter of 12 feet and a height of approximately 40 feet.

The tank will have single wall construction, which provides for more effective monitoring and reparability than a double wall tank. The tank, as well as ammonia transfer pumps, valves and piping will be located within a concrete containment structure (dike) which will be designed to contain 110% of the volume of the tank. The dike will be 23 feet by 19 feet and have 12 foot walls to provide the necessary containment. The dike will be constructed so that the floor of the dike will be 4 feet below grade and the top of the dike walls will be 8 feet above grade. In order to minimize the exposed surface area of any aqueous ammonia that enters the diked area, passive evaporative controls (polyethylene balls or equivalent) will be installed to reduce the surface area by 90%. In order to further mitigate the potential impacts of an accidental ammonia release, the entire tank and diked area will be located within an enclosure 60 feet long, 40 feet wide, and 40 feet high. The walls of the structure will be fully sealed, and the only ventilation for the structure will be by means of roof vents.

The aqueous ammonia storage tank will be constructed in accordance with the Massachusetts Department of Public Safety requirements for storage tanks greater than 10,000 gallons containing material other than water. The dike wall and enclosure surrounding the tank will decrease the risk of damage to the tank caused by accidental vehicle contact.

Transfer from ammonia delivery trucks to the storage tank will take place within a contained concrete storage tank unloading pad with drainage design such that any spills during ammonia delivery will drain into the diked containment area. Delivery trucks will be required to have fast-acting shutoff valves in the unlikely event that a leak or other problem should arise. A hose from the top of the tank connected back to the truck will return displaced vapor to the truck, or an equivalent method for control of transfer losses will be used. The storage tank will be equipped with level monitoring instrumentation that will be continuously monitored in the control room. In the event that the tank level approaches an overfill condition during filling, a high level alarm will sound, initiating an immediate response to the situation.

Ammonia in aqueous solution is volatile, and the accidental release of this material would result in some release of ammonia to the ambient air. Therefore, a worst-case accidental release scenario was performed to evaluate the potential health impacts of such a release. The release scenario assumed a release of the entire contents of the tank into the diked containment area, and conservatively evaluated the air quality impacts of such a release at the nearest projected controlled access perimeter (PACP) (approximately 230 feet from the ammonia storage area).

The ammonia emissions resulting from a hypothetical worst-case release scenario were calculated using the Areal Locations of Hazardous Atmospheres (ALOHA) model, which demonstrates that no locations outside the PCAP would be exposed to concentrations above 25 ppm. This model was developed by the EPA and the National Oceanic and Atmospheric Administration, and is included as a prescribed technique under the EPA Risk Management Program (RMP) guidance. The ALOHA model ammonia release emissions were calculated with the inputs specified below.

- Volume of 19% Aqueous Ammonia released: 34,000 gallons.

- Surface Area of Ammonia "Puddle": In the event of a leak of the entire contents of the storage tank into the containment area, the potential liquid surface area, excluding the footprint of the tank itself would be 343 square feet. The evaporative contrails would reduce the exposed surface area to 34.3 square feet.

- Ambient Temperature: 103 degrees F. This is the maximum temperature recorded in Boston (Logan Airport) over the last 3 years (2009-2011). Use of the maximum temperature in the last three years is specified in EPA RMP guidance for evaluating accidental releases.

- Wind speed at 3 meter height: 0.85 meters/second. This is the minimum wind speed that can be input into ALOHA. The minimum wind speed is used since the NH_3 tank is within an enclosure and will not be subject to outdoor winds.

- Relative Humidity: 62%.This is the average relative humidity for Boston (Logan Airport) over the last 3 years (2009-2011).Use of the average relative humidity over the last three years is specified in EPA RMP guidance for evaluating accidental releases.

The ALOHA model results indicate a steady state release rate of ammonia from the diked area (within the enclosure) of 1.23 pounds per minute. The enclosure will mitigate the release of ammonia to the atmosphere, since the exchange of enclosure air with outdoor air is controlled by the building ventilation design. The enclosure will be designed with an air exchange rate of 4, meaning the flow rate of outdoor air into and out of the enclosure per hour will be four times the enclosure volume. [The air exchange rate multiplied by the building volume yields the flow rate of air both into and out of the building over a 1-hour period because as much air needs to come in as goes out to equalize the pressure.] For the ammonia enclosure design, an air exchange rate of 4 means that the volume of enclosure air exhausted to the atmosphere will be 914 actual cubic feet per minute (acfm). If the diked area releases ammonia at 1.23 pounds per minute, after about 45 minutes (if the release is not controlled) the ammonia concentration in the enclosure will be near equilibrium and the release rate of ammonia from the enclosure roof will approach 1.23 pounds per minute. In actuality, ammonia sensors in the enclosure will alert plant staff to a problem, and action to control a release to the dike can be taken before significant ammonia accumulates in the diked area.

In order to conservatively evaluate potential offsite consequences of an ammonia release, a continuous release of ammonia of 1.23 pounds per minute from the enclosure roof was evaluated with the AERMOD dispersion model. This is the same dispersion model used for the evaluation of air quality impacts from the facility exhaust stacks. The same AERMOD inputs and data-bases used for the stack modeling described in Section 6 of this application were used for the ammonia release analysis. A dense modeling receptor network at and near the PCAP was used to assess the maximum offsite ammonia concentrations. The enclosure exhaust parameters used were a 40 foot release height, from a roof vent with an area of 1 square foot exhausting 914 acfm at ambient temperature.

The concentrations of ammonia at the PCAP and nearby locations were evaluated in terms of the American Industrial Hygiene Association (AIHA) Emergency Response Planning Guideline Level 1 (ERPG-1) of 25 parts per million (ppm) by volume, and the ERPG-2 of 150 ppm. ERPG-1 is defined as

maximum airborne concentration below which nearly all individuals could be exposed to for up to one hour without experiencing other than mild transient health effects and/or a clearly defined objectionable odor. ERPG-2 is defined as the maximum airborne concentration which it is believed that nearly all individuals could be exposed to for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair the ability to take self-directed protective action.

The results of the AERMOD Model indicate that in the event of a hypothetical worst-case release, the ammonia concentrations would be less than the ERPG-1 level of 25 ppm at all locations outside of the PCAP. Thus, the ammonia concentrations at all locations outside the PCAP would be well below the ERPG-2 level of 150 ppm. Table G-1 presents the results of the predicted 1-hour maximum concentrations of ammonia in the event of a worse case release from the storage tank. The results in Table G-1 are shown for the northern PCAP (worst case PCAP value), the west PCAP (worst case aside from north PCAP), the East PCAP, the South Essex Sewerage District and the nearest residence to the ammonia storage area (Fort Avenue, just east of Memorial Drive).

Table G-1 Summary of Worst-Case Release Scenario for Ammonia

Location	Distance From Ammonia Storage Enclosure (feet)	Ammonia Concentration (Maximum Hourly Value in ppm)	ERPG-1 (ppm)	ERPG-2 (ppm)
Power Plant North PCAP	230	24.5	25	150
Power Plant West PCAP	360	14.3	25	150
Power Plant East PCAP	470	4.9	25	150
Nearest Residence (Fort Avenue)	560	6.9	25	150
SESD	730	7.5	25	150

Figure G-1 shows the site area with an overlay of the SHR Facility structures, ammonia storage area, and locations of predicted worst-case ammonia concentrations as referenced in Table G-1. The area along the northern PCAP (where the 24.5 ppm concentration is predicted) is adjacent to the existing National Grid switchyard (which will remain in use as a switchyard). There will be no future public access inside this switchyard area. Thus, there are no residences that would be subject to ammonia concentrations approaching 25 ppm.

Therefore, the storage plans for aqueous ammonia at the proposed site adequately mitigate the potential impacts at and beyond the site PCAP even in the event of a worst-case aqueous ammonia release.

APPENDIX H

Noise Modeling Data

Appendix H

Noise Modeling Data

The first data table, which is labeled *Received Sound Levels - Partial Levels*, has the contribution of each project sound source in dBA at each of the 12 receptors as identified in Table 9-4 of the Application. Day and Night are the same values since these are source contribution values only and do not include background.

The remaining data tables, labeled *Sound Sources*, have all the data used in the Cadna model for each of the individual component noise sources. Stacks are modeled as point sources, and the remainder of the sources are modeled either as (horizontal) area or vertical area sources. Key data is PWL which is sound power levels which indicates the strength of each source.

Salem Redevelopment Project - Acoustic Modeling Input Parameters

Received Sound Levels - Partial Levels

Name	Source M.	ID	Partial Level 1		2		3		4		5		6		7		8		9		10		11		12	
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Stack Exit 2			35.4	35.4	35.2	35.2	34.7	34.7	33.4	33.4	32.3	32.3	18.4	18.4	26.6	26.6	23.2	23.2	28.8	28.8	28.9	28.9	26.5	26.5	21.6	21.6
Stack Exit 1			35.1	35.1	35.0	35.0	34.4	34.4	33.4	33.4	32.2	32.2	18.5	18.5	26.6	26.6	23.2	23.2	29.0	29.0	28.0	28.0	26.5	26.5	21.6	21.6
Aux Boiler Stack			33.7	33.7	14.0	14.0	32.6	32.6	10.8	10.8	7.7	7.7	12.8	12.8	23.6	23.6	18.7	18.7	22.4	22.4	10.7	10.7	9.7	9.7	-4.2	-4.2
ACC Fan 01		ACC	8.0	8.0	9.0	9.0	5.3	5.3	7.2	7.2	8.4	8.4	0.1	0.1	20.0	20.0	14.6	14.6	27.7	27.7	9.4	9.4	7.6	7.6	6.3	6.3
ACC Fan 02		ACC	29.4	29.4	8.1	8.1	28.8	28.8	20.1	20.1	28.7	28.7	1.5	1.5	10.9	10.9	14.7	14.7	27.6	27.6	27.8	27.8	24.2	24.2	2.9	2.9
ACC Fan 03		ACC	10.9	10.9	7.6	7.6	8.9	8.9	7.2	7.2	7.1	7.1	0.4	0.4	11.2	11.2	15.3	15.3	27.4	27.4	7.3	7.3	7.5	7.5	1.6	1.6
ACC Fan 04		ACC	12.4	12.4	8.2	8.2	10.2	10.2	9.2	9.2	9.0	9.0	0.6	0.6	9.5	9.5	14.8	14.8	27.6	27.6	9.4	9.4	8.3	8.3	4.2	4.2
ACC Fan 05		ACC	13.0	13.0	8.2	8.2	11.4	11.4	9.6	9.6	21.5	21.5	0.8	0.8	8.5	8.5	14.6	14.6	27.6	27.6	26.5	26.5	18.6	18.6	3.6	3.6
ACC Fan 06		ACC	12.6	12.6	8.4	8.4	10.6	10.6	9.5	9.5	23.7	23.7	0.5	0.5	8.7	8.7	14.6	14.6	27.5	27.5	27.9	27.9	24.2	24.2	2.8	2.8
ACC Fan 07		ACC	12.7	12.7	8.0	8.0	12.0	12.0	9.1	9.1	23.5	23.5	1.8	1.8	8.9	8.9	14.6	14.6	27.5	27.5	27.8	27.8	24.2	24.2	3.0	3.0
ACC Fan 08		ACC	9.2	9.2	8.7	8.7	8.2	8.2	8.2	8.2	9.5	9.5	1.0	1.0	15.9	15.9	14.5	14.5	27.9	27.9	8.9	8.9	7.5	7.5	4.1	4.1
ACC Fan 09		ACC	8.9	8.9	8.2	8.2	12.8	12.8	20.8	20.8	24.0	24.0	0.8	0.8	15.3	15.3	13.7	13.7	27.9	27.9	25.2	25.2	14.5	14.5	3.1	3.1
ACC Fan 10		ACC	28.2	28.2	8.2	8.2	23.1	23.1	25.0	25.0	29.0	29.0	0.9	0.9	15.2	15.2	13.7	13.7	27.9	27.9	28.0	28.0	19.7	19.7	3.0	3.0
ACC Fan 11		ACC	30.6	30.6	7.8	7.8	23.3	23.3	27.8	27.8	28.9	28.9	1.6	1.6	13.5	13.5	13.7	13.7	27.8	27.8	28.0	28.0	19.6	19.6	2.8	2.8
ACC Fan 12		ACC	9.4	9.4	8.4	8.4	7.5	7.5	7.0	7.0	6.6	6.6	0.6	0.6	14.1	14.1	15.4	15.4	27.3	27.3	8.2	8.2	7.7	7.7	3.3	3.3
ACC Fan 13		ACC	10.2	10.2	8.7	8.7	9.1	9.1	8.0	8.0	8.2	8.2	1.0	1.0	12.7	12.7	15.2	15.2	27.8	27.8	8.9	8.9	7.6	7.6	3.7	3.7
ACC Fan 14		ACC	27.4	27.4	8.2	8.2	13.7	13.7	20.7	20.7	21.1	21.1	0.2	0.2	11.9	11.9	14.7	14.7	27.7	27.7	26.1	26.1	18.6	18.6	3.1	3.1
ACC Fan 15		ACC	28.9	28.9	8.2	8.2	24.9	24.9	22.2	22.2	26.7	26.7	1.1	1.1	11.0	11.0	14.7	14.7	27.7	27.7	28.0	28.0	24.5	24.5	3.0	3.0
ACC Fan 16		ACC	24.9	24.9	15.4	15.4	7.7	7.7	29.4	29.4	29.0	29.0	0.8	0.8	21.8	21.8	7.0	7.0	9.8	9.8	9.3	9.3	18.2	18.2	3.7	3.7
ACC Fan 17		ACC	30.2	30.2	7.8	7.8	8.1	8.1	29.3	29.3	28.9	28.9	1.1	1.1	17.3	17.3	8.1	8.1	28.8	28.8	27.1	27.1	18.3	18.3	3.2	3.2
ACC Fan 18		ACC	9.1	9.1	15.5	15.5	8.1	8.1	12.1	12.1	14.1	14.1	1.0	1.0	25.6	25.6	6.2	6.2	9.6	9.6	10.3	10.3	8.0	8.0	9.6	9.6
ACC Fan 19		ACC	7.6	7.6	12.3	12.3	7.4	7.4	12.2	12.2	14.2	14.2	0.9	0.9	21.7	21.7	4.6	4.6	9.7	9.7	9.5	9.5	7.2	7.2	7.2	7.2
ACC Fan 20		ACC	8.4	8.4	30.3	30.3	6.1	6.1	29.5	29.5	29.4	29.4	0.7	0.7	21.5	21.5	5.9	5.9	10.4	10.4	10.3	10.3	15.5	15.5	7.1	7.1
ACC Fan 21		ACC	21.3	21.3	31.3	31.3	7.5	7.5	29.4	29.4	21.3	21.3	1.3	1.3	21.6	21.6	5.3	5.3	9.6	9.6	9.2	9.2	7.1	7.1	9.5	9.5
ACC Fan 22		ACC	5.5	5.5	28.9	28.9	7.2	7.2	23.8	23.8	18.7	18.7	0.9	0.9	21.6	21.6	5.2	5.2	9.7	9.7	9.3	9.3	7.1	7.1	9.5	9.5
ACC Fan 23		ACC	8.4	8.4	30.8	30.8	5.2	5.2	29.0	29.0	12.1	12.1	0.6	0.6	21.4	21.4	5.8	5.8	9.4	9.4	9.7	9.7	7.5	7.5	13.6	13.6
ACC Fan 24		ACC	7.1	7.1	31.0	31.0	5.8	5.8	29.2	29.2	18.4	18.4	1.9	1.9	21.6	21.6	3.9	3.9	9.5	9.5	8.9	8.9	6.9	6.9	9.8	9.8
ACC Fan 25		ACC	28.7	28.7	7.7	7.7	29.3	29.3	11.9	11.9	28.5	28.5	0.7	0.7	9.3	9.3	7.5	7.5	28.8	28.8	27.8	27.8	24.2	24.2	3.3	3.3
ACC Fan 26		ACC	30.4	30.4	7.8	7.8	23.6	23.6	29.2	29.2	28.7	28.7	1.2	1.2	13.4	13.4	7.3	7.3	29.0	29.0	27.9	27.9	19.5	19.5	2.9	2.9
ACC Fan 27		ACC	13.6	13.6	8.0	8.0	12.7	12.7	9.1	9.1	27.0	27.0	0.6	0.6	8.2	8.2	7.4	7.4	28.7	28.7	27.5	27.5	23.9	23.9	3.2	3.2
ACC Fan 28		ACC	6.4	6.4	12.7	12.7	5.8	5.8	13.4	13.4	13.9	13.9	0.7	0.7	25.9	25.9	12.7	12.7	9.1	9.1	9.7	9.7	7.6	7.6	9.6	9.6
ACC Fan 29		ACC	24.1	24.1	21.1	21.1	6.0	6.0	29.6	29.6	29.2	29.2	1.7	1.7	21.5	21.6	13.8	13.8	8.3	8.3	9.0	9.0	17.6	17.6	3.2	3.2
ACC Fan 30		ACC	5.8	5.8	8.8	8.8	5.9	5.9	10.6	10.6	11.3	11.3	0.9	0.9	21.5	21.6	14.4	14.4	27.6	27.6	9.6	9.6	7.7	7.7	9.9	9.9
ACC Fan 31		ACC	7.8	7.8	8.7	8.7	5.1	5.1	11.3	11.3	11.0	11.0	0.7	0.7	16.8	16.8	14.4	14.4	27.5	27.5	8.3	8.3	8.7	8.7	9.2	9.2
ACC Fan 32		ACC	8.2	8.2	7.8	7.8	11.5	11.5	24.2	24.2	23.5	23.5	0.8	0.8	16.8	16.8	13.6	13.6	27.5	27.5	24.5	24.5	13.3	13.3	4.4	4.4
ACC Fan 33		ACC	23.8	23.8	8.1	8.1	22.4	22.4	29.7	29.7	29.2	29.2	1.1	1.1	15.4	15.4	13.7	13.7	27.5	27.5	26.7	26.7	14.8	14.8	3.0	3.0
ACC Fan 34		ACC	26.0	26.0	7.7	7.7	17.4	17.4	29.5	29.5	29.0	29.0	1.5	1.5	16.9	16.9	13.7	13.7	27.4	27.4	27.1	27.1	18.4	18.4	2.9	2.9
ACC Fan 35		ACC	6.2	6.2	11.7	11.7	7.1	7.1	12.7	12.7	11.6	11.6	1.1	1.1	20.2	20.2	13.6	13.6	9.4	9.4	9.7	9.7	8.0	8.0	10.0	10.0
ACC Fan 36		ACC	5.9	5.9	29.2	29.2	7.5	7.5	27.1	27.1	26.8	26.8	0.8	0.8	21.3	21.3	12.9	12.9	9.4	9.4	9.2	9.2	10.9	10.9	8.6	8.6
ACC Fan 37		ACC	23.5	23.5	30.8	30.8	6.6	6.6	30.3	30.3	29.9	29.9	1.2	1.2	21.7	21.7	11.0	11.0	9.5	9.5	8.9	8.9	11.3	11.3	10.0	10.0
ACC Fan 38		ACC	23.0	23.0	30.5	30.5	6.4	6.4	29.7	29.7	29.6	29.6	1.8	1.8	21.7	21.7	11.1	11.1	9.5	9.5	9.3	9.3	12.4	12.4	9.9	9.9
ACC Fan 39		ACC	5.3	5.3	11.2	11.2	6.3	6.3	12.9	12.9	11.5	11.5	0.5	0.5	26.0	26.0	14.5	14.5	8.1	8.1	9.5	9.5	7.5	7.5	9.7	9.7
ACC Fan 40		ACC	5.6	5.6	10.0	10.0	6.7	6.7	12.3	12.3	10.8	10.8	0.8	0.6	20.9	20.9	14.5	14.5	8.4	8.4	8.9	8.9	7.3	7.3	9.9	9.9
ACC Fan 41		ACC	7.6	7.6	22.4	22.4	4.7	4.7	24.4	24.4	23.2	23.2	0.8	0.8	19.7	19.7	13.7	13.7	8.9	8.9	8.0	8.0	11.2	11.2	8.7	8.7
ACC Fan 42		ACC	23.6	23.6	23.2	23.2	6.0	6.0	29.8	29.8	29.3	29.3	1.1	1.1	20.5	20.5	13.7	13.7	8.3	8.3	8.1	8.1	13.3	13.3	8.5	8.5
Air Inlet Plenum Roof - Unit 1	AIP		19.3	19.3	17.6	17.6	19.4	19.4	16.9	16.9	14.8	14.8	-16.6	-16.6	3.5	3.5	-0.3	-0.3	5.4	5.4	9.9	9.9	7.7	7.7	1.7	1.7
Air Inlet Plenum Roof - Unit 2	AIP		6.8	6.8	13.7	13.7	7.7	7.7	14.7	14.7	15.0	15.0	3.5	3.5	9.4	9.4	-3.8	-3.8	12.7	12.7	13.2	13.2	10.2	10.2	4.6	4.6
Gas Compressor Roof 1			-1.5	-1.5	0.6	0.6	-1.9	-1.9	0.5	0.5	0.0	0.0	2.8	2.8	19.2	19.2	12.7	12.7	-0.7	-0.7	-2.0	-2.0	-5.3	-5.3	-11.4	-11.4
Gas Compressor Roof 2			-1.2	-1.2	1.2	1.2	-1.7	-1.7	0.8	0.8	0.6	0.6	4.8	4.8	19.0	19.0	12.6	12.6	-0.7	-0.7	-2.2	-2.2	-5.4	-5.4	-11.7	-11.7
GasMeter Roof			-50.5	-50.5	-33.9	-33.9	-50.8	-50.8	-30.2	-30.2	-26.5	-26.5	-45.1	-45.1	-28.7	-28.7	-34.8	-34.8	-33.6	-33.6	-35.9	-35.9	-38.0	-38.0	-43.8	-43.8
HRSG 1		HRSG	25.6	25.6	22.4	22.4	27.9	27.9	22.2	22.2	21.9	21.9	5.4	5.4	17.0	17.0	14.7	14.7	17.9	17.9	19.4	19.4	18.0	18.0	13.3	13.3
HRSG 2		HRSG	21.5	21.5	23.1	23.1	24.7	24.7	24.3	24.3	24.0	24.0	8.9	8.9	18.2	18.2	14.9	14.9	18.5	18.5	21.4	21.4	19.9	19.9	16.1	16.1
Steam Turbine Bldg Roof		Steam_Turbine_Bldg_Roof	5.1	5.1	-11.2	-11.2	3.1	3.1	-15.7	-15.7	-16.0	-16.0	-10.7	-10.7	-3.3	-3.3	-10.6	-10.6	-0.6	-0.6	-7.1	-7.1	-10.1	-10.1	-12.7	-12.7
Turbine Bldg 1 Roof		Turbine_Bldg_Roof	-0.9	-0.9	10.0	10.0	3.2	3.2	10.6	10.6	9.7	9.7	2.4	2.4	7.0	7.0	-7.2	-7.2	4.4	4.4	6.6	6.6	4.1	4.1	-0.4	-0.4
Turbine Bldg 1 Roof		Turbine_Bldg_Roof	13.7	13.7	11.2	11.2	13.7	13.7	11.9	11.9	11.2	11.3	-21.8	-21.8	2.7	2.7	-2.8	-2.8	5.0	5.0	6.8	6.8	4.1	4.1	-0.1	-0.1

Name	Source M.	ID	Partial Level 1 Day	1 Night	2 Day	2 Night	3 Day	3 Night	4 Day	4 Night	5 Day	5 Night	6 Day	6 Night	7 Day	7 Night	8 Day	8 Night	9 Day	9 Night	10 Day	10 Night	11 Day	11 Night	12 Day	12 Night
ACCSW		ACCLOUVERS	-18.7	-18.7	1.4	1.4	-18.2	-18.2	-3.1	-3.1	-0.6	-0.6	-7.6	-7.6	0.3	0.3	-5.7	-5.7	-0.7	-0.7	-2.8	-2.8	-5.2	-5.2	-10.2	-10.2
ACCNW		ACC NW	12.6	12.6	8.8	8.8	9.3	9.3	11.8	11.8	12.6	12.6	0.6	0.6	10.5	10.5	3.3	3.3	14.6	14.6	12.8	12.8	9.4	9.4	5.8	5.8
Gas Compressor 1			9.7	9.7	11.5	11.5	9.0	9.0	11.5	11.5	11.3	11.3	12.7	12.7	30.2	30.2	23.7	23.7	10.0	10.0	8.6	8.6	5.3	5.3	-1.1	-1.1
Gas Compressor 2			9.8	9.8	12.2	12.2	9.4	9.4	11.8	11.8	11.6	11.6	14.6	14.6	30.0	30.0	23.6	23.6	10.2	10.2	9.1	9.1	5.7	5.7	-0.6	-0.6
Gas Meter Encl Vent			-51.2	-51.2	-38.2	-38.2	-50.9	-50.9	-34.1	-34.1	-27.8	-27.8	-45.8	-45.8	-29.2	-29.2	-35.4	-35.4	-38.1	-38.1	-40.1	-40.1	-42.0	-42.0	-46.8	-46.8
GT 1 Air Inlet North		Turbine_Air_Inlet_GE	36.0	36.0	30.5	30.5	35.7	35.7	24.7	24.7	22.5	22.5	10.1	10.1	18.6	18.6	15.6	15.6	15.0	15.0	17.5	17.5	13.5	13.5	11.4	11.4
GT 1 Air Inlet South		GT1_Air Inlet_South	25.3	25.3	33.6	33.6	25.4	25.4	32.6	32.6	31.3	31.3	-1.6	-1.6	8.3	8.3	11.0	11.0	22.8	22.8	26.4	26.4	23.9	23.9	18.3	18.3
GT 1 Inlet Plenum		G_T_Inlet_Plenum	17.9	17.9	17.1	17.1	17.9	17.9	14.9	14.9	13.1	13.1	-11.6	-11.6	1.5	1.5	-0.6	-0.6	6.9	6.9	8.5	8.5	5.9	5.9	0.7	0.7
GT 2 Air Inlet South		GT_2_Air_Inlet_South	15.4	15.4	29.3	29.3	16.0	16.0	33.3	33.3	33.1	33.1	10.5	10.5	7.2	7.2	4.4	4.4	30.5	30.5	30.3	30.3	27.4	27.4	22.0	22.0
GT 2 Inlet Plenum		G_T_Inlet_Plenum	1.5	1.5	12.3	12.3	3.8	3.8	13.3	13.3	13.0	13.0	1.8	1.8	7.2	7.2	-0.1	-0.1	11.0	11.0	10.7	10.7	7.9	7.9	2.6	2.6
HRSG 1		HRSG	26.7	26.7	21.9	21.9	26.7	26.7	20.5	20.5	19.6	19.6	5.8	5.8	14.2	14.2	12.7	12.7	15.9	15.9	16.8	16.8	15.0	15.0	10.0	10.0
HRSG Building Vent S			3.5	3.5	15.4	15.4	3.8	3.8	16.1	16.1	15.5	15.5	-17.6	-17.6	-9.3	-9.3	-11.9	-11.9	8.6	8.6	11.4	11.4	9.0	9.0	4.0	4.0
HRSG Building Vent N			21.2	21.2	5.8	5.8	17.4	17.4	3.8	3.8	2.9	2.9	3.7	3.7	10.8	10.8	5.1	5.1	7.6	7.6	1.9	1.9	-0.4	-0.4	-6.5	-6.5
Step-up Transformer 1		Transformer	20.2	20.2	27.2	27.2	20.3	20.3	26.3	26.3	25.4	25.4	-6.4	-6.4	1.9	1.9	7.6	7.6	20.1	20.1	20.7	20.7	18.2	18.2	12.9	12.9
Step-up Transformer 2		Transformer	17.5	17.5	26.5	26.5	13.6	13.6	25.8	25.8	25.5	25.5	9.6	9.6	1.2	1.2	4.3	4.3	21.5	21.5	20.6	20.6	18.1	18.1	13.5	13.5
STG Bldg 1&2		STG_Bldg	19.6	19.6	2.9	2.9	16.3	16.3	-0.6	-0.6	-1.8	-1.8	1.6	1.6	10.1	10.1	4.3	4.3	12.8	12.8	8.6	8.6	5.8	5.8	2.6	2.6
Transformer 3		GSU Transformer	22.8	22.8	5.3	5.3	21.2	21.2	2.3	2.3	1.1	1.1	1.1	1.1	14.9	14.9	12.5	12.5	-1.0	-1.0	-1.5	-1.5	-3.9	-3.9	-10.8	-10.8
Transformer 4		GSU Transformer	22.2	22.2	4.0	4.0	21.2	21.2	1.6	1.6	0.5	0.5	3.3	3.3	16.6	16.6	13.4	13.4	-1.1	-1.1	-2.1	-2.1	-4.4	-4.4	-10.1	-10.1
Turbine Bldg 1		Turbine_Bldg 1	14.6	14.6	14.4	14.4	14.3	14.3	12.8	12.8	10.8	10.8	-8.3	-8.3	5.5	5.5	-1.1	-1.1	4.5	4.5	6.2	6.2	3.8	3.8	-0.8	-0.8
Turbine Bldg 2		Turbine_Bldg 2	1.0	1.0	10.0	10.0	2.5	2.5	10.8	10.8	10.3	10.3	2.3	2.3	8.8	8.8	3.4	3.4	7.5	7.5	8.2	8.2	5.6	5.6	0.4	0.4
HRSG Enclosure East		HRSG_Enclosure	13.0	13.0	11.1	11.1	12.3	12.3	10.3	10.3	8.6	8.6	-24.8	-24.8	-7.6	-7.6	-7.1	-7.1	2.1	2.1	5.0	5.0	2.4	2.4	-2.6	-2.6
HRSG Enclosure East		HRSG_Enclosure	-3.5	-3.5	9.2	9.2	-3.2	-3.2	10.0	10.0	8.5	8.5	-15.9	-15.9	-12.9	-12.9	-14.9	-14.9	4.3	4.3	5.3	5.3	2.8	2.8	-2.3	-2.3
HRSG 2		HRSG	20.4	20.4	20.5	20.5	23.2	23.2	20.7	20.7	19.7	19.7	2.8	2.8	13.7	13.7	12.3	12.3	15.5	15.5	16.6	16.6	14.7	14.7	11.1	11.1

Sound Sources

Point Sound Sources

Name	M.	ID	Result. PWL Day (dBA)	Evening (dBA)	Night (dBA)	Type	Lw / Li Value	norm. dB(A)	Correction Day dB(A)	Evening dB(A)	Night dB(A)	Sound Reduction R	Area (m²)	Attenuation	Operating Time Day (min)	Special (min)	Night (min)	K0 (dB)	Freq. (Hz)	Direct.	Height	Coordinates X (m)	Y (m)	Z (m)
Stack Exit 2			98.9	98.9	98.9	Lw	Stack_Exit		0.0	0.0	0.0			5				0.0		EEIG	6.10 g	345732.75	4709836.28	74.98
Stack Exit 1			98.9	98.9	98.9	Lw	Stack_Exit		0.0	0.0	0.0			5				0.0		EEIG	6.10 g	345735.76	4709828.29	74.98
Aux Boiler Stack			98.7	98.7	98.7	Lw	AuxBoil		0.0	0.0	0.0							0.0		EEIG	38.10 a	345765.99	4709845.95	38.10

Area Sound Sources

Name	M.	ID	Result. PWL Day (dBA)	Evening (dBA)	Night (dBA)	Result. PWL" Day (dBA)	Evening (dBA)	Night (dBA)	Type	Lw / Li Value	Correction norm. dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)	Sound Reduction R	Area (m²)	Attenuation	K0 (dB)	Freq. (Hz)	Direct.	Average Ground Height Night	Absolute Height	Directivity X	User Defined Y	Z
ACC Fan 01		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 02		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 03		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 04		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 05		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 06		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 07		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 08		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 09		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 10		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 11		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 12		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 13		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 14		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 15		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 16		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 17		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 18		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 19		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 20		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 21		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0
ACC Fan 22		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0		22		0.0		(none)	4.88	36.6	0.0	0.0	-1.0

Name	M.	ID	Result. PWL			Result. PWL"			Type	Lw / Li Value	Correction				Sound Reduction		Attenuation	K0	Freq.	Direct.	Average Ground	Height	Absolute Height	Directivity		User Defined
			Day (dBA)	Evening (dBA)	Night (dBA)	Day (dBA)	Evening (dBA)	Night (dBA)			norm. dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)	R	Area (m²)		(dB)	(Hz)				Night	X	Y	Z
ACC Fan 23		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 24		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 25		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 26		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 27		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 28		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 29		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 30		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 31		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 32		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 33		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 34		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 35		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 36		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 37		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 38		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 39		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 40		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 41		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
ACC Fan 42		ACC	88.1	88.1	88.1	68.0	68.0	68.0	Lw	ACC		0.0	0.0	0.0			22	0.0		(none)	4.88		36.6	0.0	0.0	-1.0
Air Inlet Plenum Roof - Unit 1		AIP	74.4	74.4	74.4	46.0	46.0	46.0	Li	GT_Inlet_Plenum		0.0	0.0	0.0	ATCO_F	686.18	3	0.0		(none)	4.88		25.0	0.0	0.0	-1.0
Air Inlet Plenum Roof - Unit 2		AIP	74.6	74.6	74.6	46.0	46.0	46.0	Li	GT_Inlet_Plenum		0.0	0.0	0.0	ATCO_F	716.03	3	0.0		(none)	4.88		25.0	0.0	0.0	-1.0
Gas Compressor Roof 1			88.5	88.5	88.5	72.4	72.4	72.4	Lw	GasComp		0.0	0.0	0.0			21	0.0		(none)	4.88		2.1	0.0	0.0	0.0
Gas Compressor Roof 2			88.5	88.5	88.5	72.4	72.4	72.4	Lw	GasComp		0.0	0.0	0.0			21	0.0		(none)	4.88		2.1	0.0	0.0	0.0
GasMeter Roof			37.9	37.9	37.9	16.1	16.1	16.1	Lw"	GasMeter_Bldg		0.0	0.0	0.0			21	0.0		(none)	4.88		9.4	0.0	0.0	0.0
HRSG 1		HRSG	91.3	91.3	91.3	60.9	60.9	60.9	Lw	HRSG_Low		0.0	0.0	0.0			3	0.0		(none)	4.88		32.8	0.0	0.0	0.0
HRSG 2		HRSG	91.3	91.3	91.3	62.5	62.5	62.5	Lw	HRSG_Low		0.0	0.0	0.0			3	0.0		(none)	4.88		31.6	0.0	0.0	0.0
Steam Turbine Bldg Roof		Steam_Turbine_Bldg_Roof	62.3	62.3	62.3	28.5	28.5	28.5	Li	STG_Bldg		0.0	0.0	0.0	ATCO_F	2398.73	21	0.0		(none)	4.88		23.2	0.0	0.0	0.0
Turbine Bldg 1 Roof		Turbine_Bldg_Roof	72.3	72.3	72.3	44.0	44.0	44.0	Li	Turbine_Bldg		0.0	0.0	0.0	ATCO_F	676.90	Enclosure+3	0.0		(none)	4.88		17.1	0.0	0.0	0.0
Turbine Bldg 1 Roof		Turbine_Bldg_Roof	72.6	72.6	72.6	44.0	44.0	44.0	Li	Turbine_Bldg		0.0	0.0	0.0	ATCO_F	721.06	Enclosure+3	0.0		(none)	4.88		17.1	0.0	0.0	0.0

Vertical Area Sources

Name	M.	ID	Result. PWL			Result. PWL"			Type	Lw / Li Value	Correction				Sound Reduction		Attenuation	K0	Freq.	Direct.	Z-Extent	Average Ground	Height	Absolute Height	Directivity		
			Day (dBA)	Evening (dBA)	Night (dBA)	Day (dBA)	Evening (dBA)	Night (dBA)			norm. dB(A)	Day dB(A)	Evening dB(A)	Night dB(A)	R	Area (m²)		(dB)	(Hz)						X	Y	Z
ACCSW		ACCLOUVERS	63.0	63.0	63.0	29.5	29.5	29.5	Lw	ACCLouvers		0.0	0.0	0.0			34	0.0		(none)	12.46	4.88		28.96	0.0	0.0	0.0
ACCNW		ACC NW	76.1	76.1	76.1	42.6	42.6	42.6	Lw	ACC		0.0	0.0	0.0			34	0.0		(none)	12.46	4.88		28.96	0.0	0.0	0.0
Gas Compressor 1			99.5	99.5	99.5	81.4	81.4	81.4	Lw	GasComp		0.0	0.0	0.0			10	0.0		(none)	2.13	4.88		2.13	0.0	0.0	0.0
Gas Compressor 2			99.5	99.5	99.5	81.4	81.4	81.4	Lw	GasComp		0.0	0.0	0.0			10	0.0		(none)	2.13	4.88		2.13	0.0	0.0	0.0
Gas Meter Encl Vert			37.1	37.1	37.1	12.9	12.9	12.9	Lw	GasMeter_Bldg		0.0	0.0	0.0				0.0		(none)	4.57	4.88		9.45	0.0	0.0	0.0
GT 1 Air Inlet North		Turbine_Air_Inlet_GE	90.0	90.0	90.0	69.4	69.4	69.4	Lw	Turbine_Air_Inlet_Low		0.0	0.0	0.0			3	0.0		(none)	7.92	4.88		25.02	0.0	0.0	0.0
GT 1 Air Inlet South		GT1_Air Inlet_South	90.0	90.0	90.0	69.2	69.2	69.2	Lw	Turbine_Air_Inlet_Low		0.0	0.0	0.0			3	0.0		(none)	7.92	4.88		25.02	0.0	0.0	0.0
GT 1 Inlet Plenum		G_T_Inlet_Plenum	75.5	75.5	75.5	46.0	46.0	46.0	Li	GT_Inlet_Plenum		0.0	0.0	0.0	ATCO_F	860.59	3	0.0		(none)	7.92	4.88		25.02	0.0	0.0	0.0
GT 2 Air Inlet South		GT_2_Air_Inlet_South	93.0	93.0	93.0	68.7	68.7	68.7	Lw	Turbine_Air_Inlet_Low		0.0	0.0	0.0				0.0		(none)	7.92	4.88		25.00	0.0	0.0	0.0
GT 2 Inlet Plenum		G_T_Inlet_Plenum	75.5	75.5	75.5	46.0	46.0	46.0	Li	GT_Inlet_Plenum		0.0	0.0	0.0	ATCO_F	881.64	3	0.0		(none)	7.92	4.88		25.02	0.0	0.0	0.0
HRSG 1		HRSG	91.3	91.3	91.3	54.7	54.7	54.7	Lw	HRSG_Low		0.0	0.0	0.0			3	3.0		(none)	39.30	4.88		32.76	0.0	0.0	0.0
HRSG Building Vert S			74.9	74.9	74.9	39.9	39.9	39.9	Li	HRSBldg		0.0	0.0	0.0	ATCO_F	3163.24		0.0		(none)	38.10	4.88		43.00	0.0	0.0	0.0
HRSG Building Vert N			77.5	77.5	77.5	39.9	39.9	39.9	Li	HRSBldg		0.0	0.0	0.0	ATCO_F	5757.89		0.0		(none)	38.10	4.88		43.00	0.0	0.0	0.0
Step-up Transformer 1		Transformer	91.4	91.4	91.4	65.0	65.0	65.0	Lw	Standard_Transformer		0.0	0.0	0.0			18	0.0		(none)	9.19	4.88		17.07	0.0	0.0	0.0
Step-up Transformer 2		Transformer	91.4	91.4	91.4	64.9	64.9	64.9	Lw	Standard_Transformer		0.0	0.0	0.0			18	0.0		(none)	9.19	4.88		17.07	0.0	0.0	0.0
STG Bldg 1&2		STG_Bldg	78.4	78.4	78.4	41.7	41.7	41.7	Li	STG_Bldg		0.0	0.0	0.0	ATCO_F	4740.17	Enclosure	0.0		(none)	22.86	4.88		27.74	0.0	0.0	0.0
Transformer 3		GSU Transformer	87.4	87.4	87.4	64.2	64.2	64.2	Lw	Standard_Transformer		0.0	0.0	0.0			22	0.0		(none)	7.98	4.88		15.85	0.0	0.0	0.0
Transformer 4		GSU Transformer	87.4	87.4	87.4	65.4	65.4	65.4	Lw	Standard_Transformer		0.0	0.0	0.0			22	0.0		(none)	6.10	4.88		15.85	0.0	0.0	0.0
Turbine Bldg 1		Turbine_Bldg 1	75.9	75.9	75.9	44.0	44.0	44.0	Li	Turbine_Bldg		0.0	0.0	0.0	ATCO_F	1535.97	Enclosure+3	0.0		(none)	12.19	4.88		17.10	0.0	0.0	0.0
Turbine Bldg 2		Turbine_Bldg 2	75.8	75.8	75.8	44.0	44.0	44.0	Li	Turbine_Bldg		0.0	0.0	0.0	ATCO_F	1521.91	Enclosure+3	0.0		(none)	12.19	4.88		17.10	0.0	0.0	0.0
HRSG Enclosure East		HRSG_Enclosure	69.3	69.3	69.3	39.9	39.9	39.9	Li	HRSBldg		0.0	0.0	0.0	ATCO_F	879.05		0.0		(none)	25.90	4.88		43.00	0.0	0.0	0.0
HRSG Enclosure East		HRSG_Enclosure	69.3	69.3	69.3	39.9	39.9	39.9	Li	HRSBldg		0.0	0.0	0.0	ATCO_F	878.81		0.0		(none)	25.90	4.88		43.00	0.0	0.0	0.0
HRSG 2		HRSG	91.3	91.3	91.3	54.7	54.7	54.7	Lw	HRSG_Low		0.0	0.0	0.0			3	3.0		(none)	39.30	4.88		31.56	0.0	0.0	0.0

APPENDIX I

Environmental Justice

APPENDIX I

ENVIRONMENTAL JUSTICE

In 2002, the Environmental Justice (EJ) policy was promulgated by the Executive Office of Environmental Affairs (EOEA), the predecessor to the Executive Office of Energy and Environmental Affairs (EOEEA). EOEA issued the EJ policy pursuant to its statutory mandate to "develop policies, plans, and programs for carrying out [its] assigned duties" (G.L. c. 21A, § 2). The EJ policy provides procedural direction to EOEEA agencies for projects proposed to be constructed in or near EJ areas. The EJ policy requires, among other things, enhanced public participation under Massachusetts Environmental Policy Act (MEPA) for projects within five miles of an EJ population if a project exceeds a mandatory Environmental Notification Form (ENF) threshold for air. EJ Policy at 8.

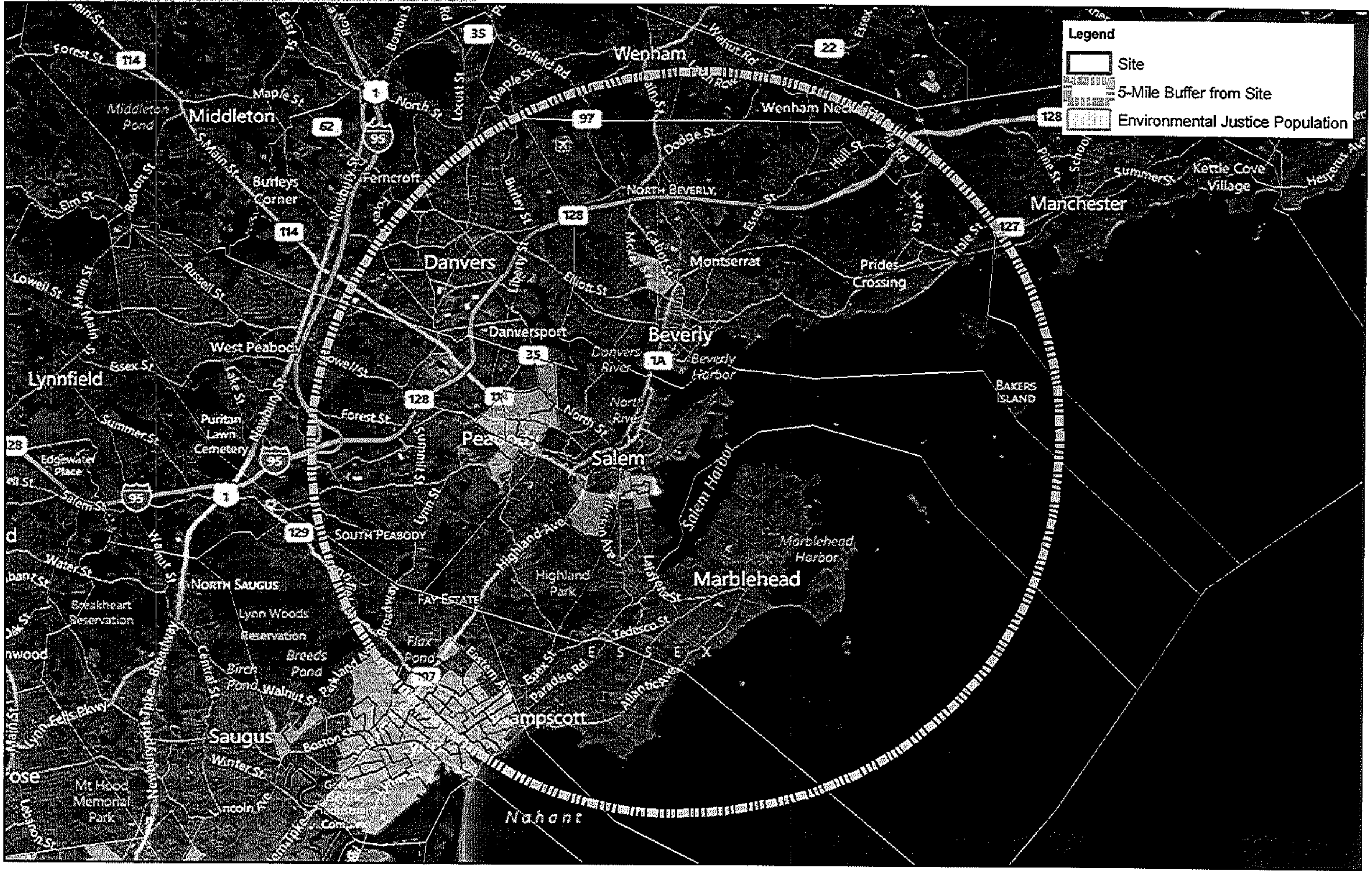
The Proposed Project is not located in or adjacent to an EJ area. However, the Project Site is within five miles of EJ areas as shown in Figure I-1 and the Proposed Project exceeds a mandatory ENF threshold for air. Pursuant to discussions with and direction from the Massachusetts Environmental Policy Act (MEPA) Office, a legal notice of the availability of the ENF was published in the Salem News in English, Spanish and Portuguese on August 8, 2012. It was also published in the Marblehead Reporter in English on August 9, 2012. Additional publication of the Legal Notice of Environmental Review was also accomplished in English, Spanish and Portuguese in the Boston Globe on August, 18, 2012, the Lynn Daily Item on August 21, 2012 and in the Danvers Herald, the Beverly Citizen and the Peabody-Lynnfield Weekly News on August 23, 2012. Notice of the public scoping meeting and site visit was sent to the City of Beverly, the City of Lynn, the Town of Peabody, Town of Marblehead, the City of Salem, and the Town of Danvers. Notification of the availability of this DEIR will be published in the Boston Globe, the Salem News, the Marblehead Reporter, the Beverly Citizen, the Danvers Herald, the Lynn Daily Item and the Peabody-Lynnfield Weekly News in English, Spanish and Portuguese.

The EOEEA is a recipient of federal financial assistance for the administration of MassDEP's air pollution control program and Title VI of the federal Civil Rights Act of 1964 applies to all recipients of federal financial assistance. Title VI states that, "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving federal financial assistance". Additionally, 310 CMR 7.00 Appendix A requires that the benefits of the Proposed Project significantly outweigh the environmental and social costs imposed as a result of the Project's location, construction, or modification. This demonstration is made in Section 8 of this application largely with reference to the MEPA Draft

Environmental Impact Report (DEIR) for the Project (EEA #14937). A detailed evaluation of alternatives is found in Section 4 of the DEIR. Mitigation alternatives for air quality and noise are addressed in Sections 5 and 9 of this application. Project benefits are described in Section 3.1 of the DEIR. Environmental costs and social costs of the Project are also presented in the DEIR (Sections 5 and 6) but these costs have been greatly mitigated by the measures described in Section 8 of the DEIR.

Figure I-1 shows that the closest EJ area to the site is approximately 0.5 miles (800 meters) southwest of the SHR Facility. The noise impact analysis and air quality impact analysis presented in Sections 9 and 6 of this CPA application, respectively, show that the SHR Project will not have a disproportionate impact on nearby EJ communities.

Date Printed: 12/13/2012
File Name: P:\62117\127-62117-12001\GIS\DEIR Graphics\Final_Draft\Figure 1-10 EJ Areas Within a 5 mile radius of the Site.mxd



TETRA TECH

0 0.5 1
Miles

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Base Map:Bing Aerial

Salem Harbor Station Redevelopment Project
Salem, Massachusetts

Environmental Justice Areas Within a 5-Mile Radius of the Site

Figure I-1

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK
Governor

RICHARD K. SULLIVAN JR.
Secretary

DAVID W. CASH
Commissioner

April 8, 2014

Clerk of the Board
U.S. Environmental Protection Agency
Environmental Appeals Board
1201 Constitution Avenue NW
WJC East Building, Room 3334
Washington, D.C. 2000

Re: In the matter of Footprint Salem Harbor Development, LP PSD Appeal NO. 14-02

Dear Ms. Durr:

On behalf of the Massachusetts Department of Environmental Protection, we are filing the following documents both electronically and by over-night mail: MassDEP's Response to the Amended Petition for Review in the above-captioned case, the exhibits accompanying this Response, and a certified index to the Administrative Record. This filing also includes the necessary certificates of service, certificate to pertaining to the word count of the response and certificate that the electronically filed and hand delivered documents are identical. .

As you know, MassDEP's Response was due on April 7, 2014. Due to a computer problem, I requested an extension by phone. I was advised to file a motion for an extension with the filing and to seek the assent of the parties to this extension. I have followed this advice and obtained the consent of the attorneys for Footprint Salem Harbor Development L.P. (Footprint) and the Petitioners. The motion for the extension and certificate of service accompanying that motion is included in this filing

Very truly yours,

Madelyn Morris

CC: Lauren Liss
Wesley Kelman