Exhibit A:

April 12, 2013, Letter from Tetra Tech to MassDEP

(the "April 12, 2013 Supplement")

TETRA TECH

April 12, 2013

Mr. James Belsky, Permit Chief
MassDEP Northeast Region
205B Lowell Street
Wilmington, MA 01887

Re: First Supplement to Major Comprehensive Plan Application – Salem Harbor Redevelopment (SHR) Project (Transmittal Number X254064)

Dear Mr. Belsky:

This first supplement to the Major Comprehensive Plan Application submitted on December 21, 2012 is being submitted on behalf of Footprint Power Salem Harbor Development LP ("Footprint"), and is based on comments provided by MassDEP in our meetings held in your offices on February 26, 2013 (for air quality related topics) and March 12, 2013 (for noise related topics). MassDEP requested that the following additional items be provided in a supplement to the Plan Application:

1. Additional justification for use of existing ambient monitoring data in lieu of of preconstruction monitoring and the selection of background concentrations used in the air quality impact analyses, considering the recent appeals court decision which vacated the Significant Monitoring Concentration (SMC) for $PM_{2.5}$

2. An adjustment to the ambient impact analysis for $PM_{2.5}$ or additional justification for the approach taken to the impact analysis which included the use of the $PM_{2.5}$ SIL, considering the recent appeals court decision which vacated and remanded portions of the rules addressing the Significant Impact Level (SIL) for $PM_{2.5}$

3. Additional justification for the selection of LAER and BACT for certain sources of criteria pollutants: a) the LAER emission rate for NO_x from the combustion turbines, and b) the BACT emission rate for VOC emission from the combustion turbines during duct firing.

4. Additional justification for the selection of the BACT emission rate for CO_2 emissions including: a) additional cost information on carbon capture and sequestration, b) comparative turbine heat rates, and c) the cost implications and energy benefits of the various potential improvements suggested by DOER

5. Additional information on start-up emissions and durations and all emissions expressed on an energy output basis (in units of lb/MW-hr)

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6. A more robust determination in accordance with the condition specified in 310 CMR 7.00 Appendix A that "by means of an analysis for alternative sites, sizes, production processes, and environmental control techniques" the Proponent shall demonstrate that "the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification."

7. An update on the status of obtaining the required emissions offsets

8. Final air quality impact modeling based on the plant with the selected turbine vendor and final site configuration and including GE Lynn and Wheelabrator Saugus as interacting sources for PM and NO_x and Rousselot, Peabody Municipal Light, and Marblehead Municipal Light as interacting sources for 1-hour NO_x

9. A more detailed analysis of federal environmental justice (EJ) considerations in support of the PSD application

10. Documentation of the notifications provided to other federal agencies and the tribal councils as stipulated in the delegation agreement for the PSD Program between MassDEP and EPA Region 1

11. An updated assessment of background noise levels including a review of other recent sound measurement data that have been collected in the vicinity of the study area

12. A more detailed assessment of construction noise impacts and potential mitigation techniques

13. Noise specifications for key plant equipment

14. Final acoustic modeling for the facility based on the turbine vendor selected, and the final site layout and noise mitigation plan

15. Vendor acoustic data for key plant equipment used in the final acoustic modeling

16. A more robust analysis of the costs and benefits of alternative noise mitigation techniques

All of the items listed above are addressed in this Plan Application supplement with the exception of the final air quality and acoustic modeling (items 8 and 14) and federal EJ, vendor acoustic data, and alternative noise mitigation technique analyses (items 9, 15, and 16) all of which depend on final turbine vendor selection and/or final modeling. Certain energy efficiency measures per item 4.b are also still under evaluation. The final turbine vendor selection is expected in late April or early May with final air and acoustic modeling anticipated to take place in May. The supplement containing these remaining five items is therefore currently expected to be submitted in late May.

The MassDEP-requested items are addressed in the sections below.

1. **Additional justification for use of existing monitoring data in lieu of preconstruction monitoring and the selection of background concentrations used in the air quality impact analyses, considering the recent appeals court decision which vacated the Significant Monitoring Concentration (SMC) for $PM_{2.5}$**

As described in the SHR Project CPA application, representative and conservative monitoring data are available and have been used to characterize criteria pollutant ambient background concentrations for the project area (see Table 6-10 of the CPA). PSD regulations allow that a regulatory authority may allow proposed sources to use existing monitoring data in lieu of PSD preconstruction monitoring requirements for a pollutant if the source can demonstrate that its ambient air impact is less than a de minimis amount (also called a significant monitoring concentration or SMC) as specified in the regulations. As shown in Table 1 below, dispersion modeling conducted for the SHR Facility predicted maximum impact concentrations well below corresponding SMC levels for all pollutants for which SMCs currently exist.

Table 1 - Comparison of Maximum SHR Project Impacts to SMCs

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu g/m^3$)	Significant Monitoring Concentration ($\mu g/m^3$)
NO_2	Annual	0.6	14
CO	8-hour	213.4	575
SO_2	24-hour	0.7	13
PM_{10}	24-hour	5.4	10

EPA had also established a SMC for $PM_{2.5}$ but this SMC was remanded by the United States Court of Appeals for the DC Circuit on January 22, 2013 (No. 10-1413, Sierra Club v. EPA). PSD regulations also allow that project-specific preconstruction monitoring may not be required for a project if existing representative monitoring data are available and the Appeals Court decision does not change this provision. On March 4, 2013, EPA Office of Air Quality Planning and Standards issued guidance to applicants and regulators with regard to the ramifications of the January 22, 2013 Appeals Court decision. The pertinent excerpt of this recent EPA guidance is as follows:

> *As a result of the Court's decision, federal PSD permits issued henceforth by either the EPA or a delegated state permitting authority pursuant to 40 CFR 52.21 should not rely on the $PM_{2.5}$ SMC to allow applicants to avoid compiling air quality monitoring data for $PM_{2.5}$. Accordingly, all applicants requesting a federal PSD permit, including those having already applied for but have not yet received the permit, should submit ambient*

$PM_{2.5}$ monitoring data in accordance with the Clean Air Act requirements whenever either direct $PM_{2.5}$ or any $PM_{2.5}$ precursor is emitted in a significant amount. In lieu of applicants setting out $PM_{2.5}$ monitors to collect ambient data, applicants may submit $PM_{2.5}$ ambient data collected from existing monitoring networks when the permitting Authority deems such data to be representative of the air quality in the area of concern for the year preceding receipt of the application. We believe that applicants will generally be able to rely on existing representative monitoring data to satisfy the monitoring data requirement.

Footprint has summarized 2009 through 2011 $PM_{2.5}$ data from MassDEP's Lynn ambient monitoring site (25-009-2006) located on Parkland Avenue at the Lynn Water Treatment Plant and has proposed to use these data for background concentrations in the ambient air quality analysis of the SHR Facility in lieu of data from a project-specific preconstruction monitoring program. On March 5, 2013, MassDEP and EPA made ambient monitoring data from 2012 available so the three year period used to characterize background concentrations has been updated to include these data. Table 6-10 Revised shows the relevant background concentrations as revised to include 2012 data. The use of data from the three year period 2010-2012 instead of 2009-2011 reduced the 24-hour and annual $PM_{2.5}$ background concentration from 19.2 and 7.3 micrograms per cubic meter, respectively, to 18.9 and 7.2 micrograms per cubic meter, but the 24-hour PM_{10} concentration increased from 35 to 41 microgram per cubic meter. Compliance with the PM_{10} NAAQS has been shown by a wide margin so this background increase does not affect the compliance situation for PM_{10}. The 1-hour NO_2 background concentration did not change.

Table 6-10 Revised. Salem Harbor Station Redevelopment Project Background Air Quality Concentrations (All Concentrations in Micrograms per Cubic Meter)

Pollutant	Representative DEP Monitoring Location	Averaging Time[3]	Background Concentration[3]	National and Massachusetts Ambient Air Quality Standards
Nitrogen Dioxide	Lynn[1]	1-hour	82.3	188
Particulate Matter 2.5	Lynn[1]	24-hr Annual	18.9 7.2	35 12
Particulate Matter 10	Harrison Ave Boston[2]	24-hr	41	150

Notes:

1. The Lynn monitoring location is approximately 5.9 miles southwest of the Salem Harbor site.
2. The Harrison Avenue monitoring location is approximately 17 miles southwest of the Salem Harbor site.
3. Background concentrations are based on the measured values from 2010-2012. Short-term concentrations (24-hours or less) are generally the maximum second highest value over the 3 years (2010-2012), or in the case of 24-hour $PM_{2.5}$, and 1-hour NO_2 the average of the 98th percentile values. These assumptions are consistent with the form of the ambient air quality standards for the pollutant.

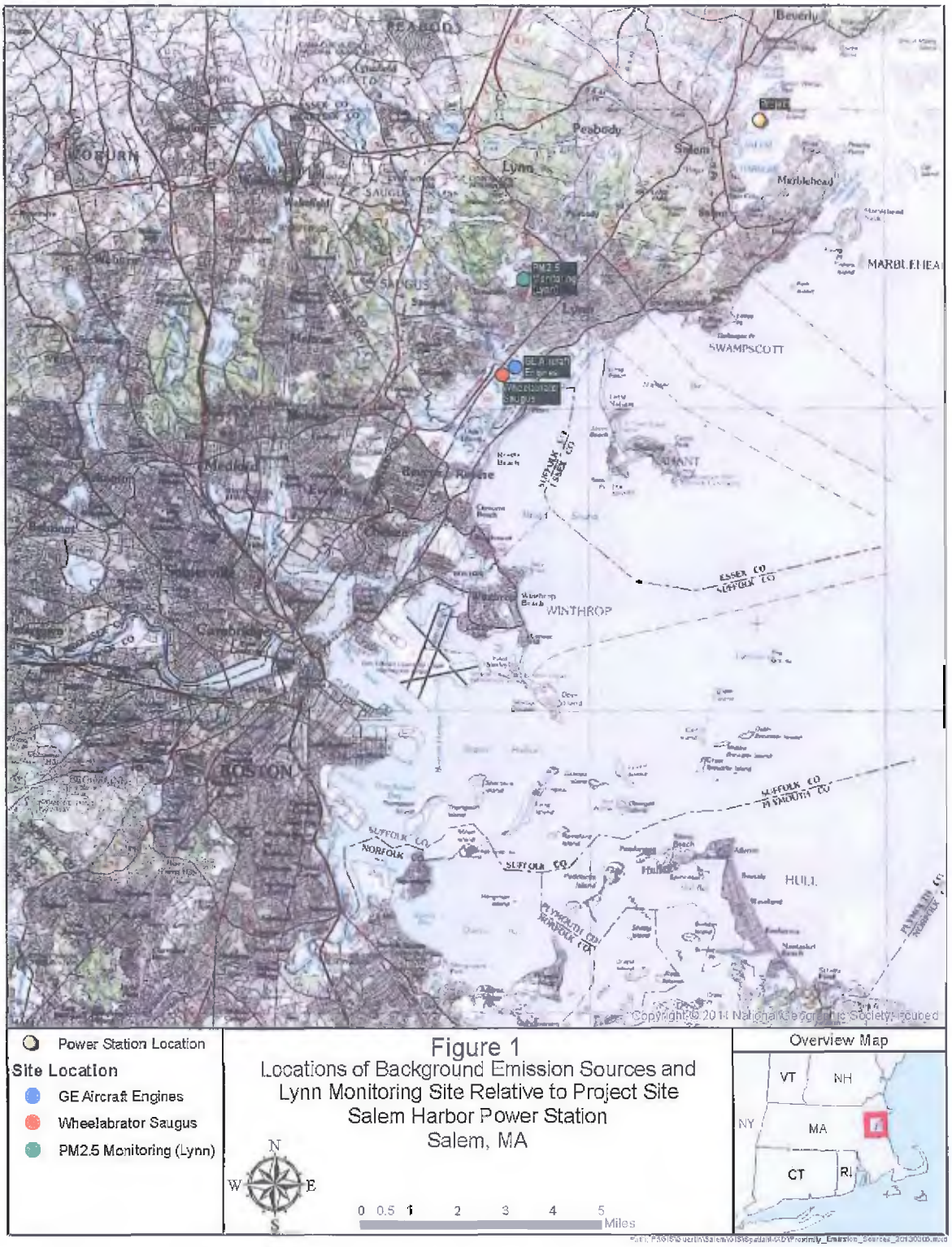
As noted in footnote 1 above, the Lynn monitoring site is located approximately 5.9 miles to the southwest of the project site. This monitoring site is representative of the Salem Project site since it is located relatively close to the site. However, use of data from the Lynn monitoring site is also conservative because Lynn is a more industrialized and densely populated area than the proposed project site area, particularly without the influence of the existing Salem Power Plant as will be the situation when the SHR Facility begins operations. The project site is located adjacent to Salem Harbor, a significantly large water body where potential emission sources are more limited. The Lynn monitoring site is also located closer to the metropolitan Boston area than the project site area. Any potentially elevated ambient background pollutant concentrations from emission sources located in and around the Boston metro area that may be transported to the Salem project area via predominant south southwesterly winds (winds blowing towards the north northeast), must pass the Lynn monitoring site, and are therefore represented in the measurement data collected at the Lynn monitoring site.

The GE Aircraft Engine facility in Lynn and the Wheelabrator Saugus waste-to-energy facility, which have been identified by MassDEP as the only two major industrial emission sources to be modeled cumulatively with the proposed SHR Facility, are located slightly less than 2 miles from the monitoring site but are located about 7 miles from the SHR Project site. Therefore, the cumulative modeling compliance demonstration, which includes both the background ambient concentrations and impacts from the interactive existing major sources potentially double counts the contribution of these sources and therefore, potentially overestimates cumulative impact concentrations. This is particularly significant because these two major sources are located to the south southwest of the monitoring site which means that they could potentially influence the monitoring site concentrations during south southwesterly winds (winds blowing towards the north northeast) which is one of the predominant wind directions in the area.

The relative location of the Project site to the Lynn monitor, the major sources modeled cumulatively, and the metropolitan Boston area is shown in Figure 1.

2. **An adjustment to the ambient impact analysis for $PM_{2.5}$ or additional justification for the approach taken to the impact analysis which included the use of the $PM_{2.5}$ SIL, considering the recent appeals court decision which vacated and remanded portions of the rules addressing the Significant Impact Level (SIL) for $PM_{2.5}$**

Despite the fact that the PSD regulations dealing with significant impact levels (SILs) for $PM_{2.5}$ were partially vacated and remanded (at EPA's request) in the January 22, 2013 Appeals Court decision, the use of the $PM_{2.5}$ SILs is still perfectly valid in certain circumstances in which ambient background concentrations are relatively low. EPA did not concede that it lacked authority to promulgate SILs and the court found that it was not necessary to address the question of whether EPA had such authority. In fact, the SILs were vacated and remanded in only PSD sections 40 CFR 51.166(k)(2) and 52.21(k)(2) but were not vacated in 40 CFR


Power Station Location
Site Location
GE Aircraft Engines
Wheelabrator Saugus
PM2.5 Monitoring (Lynn)
Figure 1
Locations of Background Emission Sources and
Lynn Monitoring Site Relative to Project Site
Salem Harbor Power Station
Salem, MA
N
W
E
S
0 0.5 1 2 3 4 5
Miles
Overview Map
VT
NH
NY
MA
CT
RI
Beverly
Peabody
Salem
Lynn
Marblehead
SAUGUS
SWAMPSCOTT
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HULL
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51.165(b)(2). This is most likely because the text of this later regulation does not exempt a source from ambient air quality analysis but states that if a source located in an attainment area exceeds a SIL in a nonattainment area (or predicted nonattainment situation), it is deemed to have contributed to or caused a violation of a NAAQS.

Key examples in the Appeals Court decision supporting the vacature and remand involved cases in which the ambient air quality background is very close to the NAAQS and that is certainly not the case in the Salem region where the $PM_{2.5}$ background is only slightly over half of the NAAQS (see Table 6-10 Revised above). Accordingly, use of the prior $PM_{2.5}$ SILs is appropriate in the case of the ambient air quality impact analysis for the SHR Facility because the background concentrations plus the SILs still leave a significant margin before the NAAQS would come close to being jeopardized.

This is consistent with the recent guidance on this matter by EPA which states[1]:

- *The EPA does not interpret the Court's decision to preclude the use of SILs for $PM_{2.5}$ entirely but additional care should be taken by permitting authorities in how they apply those SILs so that the permitting record supports a conclusion that the source will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS.*
- *PSD permitting authorities have the discretion to select $PM_{2.5}$ SIL values if the permitting record provides sufficient justification for the SIL values that are used and the manner in which they are used to support a permitting decision.*
- *The $PM_{2.5}$ SIL values in the EPA's regulations may continue to be used in some circumstances if permitting authorities take care to consider background concentrations prior to using these SIL values in particular ways.*
- *Because of the Court's decision vacating the $PM_{2.5}$ SMC, all applicants for a federal PSD permit should include ambient $PM_{2.5}$ monitoring data as part of the air quality impacts analysis. If the preconstruction monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the EPA's $PM_{2.5}$ SIL value, then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a proposed source with a $PM_{2.5}$ impact below the $PM_{2.5}$ SIL value will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and to forego a more comprehensive cumulative modeling analysis for $PM_{2.5}$.*
- *As part of a cumulative analysis, the applicant may continue to show that the proposed source does not contribute to an existing violation of the $PM_{2.5}$*

[1] U.S. EPA, Office of Air Quality Planning and Standards, "Circuit Court Decision on $PM_{2.5}$ Significant Impact Levels and Significant Monitoring Concentration – Questions and Answers", March 4, 2013. http://www.epa.gov/nsr/documents/20130304qa.pdf

NAAQS by demonstrating that the proposed source's $PM_{2.5}$ impact does not significantly contribute to an existing violation of the $PM_{2.5}$ NAAQS. However, permitting authorities should consult with the EPA before using any of the SIL values in the EPA's regulations for this purpose (including the $PM_{2.5}$ SIL value in section 51.165(b)(2), which was not vacated by the Court)

3. **Additional justification of the selection of LAER and BACT for certain sources of criteria pollutants: a) the LAER emission rate for NO_x from the combustion turbines, and b) the BACT emission rate for VOC emission from the combustion turbines during duct firing.**

3.a) NO_x LAER

With respect to item 3a, the following sources of data are referenced to support the NO_x LAER determination:

- Attachment 1 provides the results for the EPA's RACT/BACT/LAER Clearinghouse (RBLC) search for the lowest NO_x emission rate for projects approved in the last 10 years for Process Type 15.210 (large gas-fired combined cycle combustion turbines). The results of this search show that the lowest approved NO_x rate in RBLC is 2.0 ppm corrected to 15% O_2 (referred to simply as 2.0 ppm here).
- The EPA Region IV National Combustion Turbine Spreadsheet, (http://www.epa.gov/region4/air/permits/) was examined to identify if any NO_x emission limits more stringent than 2.0 are reported. The only project identified with a NOx emission limit < 2.0 ppm is the Sunlaw (CA) Cogeneration Project, which shows "1-2 ppm" for NOx. However, the RBLC entry for Sunlaw (RBLC ID # CA-0863) confirms the emission level demonstrated in practice for this facility is 2.0 ppm,
- The California Air Resources Board (ARB) BACT Clearinghouse (http://www.arb.ca.gov/bact/bactnew/rptpara.htm) had 9 records for combined-cycle gas turbines > 50 MW; the only one more stringent than 2.0 ppm NO_x is the IDC Bellingham Project (in MA), which is shown as having a NO_x limits of 1.5 ppm. This entry contains a note indicating that the limit(s) "are as stringent or more stringent than prior existing SCAQMD BACT for this source category. These limits have not been verified by performance data. These limits were negotiated with the applicant and are presumably based on vendor guarantees." The IDC Bellingham Project was never built, so the approved NO_x level of 1.5 ppm was never demonstrated in practice. Therefore, IDC Bellingham is not a precedent for NO_x LAER.
- The South Coast Air Quality Management District (SCAQMD) BACT Clearinghouse (http://www.aqmd.gov/bact/AQMDBactDeterminations.htm) has 3 gas turbine combined-cycle units listed, with 2 approved at 2.0 ppm and one approved at 2.5 ppm.
- New Jersey's State of the Art (SOTA) Manual for combustion turbines (http://www.state.nj.us/dep/aqpp/sota.html) specifies a NO_x limit of 2.5 ppm for combustion turbine combined cycle units > 150 MMBtu/hr heat input.

In summary, we are not aware of any LAER precedents for large gas-fired combined cycle turbines where a NO_x emission limit of less than 2.0 ppm has been approved and subsequently demonstrated in practice. The Massachusetts BACT guidance for combustion sources identifies 2.0 ppm of NO_x as the "top case" for large gas-fired combined cycle units. The two most recent NO_x LAER precedents for similar Massachusetts projects are also 2.0 ppm for gas firing. These are for the Brockton Power Company LLC (Plan Approval No. 4B08015, July 20, 2011) and Pioneer Valley Energy Center (Plan Approval No.-B-08-037, December 31, 2010).

3.b) VOC BACT

Footprint has contacted turbine suppliers with regard to the 2 ppmvd at 15% O_2 VOC emissions guarantee provided during duct firing determined by Footprint as BACT in the original application. All turbine suppliers still in consideration for the SHR Project have lowered their VOC emissions guarantee to 1.7 ppmvd at 15% O_2. Tables 3-1 and 3-3 of the Major CPA application have been updated for this change below and Footprint accordingly changes the proposed BACT determination based on these guarantees.

Table 3-1 Short-Term Emission Rates for Turbine and HRSG Units

Pollutant	ppmvd at 15% O_2	lb/MMBtu	lb/hr (per CTG+HRSG)
NO_x	2.0	0.0074	18.1
CO	2.0	0.0045	11.0
VOC, unfired	1.0	0.0013	3.2
VOC, duct-fired	1.7	0.0022	5.4
SO_2	0.3	0.0015	3.7
PM	N/A	<0.009	16.1
PM_{10}	N/A	<0.009	16.1
$PM_{2.5}$	N/A	<0.009	16.1
NH_3	2.0	0.0027	6.6

Table 3-3 Facility-Wide Annual Potential Emissions

Pollutant	CT Unit 1 (tpy)	CT Unit 2 (tpy)	Auxiliary Boiler (tpy)	Emergency Generator (tpy)	Fire Pump (tpy)	Auxiliary Cooling Tower (tpy)	Facility Total (tpy)
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	18.6	18.6	1.3	0.35	0.12	0	38.9
SO_2	15.6	15.6	0.4	0.0017	0.0006	0	31.5
PM	54.0	54.0	1.3	0.06	0.02	0.43	109.9
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	0.00013	0.00005	0	20.8
Lead	0	0	0.00013	0.000001	0.0000003	0	0.00013
Formaldehyde	3.6	3.6	0.019	0.00009	0.0005	0	7.3
Total HAP	6.9	6.9	0.5	0.0018	0.0016	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

4. **Additional justification of the selection of the BACT emission rate for CO_2 emissions including: a.) additional cost information on carbon capture and sequestration, b.) comparative turbine heat rates, and c.) the cost implications and energy benefits of the various potential improvements suggested by DOER**

4.a)Carbon Capture and Sequestration (CCS)

With regard to CCS, as identified by US EPA, CCS is composed of three main components: CO_2 capture and/or compression, transport, and storage. CCS may be eliminated from a BACT analysis in Step 2 (technical feasibility) if it can be shown that there are significant differences pertinent to the successful operation for each of these three main components from what has already been applied to a differing source type. For example, the temperature, pressure, pollutant concentration, or volume of the gas stream to be controlled, may differ so significantly from previous applications that it is uncertain the control device will work in the situation currently undergoing review. Furthermore, CCS may be eliminated from a BACT analysis in Step 2 if the three components working together are deemed technically infeasible for the proposed source, taking into account the integration of the CCS components with the base facility and site-specific considerations (e.g., space for CO_2 capture equipment at an existing facility, right-of-ways to build a pipeline or access to an existing pipeline, access to suitable geologic reservoirs for sequestration, or other storage options). While CCS is a promising technology, EPA does not believe that at this time CCS will be a technically feasible BACT option in certain cases.

As identified by the August 2010 Report of the Interagency Task Force on Carbon Capture and Storage (co-chaired by US EPA and the US Department of Energy), while amine- or ammonia-based CO_2 capture technologies are commercially available, they have been implemented either in non-combustion applications (i.e., separating CO_2 from field natural gas) or in relatively small-scale combustion applications (e.g., slip streams from power plants, with volumes on the order of what would correspond to one megawatt). Scaling up these existing processes represents a significant technical challenge and potential barrier to widespread commercial deployment in the near term. It is unclear how transferable the experience with natural gas processing is to separation of power plant flue gases, given the significant differences in the chemical make-up of the two gas streams. In addition, integration of these technologies with the power cycle at generating plants present significant cost and operating issues that will need to be addressed to facility widespread, cost-effective deployment of CO_2 capture. Current technologies could be used to capture CO_2 from new and existing fossil energy power plants; however, they are not ready for widespread implementation primarily because they have not been demonstrated at the scale necessary to establish confidence for power plant applications.

Regarding pipeline transport for CCS, there is no nearby existing CO_2 pipeline infrastructure. The nearest CO_2 pipelines to Massachusetts are in northern Michigan and southern Mississippi. With regard to storage for CCS, the Interagency Task Force concluded that while there is currently estimated to be a large volume of potential storage sites, "to enable widespread, safe, and effective CCS, CO_2 storage should continue to be field-demonstrated for a variety of geologic reservoir classes" and that "scale-up from a limited number of demonstration projects to widescale commercial deployment may necessitate the consideration of basin-scale factors (e.g., brine displacement, overlap of pressure fronts, spatial variation in depositional environments, etc.)."

Based on the abovementioned EPA guidance regarding technical feasibility and the conclusions of the Interagency Task Force for the CO_2 capture component alone (let alone a detailed evaluation of the technical feasibility of right-of-ways to build a pipeline or of storage sites), CCS has been determined to not be technically feasible.

CCS would be the most effective option at reducing GHGs, if successfully applied. However, as the Congressional Budget Office identified in June 2012, the technology is not economically viable now.[2] For example, the Center for Climate and Energy Solutions (C2ES) has calculated that in general, the levelized cost of electricity from a new-build natural gas-fired combined cycle power plant is $74.70/MWh without CCS and $108.9/MWh with CCS.[3] This cost differential either (a) makes a CCS-equipped plant completely unprofitable to build and operate, or (b) to the extent that costs are passed along, makes the plant unlikely to be dispatched relative to more economical plants. The International Energy Agency (IEA) has identified the cost-

[2] Congressional Budget Office, "Federal Efforts to Reduce the Cost of Capturing and Storing Carbon Dioxide," Publication No. 4146, June 2012 (available from http://www.cbo.gov/sites/default/files/cbofiles/attachments/43357-06-28CarbonCapture.pdf), p. 13.

[3] Center for Climate and Energy Solutions, "Carbon Capture and Storage", October 2012 (available from http://www.c2es.org/technology/factsheet/CCS).

effectiveness of applying CCS to natural gas-fired combined-cycle power plants is approximately $80 per tonne of CO_2 avoided.[4] On top of that, the C2ES and IEA data are for typical or average installations, and do not take into account the fact that Massachusetts is a particularly sub-optimal area for carbon sequestration, being one of the few states identified in the 2012 North American Carbon Storage Atlas as having zero carbon storage resources.[5] This drawback means that costs for implementing CCS in Massachusetts are even higher, and would require the construction and operation of a large pipeline extending to a state that does have carbon storage resources, or offshore.

EPA has not identified a cost-effectiveness threshold, and none of the BACT/LAER determinations for GHGs that are in EPA's Clearinghouse identified quantitative cost-effectiveness thresholds either. However, that being said, none of those determinations concluded that CCS was cost-effective either. We are aware that several projects have had to conduct BACT analyses for GHGs and that these results are not shown in the Clearinghouse; however, to our knowledge, even in the areas of the U.S. that are more conducive to GHG storage than Massachusetts, there have been no determinations that CCS is cost-effective for natural gas-fired combined cycle electric generating plants.

4.b) Comparative Combined Cycle Heat Rates and Proposed GHG BACT

In Section 5.1 of the Plan Approval/PSD Application, we proposed a "new and clean" full load ISO corrected heat rate for each combined cycle unit of 7,080 Btu/kWhr. This is based on HHV, and net output to the grid. Using the EPA Part 75 default CO_2 emission factor of 118.9 lb/MMBtu, this corresponds to a proposed GHG BACT emission rate of 842 lb/MWhr. This is also for "new and clean" conditions, full load, and corrected to ISO conditions. These values are based on the projected performance of the Siemens SCC6-5000F(5) Flex-PlantTM 30.

If the GE 107FA.05 combined cycle plant is installed, the GE equipment would have a better (lower) heat rate. The projected "new and clean" full load ISO corrected heat rate for each GE-based combined cycle unit would be 6,940 Btu/kWhr. This is also based on HHV, and net output to the grid. Using the EPA Part 75 default CO_2 emission factor of 118.9 lb/MMBtu, this corresponds to a proposed GHG BACT emission rate (for GE) of 825 lb/MWhr. This is also for "new and clean" conditions, full load, and corrected to ISO conditions.

The final selection of the SHR project equipment has not been announced. The comparative efficiency will be a key factor in this selection, along with various other technical and commercial considerations.

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[4] Matthias Finkenrath (International Energy Agency), "CO_2 Capture Costs", keynote presented at the CCS Costs Workshop, March 22-23, 2011, Paris (available from http://sequestration.mit.edu/pdf/2011%20CCS%20Cost%20Workshop%20-%20Proceedings.pdf).

[5] North American Carbon Atlas Partnership (NACAP), "The North American Carbon Storage Atlas 2012" (available from http://www.netl.doe.gov/technologies/carbon_seq/refshelf/NACSA2012.pdf), p. 49.

4.c) Energy Efficiency Improvements Suggested by DOER

The Massachusetts Department of Energy Resources (DOER), in comments made on the Draft EIR, suggested several energy efficiency improvements in order to reduce the plant parasitic load. The improvements suggested are: high efficiency exterior and industrial interior lighting, variable speed electric drives and motors, piping and valve design to reduce pressure losses, and use of premium efficiency transformers.

With respect to exterior and industrial interior lighting, the SHR Project will use high efficiency LED lighting for these areas. (The Project will also use high efficiency lighting in the Administration Building and Operations Center as documented in the FEIR). Attachment 2 provides a summary of the energy benefits of the high efficiency exterior and industrial interior lighting compared to standard lighting.

With respect to variable speed electric drives and motors, piping and valve design to reduce pressure losses, and use of premium efficiency transformers, engineering evaluation of these measures is still ongoing and the results of these evaluations will be provided in a later supplement.

5. Additional information on start-up emissions and durations and express all emissions also on an energy output basis (in units of lb/MW-hr)

5.a) Startup Emissions

Table 5-3 of the Plan Approval/PSD Application provides the estimated startup/shutdown emissions performance for each combined cycle unit. This is expressed in pounds of emissions over 45 minutes for startup and for 30 minutes for shutdown. This is estimated performance for the project which we fully expect will be met by the installed equipment. However, since various site-specific equipment factors can influence the actual startup/shutdown emissions, Footprint is requesting that the limits in Table 5-3 be considered as "provisional" limits for the first year of commercial operation. Then, after review of the stack test data and CEMS data for the first year of operation, final startup/shutdown limits will be established. The Pioneer Valley Energy Center Plan Approval contains a provision to this effect (page 35 of 54, Table 11, footnote 3.

5.b) Proposed Emission Limits – Energy Output Basis

Proposed emission limits on an energy output basis are provided in Table 2 below. These proposed limits are based on the proposed heat rate for the Siemens turbine (7,080 Btu/kWhr net), since this will provide proposed limits inclusive of both the Siemens and GE equipment. These limits are proposed to apply to full load operation, "new and clean," to be demonstrated by an initial stack test, with the turbine heat rate corrected to ISO conditions.

Table 2 Short-Term Emission Rates for Turbine and HRSG Units – Energy Output Basis

Pollutant	pounds/MWhr corrected to ISO conditions
NO_x	0.052
CO	0.032
VOC, unfired	0.009
VOC, duct-fired	0.016
SO_2	0.011
PM	0.064
PM_{10}	0.064
$PM_{2.5}$	0.064
NH_3	0.019

6. **A more robust determination in accordance with the condition specified in 310 CMR 7.00: Appendix A that "by means of an analysis for alternative sites, sizes, production processes, and environmental control techniques" the Proponent shall demonstrate that "the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification."**

Attachment 3 provides the requested Appendix A demonstration.

7. **An update on the status of obtaining the required emissions offsets**

To date, Footprint has secured 194 tons per year (tpy) of the required 200 tpy of emissions offsets. As recorded in the latest Massachusetts ERC Registry dated February 13, 2013, 59 tpy were purchased from the Newark Group on February 4, 2013 (22 tpy from a shutdown at Haverhill Paperboard and 37 tpy from a shutdown at Natick Paperboard). Footprint has entered into a contract to purchase another 135 tpy from a prior source shutdown in Rhode Island and the transfer is expected to be recorded in the ERC Registry soon. The remaining 6 tpy will be secured before the air permit is finalized.

8. **Final air quality impact modeling based on the plant with the selected turbine vendor and final site configuration and including GE Lynn and Wheelabrator Saugus as interacting sources for PM and NO_x and Rousselot, Peabody Municipal Light, and Marblehead Municipal Light as interacting sources for 1-hour NO_x**

This final air dispersion modeling will be provided in a second supplement to the application expected to be submitted in late May.

9. **A more detailed analysis of federal environmental justice (EJ) considerations in support of the PSD application**

The expanded EJ analysis is dependent on final air dispersion modeling results so it will be included with the second supplement.

10. **Documentation of the notifications provided to other federal agencies and the tribal councils as stipulated in the delegation agreement for the PSD Program between MassDEP and EPA Region 1**

Footprint wanted this supplement and the original December 21, 2012 application to both be available to the other federal agencies and the tribal councils so we will be copying you directly on the notification letters to these organizations which will be sent within 5 days.

11. **An updated assessment of background noise levels including a review of other recent sound measurement data that have been collected in the vicinity of the study area**

The background noise levels used in our operational noise impact assessment have been updated. The two changes made are as follows:

- Nighttime ambient levels that were measured by Tetra Tech before midnight have been conservatively reduced by 2 dBA for purposes of the impact assessment. We still consider the nighttime measurements made between 10 PM and midnight to represent valid data. However, in order to ensure the impact analysis is conservative, the 2 dBA subtraction has been made for ST-1, ST-2, ST-5, ST-6, and ST-8.

- The second change is that two new monitoring locations are added, Winter Island Wind Turbine (WIWT-1 or R-1) and WIWT-2 or R-2. This is additional data in the public record indicating lower nighttime ambient levels than the other data at one of the locations. The locations for R-1 and R-2 are provided in Attachment 4.

Table 9-4 from the PSD/Plan Application is updated for these changes. New and revised values are in bold and italics.

Table 9-4 Revised Cumulative Environmental Noise Levels During Base Load Operation in dBA

Receptor	Background/ Ambient	SHR facility	Total	Increase Over Background
1. 22 Fort Avenue	*47*	44	*49*	*2*
2. Block House Square/Derby Street	*42*	44	*46*	*4*
3. Bentley Elementary School	39	42	44	5
4. 36 Derby Street	39	44	45	6
5. 56 Derby Street South	*39*	44	*45*	*6*
6. 79 Naugus Avenue (Marblehead)	*36*	25	*36*	<1
7. Winter Island Park	39	39	42	3
8. Winter Island Road	*38*	33	*39*	1
9. Blaney Street Pier on Salem Wharf	39	43	44	5
10. Mackey Building/Art Gallery	36	41	42	6
11. House of Seven Gables	39	37	41	2
12. Pickering Wharf	41	30	41	<1
WITI-1 Plummer House	*40*	*35*	*41*	*1*
WITI-2 Winter Island Road Residences	*34*	*35*	*38*	*4*

As shown by the results in Table 9-4 (revised), the maximum impact of the SHR Facility remains at 6 dBA over ambient. Please note the acoustic modeling for the SHR Facility will be updated to reflect the details of the final turbine selection with more detailed acoustic design, per item 14 below. Acoustic design measures will ensure the maximum impact level does not exceed 6 dBA.

12. A more detailed assessment of construction noise impacts and potential mitigation techniques

Acoustic emission levels for activities associated with the construction of the SHR Facility have been updated to reflect potential maximum impacts for construction activity occurring close to the edge of the site, and to reflect the potential reduction in offsite impacts via use of a temporary construction noise barrier. Basic construction noise estimates remain based upon typical ranges of energy equivalent noise levels at construction sites, as documented by the U.S. Environmental Protection Agency (EPA) (U.S. EPA, Technical Document NTID300.1, December 1971). Construction noise is highly variable because most construction equipment operates intermittently, and the types of construction equipment change with construction phase. The EPA methodology distinguishes between type of construction and construction phase.

Using those energy equivalent noise levels as input to a basic propagation model, construction noise levels were recalculated at the closest residential locations and at the Bentley Elementary School. The basic model assumed spherical wave divergence and now also reflects worse case location of equipment for a given construction phase. Furthermore, the model conservatively assumes that all pieces of construction equipment associated with an activity would operate simultaneously for the duration of that activity to estimate the average noise levels from the construction equipment over the duration of phase. Atmospheric absorption and terrain effects, including the shielding effects of the berm which would be constructed during Phase 1, have been conservatively ignored. An additional level of conservatism was built into the construction noise model by excluding the shielding effects due to intervening structures and buildings along the propagation path from the site to noise-sensitive locations in the community.

The results of these calculations are provided in Table 3 and show construction sound levels at the closest residential locations on Derby Street would in most instances be between 65 and 83 dBA.

Table 3: Equivalent Noise Levels by Construction Phase at Closest Noise Sensitive Areas

Construction Phase	EPA Construction Noise Level 50 ft	Closest Residences	Bentley Elementary School	Bentley Elementary Fields
	L_{eq} (dBA)			
Ground clearing (Phase 1)	84	78	63	71
Excavation (Phase 1)	89	83	68	76
Foundations and concrete pouring (Phase 2)	78	65	56	62
Steel erection (Phase 3)	85	72	63	69
Mechanical (Phase 4)	81	68	59	65
Finishing Work (Phase 5)	89	83	68	76

Temporary Construction Noise Barrier

A review of the effectiveness of a temporary property line noise barrier was completed. A temporary sound wall is a sound barrier that is a non-retractable temporary wall that is typically constructed of ¾ inch Medium Density Overlay (MD) plywood, or other material of equivalent utility and appearance having a surface weight of 2 pounds per square foot or greater. The analysis assumed a Sound Transmission Class of STC 30, or greater, per American Society for Testing and Materials (ASTM) Test Method E90 and on one side with glass fiber, mineral wool, or other similar type noise-absorbing material at least 2-inches thick and have a Noise Reduction Coefficient rating of NRC-0.85, or greater, as per ASTM Test Method C423. The materials used for temporary barriers should be sufficient to last through the duration of the construction work, and maintained in good repair. The barriers will be installed such that sound-absorptive surfaces

face the site. When the barrier units are joined together, the mating surfaces of the barrier sides are flush with each other and gaps between barrier units and between the bottom edges of the barrier panels and the ground would be closed with material of sufficient density to attenuate sound. The acoustic modeling assumed a barrier height of 12 feet and placement is along the property line adjacent to Derby Street. The results of the estimated barrier insertion loss calculations and received noise levels at key receptor locations are presented in Table 4. The mitigated construction sound levels at the closest residential locations on Derby Street would in most instances be between 54 and 72 dBA.

Table 4: Equivalent Noise Levels by Construction Phase at Closest Noise Sensitive Areas with Temporary Noise Barrier

Construction Phase	EPA Construction Noise Level 50 ft	Closest Residences	Bentley Elementary School	Bentley Elementary Fields
	L_{eq} (dBA)			
Ground clearing (Phase 1)	84	67	51	59
Excavation (Phase 1)	89	72	56	64
Foundations and concrete pouring (Phase 2)	78	54	44	50
Steel erection (Phase 3)	85	61	51	57
Mechanical (Phase 4)	81	57	47	53
Finishing Work (Phase 5)	89	72	56	64

13. Noise specifications for key plant equipment

These specifications are provided in Attachment 5.

14. Final acoustic modeling for the facility based on the turbine vendor selected, and the final site layout and noise mitigation plan

Final acoustic modeling will be included with the second supplement in late May.

15. Vendor acoustic data for key plant equipment used in the final acoustic modeling

Vendor acoustic data will be included with the second supplement.

16. A more robust analysis of the costs and benefits of alternative noise mitigation techniques

The requested analysis of alternative noise mitigation techniques will be included with the second supplement.

If you have any questions, please contact either me at (617) 803-7809 or George Lipka at (617) 443-7568.

Sincerely,

Keith H. Kennedy

Keith H. Kennedy
Senior Consultant – Energy Programs

Attachments

Attachment 1

EPA RBLC Clearinghouse for NO_x

Attachment 1 - EPA RBLC Clearinghouse

Lowest NOx Emission Rates for Category 15.210

RBLC ID	Permit Issuance Date	Corporate & Facility Name	Standard Emission Limit (NOx)
CT-0151	02/25/2008	KLEEN ENERGY SYSTEMS, LLC	2.0000 PPM @ 15% O2
NV-0037	05/14/2004	SEMPRA ENERGY RESOURCES COPPER MOUNTAIN POWER	2.0000 PPM @ 15% O2
NY-0100	06/23/2005	EMPIRE GENERATING CO. LLC EMPIRE POWER PLANT	2.0000 PPMVD AT 15% O2
NY-0098	01/19/2007	NEW ATHENS GENERATING CO. LLC ATHENS GENERATING PLANT	2.0000 PPMVD @ 15% O2
AZ-0049	09/04/2003	ALLEGHENY ENERGY SUPPLY LLC LA PAZ GENERATING FACILITY	2.0000 PPM @ 15 O2
AZ-0047	12/01/2004	DOME VALLEY ENERGY PARTNERS WELLTON MOHAWK GENERATING STATION	2.0000 PPM @ 15% O2
AZ-0047	12/01/2004	DOME VALLEY ENERGY PARTNERS WELLTON MOHAWK GENERATING STATION	2.0000 PPM AT 15% O2
FL-0263	02/08/2005	FLORIDA POWER AND LIGHT FPL TURKEY POINT POWER PLANT	2.0000 PPM @ 15 % O2
NV-0035	08/16/2005	SIERRA PACIFIC POWER COMPANY TRACY SUBSTATION EXPANSION PROJECT	2.0000 PPM @ 15% O2
NV-0035	08/16/2005	SIERRA PACIFIC POWER COMPANY TRACY SUBSTATION EXPANSION PROJECT	2.0000 PPM @ 15% O2
NV-0038	12/29/2003	IVANPAH ENERGY CENTER, L.P. IVANPAH ENERGY CENTER, L.P.	2.0000 PPM@ 15% O2
WA-0315	04/17/2003	SUMAS ENERGY 2 GENERATION FACILITY SUMAS ENERGY 2 GENERATION FACILITY	2.0000 PPM @ 15% O2
AZ-0043	11/12/2003	DUKE ENERGY ARLINGTON VALLEY DUKE ENERGY ARLINGTON VALLEY (AVEFII)	2.0000 PPM @ 15% O2
AZ-0043	11/12/2003	DUKE ENERGY ARLINGTON VALLEY DUKE ENERGY ARLINGTON VALLEY (AVEFII)	2.0000 PPM @ 15% O2
CA-1097	05/27/2003	MAGNOLIA POWER PROJECT, SCPPA MAGNOLIA POWER PROJECT, SCPPA	2.0000 PPM @ 15% O2
CA-1096	05/27/2003	VERNON CITY LIGHT & POWER VERNON CITY LIGHT & POWER	2.0000 PPM @ 15% O2
AZ-0039	03/07/2003	SALT RIVER PROJECT/SANTAN GEN. PLANT SALT RIVER PROJECT/SANTAN GEN. PLANT	2.0000 PPM @ 15% O2
CA-0997	09/01/2003	SACRAMENTO MUNICIPAL UTILITY DISTRICT	2.0000 PPM @ 15% O2
UT-0066	05/17/2004	PACIFICORP CURRANT CREEK	2.2500 PPM @ 15% O2
WY-0061	04/04/2003	BLACK HILLS CORP. NEIL SIMPSON TWO	2.5000 PPM @ 15% O2
FL-0244	04/16/2003	FLORIDA POWER & LIGHT FPL MARTIN PLANT	2.5000 PPM @ 15% O2

RBLC ID	Permit Issuance Date	Corporate & Facility Name	Standard Emission Limit (NOx
FL-0244	04/16/2003	FLORIDA POWER & LIGHT FPL MARTIN PLANT	2.5000 PPM @ 15% O2
OR-0039	12/30/2003	Peoples Energy Resources COB ENERGY FACILITY, LLC	2.5000 PPM @ 15% O2
OR-0040	03/12/2003	KLAMATH GENERATION, LLC KLAMATH GENERATION, LLC	2.5000 PPM @ 15% O2
VA-0287	12/01/2003	JAMES CITY ENERGY PARK LLC JAMES CITY ENERGY PARK	2.5000 PPM @ 15% O2
VA-0289	02/05/2004	DUKE ENERGY WYTHE, LLC DUKE ENERGY WYTHE, LLC	2.5000 PPM @ 15% O2
VA-0289	02/05/2004	DUKE ENERGY WYTHE, LLC DUKE ENERGY WYTHE, LLC	2.5000 PPM @ 15% O2
VA-0287	12/01/2003	JAMES CITY ENERGY PARK LLC JAMES CITY ENERGY PARK	2.5000 PPM @ 15% O2
FL-0245	04/15/2003	FLORIDA POWER & LIGHT FPL MANATEE PLANT - UNIT 3	2.5000 PPM @ 15% O2
MI-0366	04/13/2005	BERRIEN ENERGY, LLC BERRIEN ENERGY, LLC	2.5000 PPM @ 15% O2
GA-0105	04/17/2003	SAVANNAH ELECTRIC AND POWER CO MCINTOSH COMBINED CYCLE FACILITY	2.5000 PPM @ 15% O2
FL-0256	09/08/2003	PROGRESS ENERGY FLORIDA HINES ENERGY COMPLEX, POWER BLOCK 3	2.5000 PPMVD @15% O2
FL-0265	06/08/2005	PROGRESS ENERGY HINES POWER BLOCK 4	2.5000 PPM @ 15% O2
LA-0192	06/06/2005	CRESENT CITY POWER, LLC CRESCENT CITY POWER	3.0000 PPM
CO-0056	05/02/2006	CALPINE CORP. ROCKY MOUNTAIN ENERGY CENTER, LLC	3.0000 PPM @ 15% O2
OH-0252	12/28/2004	DUKE ENERGY HANGING ROCK, LLC DUKE ENERGY HANGING ROCK ENERGY FACILITY	3.0000 PPM @ 15% O2
NC-0101	09/29/2005	FORSYTH ENERGY PROJECTS, LLC FORSYTH ENERGY PLANT	3.0000 PPM @ 15% O2
OH-0252	12/28/2004	DUKE ENERGY HANGING ROCK, LLC DUKE ENERGY HANGING ROCK ENERGY FACILITY	3.0000 PPM @ 15% O2
NY-0100	06/23/2005	EMPIRE GENERATING CO. LLC EMPIRE POWER PLANT	3.0000 PPMVD AT 15% O2
MN-0054	12/04/2003	MANKATO ENERGY CENTER	3.0000 PPM @ 15% O2
MS-0073	11/23/2004	RELIANT ENERGY CHOCTAW COUNTY, LLC	3.5000 PPM @ 15% 02
MS-0073	11/23/2004	RELIANT ENERGY CHOCTAW COUNTY, LLC	3.5000 PPM @ 15% 02
OH-0254	08/14/2003	DUKE ENERGY NORTH AMERICA DUKE ENERGY WASHINGTON COUNTY LLC	3.5000 PPM @ 15% O2

RBLC ID	Permit Issuance Date	Corporate & Facility Name	Standard Emission Limit (NOx)
NE-0017	05/29/2003	NEBRASKA PUBLIC POWER DISTRICT BEATRICE POWER STATION	3.5000 PPM @ 15% O2
MS-0073	11/23/2004	RELIANT ENERGY CHOCTAW COUNTY, LLC	3.5000 PPM @ 15% 02
OK-0096	06/03/2003	REDBUD ENERGY LP REDBUD POWER PLANT	3.5000 PPM @ 15% O2
OK-0090	03/21/2003	DUKE ENERGY DUKE ENERGY STEPHENS, LLC STEPHENS ENERGY	3.5000 PPM @ 15% O2
OH-0254	08/14/2003	DUKE ENERGY NORTH AMERICA DUKE ENERGY WASHINGTON COUNTY LLC	3.5000 PPM @ 15% O2
NV-0033	08/19/2004	EL DORADO ENERGY, LLC EL DORADO ENERGY, LLC	3.7000 PPM @ 15% O2
LA-0224	03/20/2008	SOUTHWEST ELECTRIC POWER COMPANY (SWEPCO) ARSENAL HILL POWER PLANT	4.0000 PPMVD@15% O2
MN-0071	06/05/2007	MINNESOTA MUNICIPAL POWER AGENCY FAIRBAULT ENERGY PARK	4.5000 PPMVD
LA-0136	07/23/2008	THE DOW CHEMICAL COMPANY PLAQUEMINE COGENERATION FACILITY	5.0000 PPMVD @ 15% O2
MN-0054	12/04/2003	MANKATO ENERGY CENTER	5.5000 PPM @ 15% O2
LA-0257	12/06/2011	SABINE PASS LNG, LP & SABINE PASS LIQUEFACTION, LL SABINE PASS LNG TERMINAL	20.0000 PPMV
* WY-0070	08/28/2012	BLACK HILLS POWER, INC. CHEYENNE PRAIRIE GENERATING STATION	25.5000 TONS
* WY-0070	08/28/2012	BLACK HILLS POWER, INC. CHEYENNE PRAIRIE GENERATING STATION	25.5000 TONS
* CA-1213	04/21/2006	MOUNTAINVIEW POWER COMPANY LLC MOUNTAINVIEW POWER COMPANY LLC	400.0000 LB/STARTUP
* CA-1213	04/21/2006	MOUNTAINVIEW POWER COMPANY LLC	400.0000 LB/STARTUP
* CA-1213	04/21/2006	MOUNTAINVIEW POWER COMPANY LLC	400.0000 LB/STARTUP
* CA-1213	04/21/2006	MOUNTAINVIEW POWER COMPANY LLC	400.0000 LB/STARTUP
* CA-1209	03/11/2010	HIGH DESERT POWER PROJECT LLC HIGH DESERT POWER PROJECT	3729.0000 LB/HOT STARTUP
* CA-1209	03/11/2010	HIGH DESERT POWER PROJECT LLC HIGH DESERT POWER PROJECT	3729.0000 LB/HOT STARTUP
* CA-1209	03/11/2010	HIGH DESERT POWER PROJECT LLC HIGH DESERT POWER PROJECT	3729.0000 LB/HOT STARTUP

Attachment 2

Lighting Energy Savings and Avoided CO2 Emissions for High Efficiency Lighting Operation Comparison - Standard vs. LED

Attachment 2 (Sheet 1 of 2)

FOOTPRINT – SALEM HARBOR
LIGHTING OPERATION COMPARISON STANDARD VS LED

INTERIOR (Illuminated 24/7/365)

		Standard	LED
Fixture Type B			
Std (HPS) =	Holophane Type P3M-150-HP-P-GB-MT-FDZ-PD-PS	Watts / Fixture=170 x 258 Fixtures = 43860 Watts	
LED =	Holophane Type PLED-98-35-5K-27-PD-NA-W-L5H-55C	Watts / Fixture=113.9 x 258 Fixtures =	29386.2 Watts
Fixture Type F3			
Std(Fluor)=	Lithonia Type IBZ 432L WDU PCL125	Watts / Fixture= 151 x 83 Fixtures = 12553 Watts	
LED =	Clean Light Green Light Type 4PI288NW	Watts / Fixture= 66.2 x 83 Fixtures =	5494.6 Watts
Total Wattage Consumed =		56393 Watts vs 34880.8 Watts	
SAVINGS =			**38% ***

EXTERIOR (Illuminated 12/7/365)

Fixture Type A			
Std (HPS) =	Luminis Wall Mtd Type W670-ED17-277-DGT-PH-ACW-R4	Watts / Fixture=170 x 20 Fixtures = 3400 Watts	
LED =	Luminis Wall Mounted Type MA14-L21W48-LD55	Watts / Fixture=47.05 x 20 Fixtures =	941.0 Watts
Fixture Type B			
Std (HPS =	Holophane Wallpack Type W4100HP-VT-SKB	Watts / Fixture=110 x 7 Fixtures = 770 Watts	
LED =	Maxlight Wallpack Type MLLWP60LED50	Watts / Fixture= 63.7 x 7 Fixtures =	445.9 Watts
Fixture Type C			
Std (HPS)=	GE M250A2 Roadway Type M2AC-25-S1N2G-MC3-1F	Watts / Fixture= 275 x 73 Fixtures= 20075 Watts	
LED =	GE Evolve Roadway Type ERMC*B660A****	Watts / Fixture= 127 x 73 Fixtures =	9271 Watts
Fixture Type D			
Std (HPS) =	Spaulding Cimarron Type CR1-WB-S15-H5-F-T-BL-PR4	Watts / Fixture= 330 x 64 Fixtures = 21120 Watts	
LED =	Spaulding Cimarron Type 5W CL1-90L-4K-5W-105-N2	Watts / Fixture= 330 x 64 Fixtures =	21120 Watts
Total Wattage Consumed =		45365 Watts vs 31777.9 Watts	
SAVINGS =			**30% ***

*Savings indicated are operational energy savings only and do not include maintenance and lamp replacement cost savings.

Attachment 2 (Sheet 2 of 2)

Energy Savings and Avoided CO2 Emissions for High Efficiency Lighting

	Standard Lighting (watts)	LED High Efficiency Lighting (watts)	Energy Savings (watts)	Energy Savings (MWhrs/year)		
Industrial Interior Lighting Energy Savings	56,393	34,881	21,512	188.4		
Exterior Lighting Energy Savings	45,365	31,778	13,587	59.5		
Total Energy Savings			35,099	248.0		
Avoided CO2 Emissions = (248 MWhrs/year)(825 lbs/MWhr)/(2000 lbs/ton) =				102.3		
				tons CO2/year		
Notes:						
1. For annual energy savings, the interior industrial lighting is assumed to operate for 24 hours per day, 365 days per year.						
2. For annual energy savings, the exterior lighting is assumed to operate for 12 hours per day, 365 days per year.						
3. Avoided CO2 emissions are conservatively based on the proposed CO2 BACT rate for the CCG combined cycle units of 825 lb/MWhr. The actual avoided CO2 emissions due to the delivery of 248 additional MWhrs to the grid will be greater than 102.3 tons per year.						

Attachment 3

310 CMR 7.00: APPENDIX A

Analysis of Benefits vs Environmental and Social Costs

ATTACHMENT 3

310 CMR 7.00: APPENDIX A

ANALYSIS OF BENEFITS VS ENVIRONMENTAL AND SOCIAL COSTS

310 CMR 7.00: Appendix A (8) (b) requires the applicant to demonstrate 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. The demonstration requires an analysis of alternative sites, sizes, production processes, and environmental control techniques.

The required demonstration for the SHR Project is contained in this attachment.

Alternative Site Evaluation

The Footprint's site selection process was guided by a number of key general objectives as described below. Footprint identified a comprehensive set of locational, environmental, reliability, regulatory and other criteria to narrow the selection process. As a result of this process, the project site was selected as the preferred site as it is a location that strikes an optimal balance among environmental, cost, reliability and community objectives. As set forth more fully below, the proposed SHR Facility will contribute to a reliable energy supply with a minimal impact on the environment at the lowest possible social cost.

The site selection process focused on sites with shuttered or challenged coal- and/or oil-fired generating facilities. The sites where these smaller, older oil and coal generating facilities presently operate also typically offer ready access to transmission, available water supply, and proximity to electric load. Developing a gas-fired facility at these challenged sites offers numerous and substantial benefits to the State and local community. In addition to retention of jobs and tax revenues, when an older fossil-fuel plant is replaced by a state-of-the-art natural gas facility with sophisticated emissions controls, significant decreases in SO_2, CO_2, NO_x, particulates, and other pollutants are realized. Moreover, while site contamination associated with an older coal- or oil-fired facility can go unaddressed (or, at least, may not get addressed in a timely manner) when a facility is simply shut down, the proposed project will addresses contamination and other environmental liability issues as an integral part of the plans to construct and operate the new SHR Facility.

Because older coal-fired facilities in the northeast typically are located adjacent to large water bodies and usually on the coast, the site selection process focused on coastal properties. These locations maximize the opportunity to dramatically improve conditions at challenged -- and often dirty -- coastal sites, and return these sites to productive use consistent with their unique waterfront location.

Further, the Footprint's experience and understanding of power markets informed its decision to site a quick-start, combined-cycle facility in Massachusetts. First, no significant new generation has been added in the Northeastern Massachusetts - Boston (NEMA/Boston) load zone for nearly a decade. Indeed, it was 2003 when Sithe's Mystic 8 and 9 were brought on line in Everett. Over the course of this period, there have been several unit retirements and still more retirements are anticipated, all while load in the NEMA/Boston area is not expected to decrease.

The site selection process was in large part predicated on Footprint's ability to develop a specific type of facility -- one that can bring on line up to 300 MW of its output within 10 minutes. Indeed, the SHR Facility will be extremely valuable to ISO-NE from the perspectives of reliability, cost and reducing emissions, as it enables ISO-NE to respond quickly and efficiently in emergency and other situations while reducing its reliance on spinning reserves, which are expensive and polluting.

Finally, the Footprint recognizes that the SHR Facility is particularly well-suited for Massachusetts because the proposed technology facilitates and supports the development of wind generation -- a renewable resource strongly favored in the Commonwealth. Because wind power is an intermittent resource, it is especially important for the region to be able to rely on clean and cost-effective quick-start generation during those periods when wind output is not available. The SHR Facility's quick-start technology will be less expensive and less polluting than spinning reserves and peaker units which presently fill the gap when wind is unavailable. Accordingly, the SHR Facility will be an extremely valuable addition to the State's and region's resource portfolio.[1]

Site Selection Characteristics

In addition to the general objectives discussed above, Footprint identified a number of locational, environmental, and community considerations for purposes of identifying and analyzing alternative sites.

Locational Considerations

- Sufficient acreage - Footprint analyzed only those sites with a minimum of 20 acres available for the proposed facility and ancillary structures;
- Proximity to electric load;
- Availability of natural gas - Footprint analyzed those sites where a gas interconnection was 5 miles or less from the proposed site; where sufficient capacity was available; and where any pipeline-related construction could be completed consistent with the schedule for constructing the proposed power facility;
- Availability of electrical interconnection;
- Compatibility with local zoning and surrounding uses;
- Limited number of sensitive receptors in close proximity to project Site;
- Expected ease of permitting; and
- Local support for an electric generating facility in the municipality.

[1] In a report issued by ISO-NE on December 5, 2010, ISO-NE's consultant reported that overall Total Operating Reserve – representing the sum of Ten-Minute Spinning Reserves and Ten-Minute Non-Spinning reserves would increase by 500 MW to 600 MW in a 20% wind penetration scenario (see pages 21-22). The Ten-Minute Non-Spinning Reserve function of the SHR Facility provided by its quick-start capabilities are far preferable from a cost and emissions stand-point than Ten-Minute Spinning Reserves provided by less efficient, less flexible units. (http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/pac/reports/2010/newis_es.pdf)

Environmental Considerations

- Ability to reduce current air quality impacts consistent with federal/state requirements;
- Potential to return coastal properties to productive use consistent with State requirements and objectives;
- Ability to minimize water consumption;
- Ability to minimize wastewater impacts;
- Ability to minimize wetlands impacts;
- Ability to minimize noise impacts;
- Ability to minimize land use impacts consistent with local zoning requirements;
- Ability to minimize historical, archaeological and cultural impacts consistent with federal and state requirements;
- Ability to minimize visual impacts;
- Ability to minimize traffic impacts;
- Ability to minimize solid and hazardous waste impacts;
- Ability to ensure safe transportation and storage of ammonia and other materials; and
- Minimization of electric and magnetic field effects.

Community Considerations

Footprint employed the following community-related considerations as part of its process of narrowing its list of identified sites:

- Support from municipal officials;
- Importance of continuing tax revenues;
- Importance of continuing project-related jobs; and
- Support from neighbors.

Benefits of the Salem Site

The Salem site presents a significant number of attributes that satisfy Footprint's locational, environmental and community criteria set forth, above. For example:

- The Salem Harbor Station facility was considered to be one of the "Filthy Five" electric generation plants in Massachusetts, with a long history of environmental challenges. Indeed, construction of the SHR Facility on the landward portion of the site will afford Footprint the opportunity to clean up the portion of the site currently occupied by the soon–to–be shuttered Salem Harbor Station, and return that valuable waterfront land to productive use, consistent with State law. Having entered commercial operation as a generating facility in 1951, the Salem Harbor Site has a long history as a site for electricity generation.
- The Salem Harbor Station has been required by ISO-NE to operate for reliability purposes through May 2014, offering Footprint the unique opportunity to minimize any gaps in electricity generation beyond that date through the development and permitting of the new state-of-the-art SHR Facility.
- The site is close (less than two miles) to natural gas pipeline facilities, namely the interconnection of the Maritime and Northeast and HubLine pipelines.

- There is strong local support for the continuation of electricity generation on the site as a means of maximizing tax revenues and local employment. The Mayor, other city officials, and state senators and representatives, have been vocal supporters of some kind of continued presence of electricity generation at the Site generally and of this Project in particular.
- There is State support for potential reuse of the Site as demonstrated by (1) the 2011 decision to use RGGI funds to supplement the City of Salem's tax revenues for an eight-year period, (2) funding of the Salem Site Reuse Study by the Massachusetts Clean Energy Center, and (3) the enactment of Chapter 209 of the Acts of 2012 and establishment of the Salem Harbor Power Station Plan Revitalization Task Force.
- Permitting of the Project is expected given city and state support of the power generation/site reuse concept, as well as compatibility of the Project with local zoning requirements.
- The site is located in close proximity to the electric grid (National Grid system).
- The 65-acre Site is sufficiently large to accommodate the SHR Facility and enable further redevelopment opportunities.
- The site offers Footprint the opportunity to significantly reduce air, water supply, wastewater, noise, visual, and other impacts relative to the current Salem Harbor Facility.
- The absence of new generation in Northeastern Massachusetts - Boston (NEMA/Boston) load zone. Indeed, it has been nearly a decade since any significant new generation, Mystic 8 and 9, has been added in NEMA. Over the course of these last ten years, there have been several unit retirements and still more retirements are anticipated, all while load in the NEMA/Boston area is not expected to decrease.
- In fiscal year 2010, Dominion paid the City approximately $4.75 million in taxes, making the power station the largest taxpayer in Salem. The $4.75 million included a negotiated usage fee of $1.75 million, and property taxes of $3 million, which included $800,000 attributable to the land. Pursuant to G.L. c. 21A, § 22, for an eight -year period, the City will be reimbursed the difference between the $4.75 million of tax revenues collected from Dominion in fiscal year 2010 and the reduced tax revenues associated with a full or partially decommissioned Salem Harbor facility with proceeds from the RGGI Auction Trust Fund. St. 2011, c. 68, § 33. The economic impact on the City of Salem will be substantial if a new generating facility is not in place when that eight-year period expires. The proposed SHR Project ensures that the City of Salem will continue to receive significant tax revenues associated with the generation of electricity. In addition, bringing the SHR Facility on line in 2016 would permit dollars from the RGGI Account Trust Fund to be redirected away from Salem and to other environmentally beneficial uses.
- The construction of a new power plant, along with demolition of the existing facility and attendant remediation of the site, will bring a significant number of jobs over the course of the next several years. Footprint expects that approximately 30-40 permanent employees will be needed to operate the SHR Facility, assuring that operations-related employment at the Salem Harbor site will continue beyond the June 1, 2014 retirement date of the existing facility.
- The demolition of the existing facility and remediation of the site will enable future use of the remainder of the Site for a variety of marine industrial purposes, thereby providing opportunities to revitalize this valuable waterfront area.

In sum, the site satisfied Footprint's overall site selection objectives, as well as most, if not all, of its locational, environmental and community criteria. Accordingly, the site was deemed to be superior to the alternative sites analyzed by Footprint.

Alternative Sites

Footprint considered other sites with fossil fuel fired electric generation facilities, including those sites that had been shut down, those that were slated to be shut down in the future and those that had no current plans to shut down. Footprint focused on Salem Harbor as a facility that was on a shut-down trajectory for several reasons. First, unlike a facility that was already shut down, Salem Harbor presented (a) the availability of revenue from short term continuing operations to fund any remediation costs, (b) a professional staff with a long history at the Site to help Footprint understand and manage the decommissioning and redevelopment process safely and efficiently, and (c) a community that continued to be involved in the current operations at the site and was interested in working towards sustainable future redevelopment. Second, unlike a facility that planned to continue to operate for the foreseeable future, Salem Harbor Station was not the subject of an extensive capital investment program in environmental controls, the costs of which would be difficult or impossible to recoup in a tear-down case.

The generating capacity of the existing Salem Harbor facility was also a factor in the site selection process in several ways. First, as an initial screen, Footprint looked at facilities whose largest unit was less than 600 MW, the threshold below which industry consensus is that installation of back end environmental controls is not cost effective. Next, Footprint looked at facilities whose existing size would likely result in sufficient transmission headroom to permit cost effective interconnection with the electric grid. Finally, Footprint compared the size of the existing facility and the proposed facility with the expected need for generating capacity at the identified location in the foreseeable time horizon.

Footprint's business model in general – and the Salem Harbor project specifically – is based on the efficiencies and public benefits that flow from reusing the sites of existing coal- and oil-fired facilities. Because coal-fired facilities require large volumes of water for once-through cooling, all the currently operating, load-serving coal-fired facilities in the Northeast are located at coastal sites or near large inland bodies of water. As a result, in order to convert these sites, the repowering projects also need to be sited at coastal locations.

Footprint analyzed three alternative sites in Massachusetts where coal-fired facilities currently are or recently were operating: Brayton Point, Somerset Power, and Mt. Tom.

Brayton Point

Footprint evaluated the current site of the Brayton Point generating facility in Somerset, Massachusetts. Operated by Dominion Energy, this approximately 1540 MW facility comprises three coal-fired units (Unit 1 at 243 MW, Unit 2 at 240 MW, and Unit 3 at 612 MW), one gas- and oil-fired unit (Unit 4 at 435 MW), and three diesel generators (7.6 MW combined). Situated on 306 acres of land at the head of Narragansett Bay, the Brayton Point facility is one of the largest operating fossil-fuel power plants in New England.

Although the Brayton Point location meets many of the site selection criteria developed by Footprint, Dominion Energy recently has invested approximately $1.1 billion in environmental improvements to its facilities. As a result, Brayton Point is no longer the type of "challenged"

site amenable to redevelopment opportunities. The environmental improvements completed by Dominion, including an investment of $570 million to reduce dramatically the amount of cooling water used from Mt. Hope Bay, a new ash recovery system which offsets significant CO_2 emissions each year, and other equipment designed to reduce sulfur dioxide, nitrogen oxide and mercury emissions, make Brayton Point an unlikely candidate for near-term shut down and redevelopment.

Somerset Power

Footprint also evaluated the former site of the Somerset Station power generating facility in Somerset, Massachusetts. The Somerset Station site comprised approximately 40 acres of land situated in a mixed-use area of Somerset, consisting of residential and commercial properties. As most recently operated by NRG Energy, the Somerset Power site included approximately 140 MW of coal, residual oil and jet fuel-fired electric power generation equipment.

The Somerset Station facility was shutdown in January 2010, and in February 2011, NRG advised the Massachusetts Department of Environmental Protection (DEP) that Somerset would no longer operate as a generating facility. In February 2012, it was reported that the facility was sold to Asset Recovery Group, a New Jersey entity, which indicated that it has no plans to use the site for a power station.

While the Somerset Station site offered a number of features that were consistent with Footprint's site selection objectives, it did not meet all necessary criteria. For example, Footprint determined that there was not likely to be support for a new generation project from either municipal officials or affected residents. Moreover, the Somerset Station site was not close to load. Without these key elements, the Somerset Station site was eliminated from further consideration.

Mt. Tom

Footprint also evaluated the Mt. Tom generating facility site, a 147 MW coal-fired plant, in Holyoke, Massachusetts. Mt. Tom is currently owned and operated by GDF Suez. The plant, which has been operating since 1960, is situated on a small portion of an 80-acre woodland site between Mt. Tom and the Connecticut River. It is reported that the plant recently has operated only 10% of the time because of the low price of natural gas relative to coal.

Footprint eliminated the Mt. Tom site from further consideration for four reasons. First, the site is not close to load. Second, the site is not located near gas pipeline facilities. Third, while the current transmission interconnection accommodates the output of the 147 MW Mt. Tom Facility, it would be quite difficult to develop and permit the transmission infrastructure necessary to accommodate an approximately 630 MW facility in Western Massachusetts. Finally, the owners of the Mt. Tom project recently invested $57 million in state-of-the-art emissions equipment.

Table 1 provides a comparison of site alternatives to the Salem site.

Table 1. Alternative Sites Considered				
	Brayton Point	**Somerset**	**Mt. Tom**	**Salem Harbor**
Acreage	306 acres	40 acres	80 acres	65 acres
Proximity to Electric Load	**No proximity to load**	**No proximity to load**	**No proximity to load**	**Proximity to load**
Gas Availability	Some proximity to gas line	No proximity to gas line	No proximity to gas line	Close proximity to gas line
Environmental	• Brownfield clean-up and reuse • Existing transmission headroom for SHRT • Proximity to large-scale wind resources (Cape Cod)	• Brownfield clean-up and reuse • Inadequate transmission headroom for SHRT • Proximity to large-scale wind resources (Cape Cod)	• Brownfield clean-up and reuse • **No** transmission headroom for SHRT • **No** proximity to load • **No** proximity to large-scale wind resources (Berkshire wind is small-scale)	• Brownfield clean-up and reuse • Existing transmission headroom for SHRT • Proximity to load (for efficient energy delivery) • Proximity to large-scale wind resources (ME and Cape Ann)
Cost	• **Prohibitive levels of** unrecovered capital expenditures • Adequate existing transmission headroom • Some proximity to gas supply	• No major unrecovered capital expenditures • **Inadequate** existing transmission headroom • **No proximity** to gas supply	• **Some** unrecovered capital expenditures • **Inadequate** existing transmission headroom • **No proximity** to gas supply	• No major unrecovered capital expenditures • Adequate existing transmission headroom • Close proximity to gas supply
Reliability	• Unknown reliability benefits since reliability has not been studied	• After study, **no** reliability benefits identified.	• Unknown reliability benefits since reliability has not been studied	• Serves load in constrained area that is approaching reserve margins
Community	• Unknown levels of community support • No shut-down of existing facility planned • Existing facility is a large tax payer and employer; community will be relying on the existing facility to continue to carry tax load and maintain jobs	• No identifiable community support • No critical role in local economic picture	• Unknown levels of community support • No shut-down of existing facility planned • Less critical role in local economic picture	• High degree of community support • Shut-down of existing facility certain and imminent • Existing facility is a large tax payer and employer; community will be relying on new SHR Facility to pick up tax load and maintain jobs.

Alternative Project Sizes, Production Processes, and Environmental Control Techniques Evaluation

Footprint considered positioning the SHR Facility on the portion of the site located outside of Chapter 91 jurisdiction. This design option was not pursued for a number of reasons. First, the approximately 14.5-acre, irregularly shaped, non-Chapter 91 portion of the site is not large enough to accommodate the proposed SHR Facility. The existing NGRID Substation – which is to remain on the Site – is located on this portion of the Site, thus reducing the available developable area to approximately 7.5 acres. Further, in order to meet the 2016 capacity need, construction of the new SHR Facility will commence prior to the shutdown of the existing Salem Harbor Station which will remain in operation until June, 2014. Thus, the new SHR Facility cannot be built on the non-Chapter 91 part of the Site that is covered by the existing Salem Harbor Station Plant building. For these reasons, Footprint has concluded that it is not feasible to locate the SHR Facility in the non-Chapter 91 part of the Site.

Footprint also considered a wet-cooling system as a design alternative for the proposed SHR Facility. However, wet cooling was not considered to be a viable option because it would result in greater impacts to the Harbor from withdrawal/discharge in terms of water quality and impingement/entrainment. Wet cooling would also introduce added particulates from tower drift, as well as fogging and icing concerns. Also it is unlikely that this option could meet the 2016 capacity need because a wet-cooling system would entail increased complexity/timing of permitting due to the need for federal permits for in-water work and impacts. It is estimated that the wet cooling scenario would result in a significant withdrawal/discharge of water per day to Salem Harbor. Finally, in discussions with applicable state agencies, there was a lack of certainty regarding whether this amount of water withdrawal/discharge was sufficient to render the project "water-dependent" for purposes of the Tidelands Regulations. Accordingly, Footprint has concluded that a wet-cooling system is not a viable alternative at the Salem site.

Footprint also considered a "dual fuel" alternative in which the proposed SHR Facility could run on either gas or diesel fuel. Due to the anticipated volumes of diesel fuel that would be needed to power the Facility under the dual-fuel scenario, the delivery of diesel fuel to the Facility would require water transportation, thus rendering the Facility "water-dependent." This alternative was considered not to be a reasonable alternative due to intense local opposition to diesel fuel at the site and the potential increased environmental risks (both to the Harbor and on site) associated with fuel delivery to and use on the site.

Project Benefits

The benefits of the project are summarized in this section.

State and Regional Benefits

Since the passage of Massachusetts's 1997 Electric Restructuring Act, private electric generation companies like Footprint have taken the place of formerly regulated entities to play a critical role in insuring a reliable supply of electricity for citizens of the Commonwealth. As recognized in a recent report submitted to the Massachusetts legislature:

> The 1997 Electric Restructuring Act changed the way the electric utility industry is configured, other than for municipally owned utilities. The Restructuring Act required traditional, "vertically integrated" electric utilities to remove themselves from the power generation business, making them divest themselves of their power plants. They continue to operate as distribution companies, purchasing electricity from competitive power suppliers and maintaining the power wires and poles that deliver it to customers.[2]

Accordingly, the energy grid depends on the private developers like Footprint to build the electric generating facilities required to satisfy the Commonwealth's electricity needs.

ISO New England is the governing body that, among other things, ensures the electricity demands of the region are met and provides administration of the competitive wholesale electric power market. In February 2013, ISO New England held its Forward Capacity Auction for Capacity Commitment Period of June 1, 2016 to May 31, 2017 (FCA-7). As predicted by the Footprint's own analysis, in conducting FCA-7, ISO New England identified the need for additional capacity in the Northeast Massachusetts (NEMA) Boston Capacity Zone. Footprint submitted a bid for the NEMA/Boston market in FCA-7, and the bid was "cleared." FCA-7 for NEMA/Boston closed after the first round, and there was no excess supply identified for NEMA/Boston at the close of the auction. ISO New England included the results of FCA-7 in a filing submitted to the Federal Energy Regulatory Commission by letter dated February 26, 2013. As stated in the FERC Filing: "Without the capacity from Footprint, NEMA/Boston would not have met its Local Sourcing Requirement." The Department of Public Utilities has accepted this position in its recently issued Order, stating that "The results of FCA-7 show that, absent Footprint, there is a need in NEMA/Boston for additional capacity resources beginning in the 2016/17 capacity year. Thus, based on the FCA-7 results and the latest market information, we find there is a need for additional capacity sources in NEMA/Boston by the 2016/17 capacity year..."

Accordingly, it is clear that the electric generation that will be provided by the proposed Project is essential to ensure reliability in the NEMA/Boston load zone. The need for reliability of the electric power grid clearly constitutes an overriding public benefit.

In addition, the public benefit served by the redevelopment of the Site represented by the proposed Project has been expressly identified in recently enacted special legislation. Section 42 of Chapter 209 of the Acts of 2012 expressly provides:

> There shall be a plant revitalization task force established to implement a plan, adopt rules and regulation and recommend necessary legislative action to ensure the full deconstruction, remediation and redevelopment or repowering of the Salem Harbor Station by December 31, 2016.

The proposed Project achieves all of the legislative goals of full demolition, remediation and redevelopment of the Site within the legislatively prescribed deadline of December 31, 2016. Indeed, unless the Commonwealth were to take the Site by eminent domain and pursue a

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[2] *"Recent Electricity Market Reforms in Massachusetts, A Report of Benefits and Costs,"* Executive Office of Housing and Economic Development, Executive Office of Energy and Environmental Affairs, July 2011, p.8.

redevelopment project on its own, it is difficult if not impossible to conceive of a project that could implement a plan for redevelopment of the Site by December 31, 2016.

The proposed Project also serves the Commonwealth's interest in developing renewable energy sources. That is, the quick-start technology included in the SHR Facility facilitates and supports the development of wind generation. Because wind power is an intermittent resource, it is especially important for the region to be able to rely on clean and cost-effective quick-start generation during those periods when wind output is not available. While a number of quick-start "peaker" facilities have recently been sited in New England, the proposed state-of-the-art quick-start technology at the proposed Project will be more efficient and will have fewer emissions than the peaker units which presently fill the gap when wind is unavailable.

While the proposed Project clearly fulfills the need for electricity reliability, the state-of-the-art natural gas-fired facility also offers significant air quality benefits. An analysis prepared for Footprint by Charles River Associates concludes that because the proposed SHR Facility "displaces other, less efficient generation on the New England Grid, operation of [the Facility] reduces net annual regional air emissions by 457,626 tons (1.3%) of CO_2, 527 tons (5.9%) of NO_x, 1,209 tons (10.4%) of SO_2, and 11 pounds (6%) of mercury."[3]

The important air quality improvements resulting from the proposed Project are also recognized in the Massachusetts Clean Energy and Climate Action Plan for 2020, which estimates that the displacement of the former Salem Harbor Station and Somerset Station by natural gas-fired power plants would result in a net 1.2 million metric ton reduction in CO_2e in 2020.[4]

Local Benefits

Without the proposed Project, the upcoming retirement of the Salem Harbor Station would result in a significant loss of tax revenues for the City. In fiscal year 2010, Dominion paid $4.75 million in taxes, making the Station the largest contributor of tax revenue in the City of Salem. The $4.75 million included a negotiated usage fee of $1.75 million, and property taxes of $3 million, which included $800,000 attributable to the land.

Moreover, the Commonwealth has determined that it is in the public interest for the City to continue to collect this level of tax revenue in the near-term. That is, pursuant to G.L. c. 21A, § 22, for a five-year period the City of Salem will be reimbursed the difference between the $4.75 million of tax revenues collected from Dominion in fiscal year 2010 and the reduced tax revenues associated with a full or partially decommissioned Salem Harbor facility. St. 2011, c.

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[3] "Analysis of the Impact of Salem Harbor Repowering on New England Air Emissions," dated November 21, 2012, p. 1, included in Appendix C to the DEIR. The analysis was recently revised for modified emissions assumptions in a response to an Energy Facilities Siting Board Record Request (RR-EFSB-6) and this resulted in slightly revised net regional emissions reductions.

[4] "Massachusetts Clean Energy and Climate Plan for 2020, A report to the Great and General Court pursuant to the Global Warming Solutions Act (Chapter 298 of the Acts of 2008, and as codified at M.G.L. c. 21N)" dated December 29, 2010, submitted by Secretary of Energy and Environmental Affairs Ian A. Bowles, p. 44.

68, § 33.[5] This "difference" will be reimbursed through proceeds from the RGGI Auction Trust Fund. This law helps to bridge the tax revenue gap until such time as a new generating facility can be constructed and placed into service. In fiscal year 2012, Dominion paid $1.5 million in taxes and $250,000 in use fees to the City of Salem. The SHR Facility will be placed into service in June 2016. Thus, the proposed Project will help ensure that tax revenues associated with the Site are maintained, thus not adversely affecting the City's budget and it will permit dollars from the RGGI Trust Account to be redirected away from Salem and to other environmentally beneficial uses.

The overriding public interests of redevelopment of a shuttered power plant and providing a reliable energy supply resulting from the Project are particularly compelling in light of the Project's minimal adverse impacts on public interests in Tideland resources at the Site. As stated previously, the Project will not involve any discharges of process or cooling water from the proposed SHR Facility, and it will not include the use of diesel as an alternate fuel for the SHR Facility. Accordingly, the SHR Facility is not anticipated to have adverse impacts on resources within Salem Harbor.

In addition, the Project will result in opportunities for public enjoyment of the waterfront, consistent with the Site's location in a DPA. Currently, there is no public access to the waterfront Site. In contrast, as a result of the Project, the public will have the opportunity to access paths on the Derby Street (residential) side of the Site, as well as linear access to view the Harbor. In addition, the demolition and remediation efforts to be undertaken by the Proponent will enable future development options for the rest of the Site that could even further enhance public access to and enjoyment of the waterfront. While these precise uses have not yet been identified, the Proponent is involved in ongoing discussions with the City of Salem and other stakeholders to identify optimal development opportunities.

Minimization of Environmental and Social Costs

Footprint Power Salem Harbor Development LP has committed to reduce and/or mitigate any environmental and social impacts as detailed below.

Air Quality

The SHR Facility will minimize emissions and will not cause or contribute to violation of any applicable air quality standard, through use of only clean-burning natural gas as fuel, advanced pollution control equipment and highly efficient combustion turbines. As a result, emissions from the proposed SHR Facility will be among the lowest of any fossil fuel-fired power plant in the United States.

Once operational, the SHR Facility will be one of the most efficient fossil-fueled electric generators in the Northeast Massachusetts (NEMA) zone and is expected to provide 5.1 million MWh of electricity annually. This additional supply will reduce the need for generation from other power plants with lower efficiency and higher operating costs, primarily fueled by natural

[5] Pursuant to section 37 of "An Act Relative to Competitively Priced Electricity in the Commonwealth," St. 2012, c. 209, passed by the General Court in July 2012 and signed into law by Governor Patrick in August, this tax "make-whole" provision was extended to 2019.

gas, oil, and coal. As mentioned previously, Footprint conducted an analysis projecting the operation of the New England bulk power system over the period 2016-2025, for scenarios with and without the SHR Facility in service, and quantified the expected changes in air emissions by the Project directly and the associated reductions of emissions at competing plants elsewhere in New England and, in particular, Massachusetts. The principal findings of the analysis are:

- The SHR Facility will operate at capacity factors of approximately 80%, cycling off only infrequently during normal operating conditions;
- Annual emissions at the SHR Facility will be approximately 2.0 million tons of CO_2 on average over the study period. The SHR Facility will emit minimal SO_2 and mercury.
- Because it displaces other, less efficient generation on the New England grid, operation of the SHR Facility *reduces* net annual regional air emissions by 457,626 tons (1.3%) of CO_2, 527 tons (5.9%) of NO_x, 1,209 tons (10.4%) of SO_2, and 11 pounds (6%) of mercury. [6]

The Project includes state of the art air pollutant emissions control technology. Most of the planned air quality control measures are mandated by requirements of Federal and Massachusetts air permitting programs for PSD and Non-attainment NSR as well as the DEP permitting program. These permitting programs contain stringent requirements for control of air pollutant emissions using LAER for non-attainment pollutants (in this case NO_x emissions as a precursor pollutant to ozone), and BACT for all other pollutant emissions.

The following key control minimization/mitigation measures are proposed for the SHR Facility to satisfy LAER and BACT requirements during operation of the plant.

- The exclusive use of clean burning natural gas in DLN (dry low-NOx) turbine combustors, in combination with SCR (selective catalytic reduction) technology will reduce NO_x emissions from the turbine generator units to less than 2.0 parts per million (at 15% oxygen) in the stack. DLN combustors are designed to minimize NO_x emissions from the combustion turbine. SCR is placed in the heat recovery steam generator portion of each unit to further lower emissions. SCR reduces NO_x to nitrogen and water in the presence of a catalyst and ammonia.
- Carbon monoxide (CO) and volatile organic compound (VOC) emissions will be minimized by the use of advanced combustor design and good combustion practices. Additionally, a catalytic oxidation system will be placed in the heat recovery steam generator portion of each unit to achieve advanced CO and VOC control. The catalytic oxidation system will reduce stack CO emissions to 2.0 parts per million or less (at 15% oxygen). VOC emissions will be less than 1.0 part per million (at 15% O_2), except when duct firing is used VOC emissions will be less than 1.7 parts per million (at 15% O_2).

[6] Analysis of the Impact of Salem Harbor Repowering on New England Air Emissions," dated November 21, 2012, p. 1, included in Appendix C to the DEIR. The analysis was recently revised for modified emissions assumptions in a response to an Energy Facilities Siting Board Record Request (RR-EFSB-6) and this resulted in slightly revised net regional emissions reductions.

- By combusting only natural gas in the SHR Facility, emissions of particulate matter, sulfur dioxide (SO_2) and any hazardous air pollutant emissions from natural gas will be very low.
- All pollutants including importantly GHG are minimized by the selected generation technology itself. Footprint has selected one of the most energy efficient electric generation technologies for the SHR Facility, an advanced turbine combined cycle technology.
- The quick start capability of the SHR Facility further minimizes all air pollutants since start-up conditions can typically produce the highest air pollutant emissions in power generation facilities.

In addition to the implementation of the LAER control technology described above, NO_x emissions from the SHR Facility will be mitigated by offsetting emissions reductions from other sources in the region. 1.26 times the NO_x potential to emit of 158.6 tons per year are required for the SHR Facility for a total of 200 tons per year of NO_x offsets.

Most of the required 200 tons per year of NOx ERCs have already been secured by Footprint to use as the required offsets and prior to issuance of the Comprehensive Plan Approval for the SHR Facility the remaining NO_x ERCs will be secured to fully satisfy the offset requirement. None of the NO_x ERCs that will be used to satisfy the offset requirement are related to the shut down of the existing Salem Harbor Station facility.

Footprint will also comply with the CO_2 reduction requirements of the Regional Greenhouse Gas Initiative (RGGI), and any other requirements that might be imposed by the Energy Facilities Siting Board.

The SHR Facility will be highly efficient and will combust only natural gas. Natural gas has the lowest GHG emissions of any fossil fuel, and the efficiency of the power generation cycle directly minimizes the quantity of GHG emission per MW-hour of power produced. The SHR Facility also will use highly efficient quick start combustion turbines. The quick start capability will minimize the quantity of GHG emissions compared to older combined cycle units with significantly longer startup times. Footprint will maintain the units to ensure optimal efficiency.

In accordance with 310 CMR 7.70 (Massachusetts CO_2 Budget Program), which implements RGGI, the SHR Facility will be required to purchase RGGI allowances to cover actual CO_2 emissions. Based on the most recent auction clearing prices for RGGI allowances, it is expected that Footprint will spend on the order of $4,000,000 annually for RGGI allowances for the Facility. A significant portion of these RGGI proceeds are used to fund energy efficiency and GHG mitigation projects in Massachusetts.

Noise

The Proponent has incorporated significant noise mitigation and controls into the proposed SHR Facility. Key features of the noise mitigation package are as follows:

- The SHR Facility equipment has been arranged to achieve an adequate distance buffer between receptors and noise-producing equipment.

- To the extent practical, equipment will be located within enclosures or buildings which provide noise attenuation through layers of insulation and siding.
- Internal walls in multiple structures will receive acoustical treatments as dictated by engineering and noise level studies conducted during the permitting and design phases of the project.

In addition, the proposed Facility will include the following noise mitigation and control measures. In particular, the Project incorporates a number of measures to mitigate noise in the direction of the historic Derby Street neighborhood to the west, the City of Salem to the south and Marblehead to the east.

- A gas turbine inlet silencing package to reduce the air inlet sound pressure levels.
- A stack silencing package to reduce the sound pressure levels leaving each flue in the stack structure.
- All equipment will include sound attenuation to meet OSHA near field sound levels whenever practical.
- Each gas turbine generator will be fully enclosed in metal enclosures. Each steam turbine body will be wrapped in thermal insulation and the generators equipped with a metal enclosure, both of which will provide acoustical insulation properties.
- Steam system vents will be equipped with silencers.
- Safety and relief valves that release high pressure steam will be equipped with silencing when permitted by the ASME code.
- Large pumps in the HRSG enclosure (boiler feed pumps) will be enclosed in additional acoustical structures as necessary.
- High energy piping and valves will be located within generation equipment buildings or be screened acoustically in order to limit fluid transfer noise.
- ACC fans will be designed to minimize noise. As a general proposition, this means that the fans are larger in size, which allows them to operate at slower speeds and lower noise levels. Moreover, all Air Cooled Condenser (ACC) fans will be shielded from sensitive receptors by cowlings and additional acoustical treatments.
- The transformers will have acoustically designed barrier walls to shield sensitive receptors from transformer noise.
- The gas compressors and gas metering enclosure will be designed with acoustic silencing to minimize noise form this equipment
- The Facility structures will be supplemented with a retaining wall and planted berm that will wrap around the power station to deflect sound away from the lower elevations surrounding the site.

Accordingly, the Project is not expected to have adverse impacts on air quality or noise.

Chapter 91 Waterways License Considerations

The Project will result in minimal if any detriments to the interests of the public in waterways associated with the site. The Project site is presently the home to a coal-fired, electric generation facility that will be shut down in mid-2014. There is currently no public access allowed at the site or to the waterfront, and accordingly there will be no detriment to this interest posed by the Project. Further, under the Tidelands Regulations, public access in a DPA is considered to be

desirable only to the extent that public access does not conflict with the use of the DPA for marine-industrial uses. Accordingly, there are minimal, if any, public access interests at the Site that will be adversely affected by the proposed Project.

Potentially, the Project could be viewed as detrimental to the interest of the public in preserving land located in DPAs exclusively for marine-industrial uses. The proposed Project is located in the Salem Harbor DPA and the proposed Project arguably does not clearly fit the definition of a marine-industrial use. However, the Project minimizes any potential detriment to preservation of DPA uses in that the proposed SHR Facility is located on only a 20-acre portion of the Site. Thus, some 40 acres of the Site are open for DPA uses. Further, the proposed Project site-design also "opens" the entire length of the harbor-front portion of the site, thus maximizing potential future use of the rest of the site for other uses consistent with the site's industrial, harbor-side location. The proposed Project, itself, is clearly an industrial use which – unlike, for example, a residential development project – will neither preclude nor limit the use of the rest of the site for marine industrial uses and other appropriate uses.

In addition, the preservation the site for potential DPA uses is quite limited as a practical matter. As recognized by the City of Salem in "A Site Assessment Study on Potential Land Use Options at the Salem Harbor Power Station Site," the challenges to future DPA uses at the site include:

- Limited Market Support – The 11 DPA's in the Commonwealth are competing for a limited pool of potential uses. Many of those markets have been hit hard (i.e. the fishing industry) over the last few decades
- Limited Landside Infrastructure – the limited landside infrastructure would negatively impact the majority of uses, with the exceptions of power generation and cruise ships
- Adjacency: Certain uses can be incompatible with the adjacent residential neighborhood to the north

It is important to note that the proposed Project in no way precludes the future use of a part of the site for a cruise ship related uses. Rather, the site-wide demolition and MCP assessment will be the first step to any redevelopment of the rest of the site for future uses that will best take advantage of the site's deep-water port location. Accordingly, any realistic detriment presented to DPA uses at the Site should be considered minimal.

Moreover, the Project has been designed to minimize any potential detriments to waterways interests. The Project will utilize dry cooling technology and thus will require neither the withdrawal of process water or cooling water from nor the discharge of process or cooling water to Salem Harbor, thus minimizing and potential water quality impacts. The Facility will also utilize natural gas as the sole fuel source (rather than having dual, diesel fuel capability), thus minimizing any potential impacts related to delivery of diesel fuel to the facility or use of diesel fuel at the facility. The Project also does not involve in-water work requiring any state or federal permits and thus will not adversely impact Tidelands resources at the Harbor.

The benefits offered by the proposed Project will more than compensate for any potential detriment to public waterways interests. First, without the Proponent's purchase of the site for development of the proposed Project, it is quite likely that the Salem Harbor Plant may simply have been shut down and legally abandoned. Because of the proposed Project, all of the un-needed structures across the site will be demolished. Further, the entire site will be assessed and

remediated, as needed, in full compliance with the Massachusetts Contingency Plan. The demolition, assessment and remediation of the non-power plant parts of the site will make those areas far more attractive (and less expensive) to develop for future, potential marine industrial users.

While the Project has been designed to respect the industrial nature of the site's DPA location, Footprint is also working with the City and other stakeholders to provide appropriate public access opportunities at the site. For example, the proposed Project will include access opportunities closest to the Derby Street (non-harbor) side of the Site. In addition the proposed Project includes a pathway from Derby Street towards the Harbor in order to offer a public a viewing opportunity/corridor to the Harbor.

The Project will not result in adverse impacts to waterways and therefore no mitigation is required or warranted. A Chapter 91 waterways license is required for the Project. Footprint will work with MassDEP staff to develop appropriate license conditions during the permitting process.

Accordingly, the Project is not expected to have adverse impacts to waterways.

Industrial Sewer User Discharges

The proposed Project will use air-cooled technology, greatly reducing the volume of water required and wastewater generated by the SHR Facility. Process and sanitary wastewater will be treated prior to discharge to the adjacent South Essex Sewerage District (SESD) secondary wastewater treatment plant. Process wastewater will be discharged from the following processes and components:

- HRSG blowdown
- Evaporative coolers blowdown
- Reverse Osmosis reject
- Backwash of filters levelized
- Service water users
- Waste water from oil/water separator
- Stormwater to oil/water separator

The annual average daily wastewater flow is projected at 186,624 gallons per day (GPD). The permitted design flow for the SESD secondary WWTP is 29.7 million GPD with an existing average daily flow of 27 million GPD. The additional average daily flow from the proposed SHR Facility represents a very small percentage of the available remaining capacity at the SESD facility.

Footprint will obtain a wastewater discharge permit from the SESD pursuant to the provisions of the SESD Sewer Use Regulations. The Project will comply with the SESD Industrial Pretreatment Program, Local Limits and Sewer Use Regulations. The proposed Facility is subject to DEP Industrial Sewer User Permit requirements (BWP IW38), as the proposed wastewater discharge will include industrial discharges and totals more than 50,000 GPD. The Proposed Project will not adversely affect wastewater discharges and therefore no mitigation is required or warranted

Visual

The design team's intent for the Project is to minimize the visual impacts and enhance the appearance of the SHR Facility through a number of procedures. First, through facility layout and placement and massing - reducing the size of the building enclosures based on the minimum required equipment clearances and second, through landscape design elements.

Second, creating a continuous landscaped berm that wraps around the Facility and increases the height of ground plane from which the buildings emerge – visually reducing the overall height and decreasing the amount of direct line-of-sight to the Facility. Third, through the design of building envelope cladding and landscaping elements - providing plantings and a building enclosure that are contextual to Salem that helps to screen the facility elements.

The continuous landscaped berm that wraps around the Facility rises to a peak height of 25 feet on the Western and Southern sides of the site. When viewed from Derby Street, the landscaping measures will shield a large portion of the plant and its components from view. On the Eastern side of the site a 15 foot tall berm and associated coastal plantings will mitigate the visual impact of the Facility from the Harbor and the opposite shore (Marblehead).

The Facility and its surrounding landscape will be designed to provide a contextual response to the surrounding neighborhood and its residents. The replacement of the existing power station provides a great improvement for visual relief for the community. The new Facility will occupy only a fraction of the square footage of the property of the former power station. When compared to the existing power station, new buildings will have a lower maximum height with a stack that is less than half as tall.

The design of the buildings will use articulated massing components combined with cladding elements to visually break down the scale of the structures from views from Salem. Given the project goals of a positive visual impact with the community, the facility will forgo the standard deployment of chain link fencing around its perimeter for its required security measures. Instead, security devices will be integrated into landscape surrounding the plant within the planting and grading of the site.

The integration of building and landscape will provide a gradual, visual transition between the street and the facility itself. While also serving as a means of acoustical mitigation, the landscaped berm on the Western and Southern sides of the power station will decrease the amount of the buildings that are visible through a direct line of sight. The 25-foot height of the berm combined with trees planted at its crest will effectively shield the lower portion of the Facility from the view of residents and pedestrians. When viewed from Derby Street, the landscaping measures will shield a large portion of the plant and its components from view. On the Eastern side of the site a 15-foot tall berm and associated plantings will visually raise the ground plain beneath and soften the appearance of the volume from the opposite shore.

Though the project design will include some low-level, minimal site lighting elements, avoiding light pollution is a design priority for the new Facility. As a result, new lighting elements will be placed below the maximum berm height of 25 feet with fixtures pointing down towards the ground to avoid illumination spilling out onto the street or the neighborhood beyond. While there

will be facility lighting requirements mandated by code, the design team will work to minimize the effects of these installations.

Wetlands

The Project will result in only minimal alterations to wetlands regulated under the Wetlands Protection Act and Salem Wetlands Protection and Conservation Ordinance, with all alterations on previously disturbed land. No vegetated wetlands or wildlife habitat will be affected and no wetlands jurisdictional under Section 404 of the Federal Clean Water Act will be affected.

The Massachusetts Wetlands Regulations do not specify performance standards for LSCSF. Because the Project is located in a coastal environment and drains to the ocean, fill within the 100-year floodplain is not subject to a requirement to provide compensatory flood storage as would be the case in inland areas.

Accordingly the Project will not adversely impact wetland resource areas and no mitigation is required or warranted.

Stormwater/Low Impact Development

The Project will include a stormwater management system designed in compliance with the applicable regulatory standards. The Project also utilizes low impact development (LID) principals which further reduce environmental impacts from the Project. The stormwater management system will be maintained through the implementation of a long term Stormwater Management System Operations and Maintenance (O&M) Plan, to be filed with the City of Salem in conjunction with the Notice of Intent filing. The O&M Plan will be prepared to ensure that the stormwater management and porous pavement systems function as designed.

The project has been designed with numerous Low Impact Development (LID) techniques to manage rainfall at its source. Specific LID techniques in this project include green roofs, storm water recapture and reuse, permeable surfaces, and the use of native species.

The Administration Building is planned to have a green roof (an area of approximately 8,100 s.f.), and the roofs of the HRSG, CTG and STG Buildings (an area of approximately 100,000 s.f.) will be designed to collect and pipe rainwater to a 30,000 cubic foot underground tank located next to the facility entrance. This water will be reused for landscape irrigation.

Inside the gabion wall, a majority of the ground cover of the facility will be permeable. All surfaces except for the access road with be crushed stone of various sizes. The access road has been designed to be as narrow as possible to allow for the types of vehicles for operations and maintenance of the facility. Outside of the gabion wall most plantings will be native, including a collection of species specific to the region. A series of narrow gardens planted with small trees, shrubs and groundcover plantings located along the toe of the landscaped berm forms a ribbon of bird and insect habitat. Additionally direct precipitation will infiltrate the acoustic landscape berm and any additional rainwater runoff will be collected in the landscaped areas.

General O&M

The proposed SHR Facility will be permitted to operate up to 8,760 hours per year. The Proponent will retain qualified and experienced O&M staff to run the SHR Facility. The O&M staff will comprise approximately 30-40 employees, including a plant manager, shift supervisors, a maintenance supervisor, operators, a compliance engineer and office and clerical personnel. The plant operators will be union personnel hired from the local and regional labor pool (particularly the existing Salem Harbor workforce) wherever possible.

All O&M workers will be trained and qualified in accordance with industry standards and state requirements. SHR Facility operators will receive classroom training as well as hands on training during the commissioning and testing phases of the project. These operators also will be trained in the areas of environmental compliance, safety and fire protection.

A full set of operating, maintenance and safety procedures will be developed and issued, including community outreach and communications procedures designed to ensure that any issues that may arise during the operations of the facility can be addressed in a satisfactory and timely manner.

Major maintenance and repairs will be performed by local and regional contractors as well as by the equipment manufacturer and EPC contractor as required by their contracts and warranties.

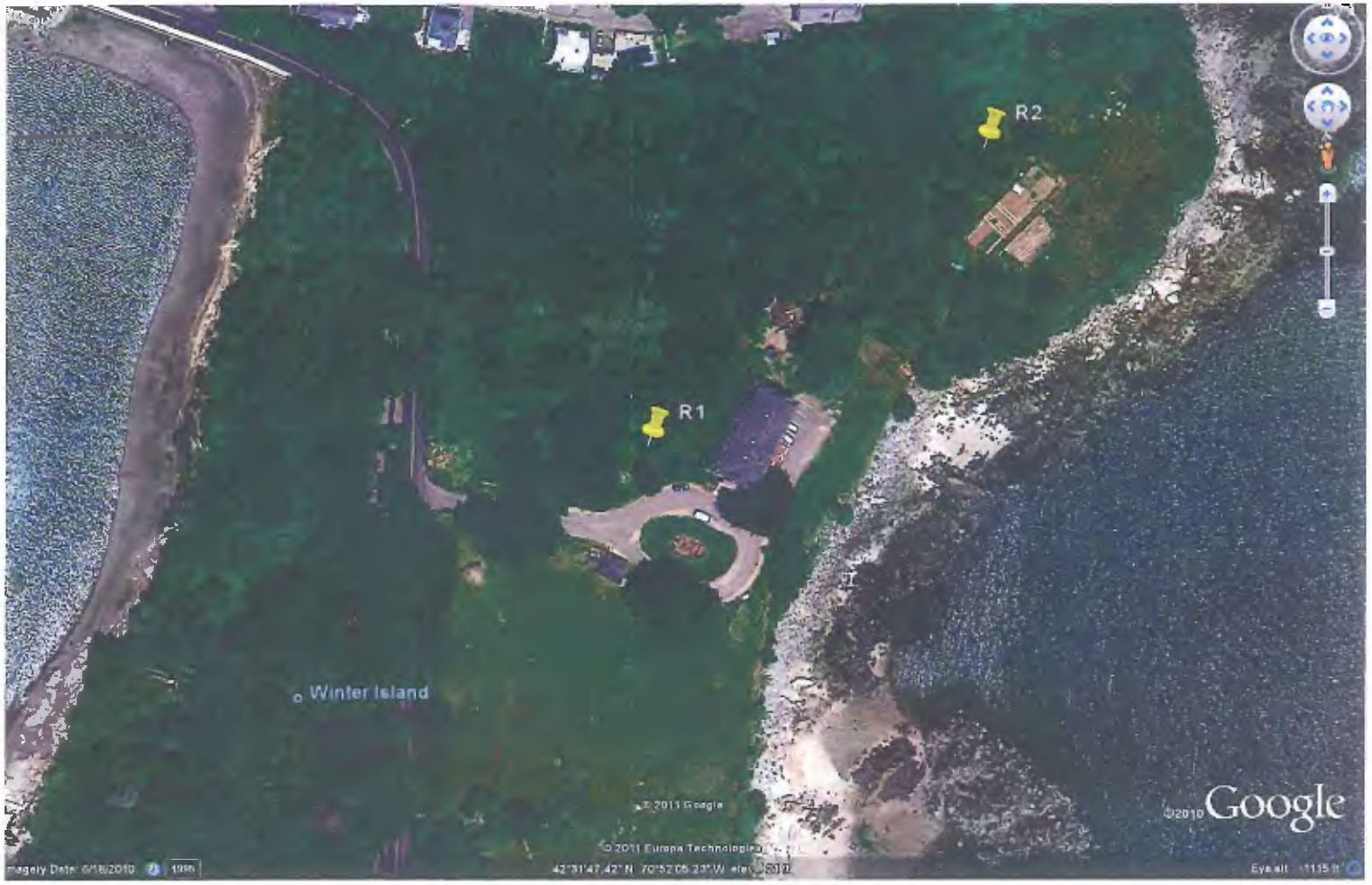
Attachment 4

Figure 1 from Winter Island Wind Turbine Noise Background Study

Attachment 4 - Figure 1 from Winter Island Wind Turbine Noise Background Study*

Figure 1.

Noise Measurement Site Locations



* Prepared by Howard Quin Consulting LLC and Cavanaugh Tocci Associates, June 30, 2011

Attachment 5

Detailed Equipment Noise Specifications

Attachment 5

Detailed Equipment Noise Specifications

1.0 Combustion and Steam Power Train Components

The two combustion and steam turbines will be housed in an acoustically-treated structure, both for their general environmental protection and for abatement of noise. The turbine building will employ acoustic treatments normally consisting of steel construction: a steel skin, mineral wool in the walls, and perforated metal interior walls for sound absorption (Sound Transmission Class (STC) rating of 46). The amount of noise radiated from the wall surfaces and ventilation system of any given building is readily controllable over a reasonably wide range. All ventilation openings and rooftop fans will be acoustically silenced and attenuated to maintain the acoustical integrity of the envelope design targets. Machinery and personnel access into the building will be through high performance acoustic doors.

Sound Power Levels Used to Model Power Generation Components, dB (Flat)

	Octave Band Center Frequency, hertz (Hz)									Broadband (dBA)
	31	63	125	250	500	1000	2000	4000	8000	
Turbine Generator (1 of 2)	105	105	104	101	103	102	101	96	87	107
Load Compartment (1 of 2)	129	121	120	109	103	100	97	94	92	108
Turbine Compartment (1 of 2)	111	113	107	106	103	101	106	102	97	110
Exhaust Diffuser (1 of 2)	119	119	113	109	106	104	102	101	98	110
Steam Turbine (1 of 2)	112	112	108	107	106	101	96	94	93	107
Steam Turbine Generator (1 of 2)	106	106	105	102	104	103	102	97	88	108
Accessory Module (1 of 2)	104	107	101	98	97	97	99	93	87	103
Air Inlet w/12 ft Silencer and Acoustically Lined Weather Hoods (1 of 2)	111	112	108	84	68	69	69	65	63	93

Silenced Stack Exit (90 deg directivity) (1 of 2)	104	102	99	90	88	86	75	66	59	93

2.0 Gas Compressor and Metering Station

The gas compressor and metering equipment will be located within a building to control noise. The building will be acoustically treated so as to minimize noise and all associated pipework will be acoustically lagged. Airways into the building will adequately sound attenuated and exhausts adequately sound attenuated through the use of silencers. The gas compressor and gas metering station assumed individual sound power levels of 110 dBA.

3.0 Heat Recovery Steam Generators (HRSG)

The two heat recovery steam generators will be housed in an enclosure including acoustically rated metal sandwich panels assumed similar to turbine building acoustic assembly. In addition, a low noise HRSG design has been specified by equipment vendors with acoustic model inputs summarized below .

Sound Power Levels Used to Model HRSG Components, dB (Flat)

	Octave Band Center Frequency, hertz (Hz)									Broadband (dBA)
	31	63	125	250	500	1000	2000	4000	8000	
HRSG Inlet (1 of 2)	105	106	102	95	85	78	71	54	37	91
HRSG Body (1 of 2)	97	102	100	93	81	73	61	43	25	88
Stack Breakout (1 of 2)	95	101	98	90	78	67	47	40	35	86
Accessories (1 of 2)	95	101	98	90	78	67	47	40	35	86

4.0 Air Cooled Condenser (ACC)

The sound power of the ACC is principally caused by the axial fans, the reducing gear, and the drive motors. As a rule, air cooled condensers emit uniform noise depending on fan speed. Based on the low noise fan design, the sound emission characteristic that were used are equivalent to a far field sound pressure level of 50 dBA at 400 feet. In addition to the mitigated design based on low speed fans, acoustically treated baffles will be installed on the sides of the ACC both above and below the fans to control noise. These panels applied to the exterior of the ACC on two sides will provide additional absorption to bring the expected contribution of the ACC to less than 50 dBA at 400 feet.

5.0 Transformers

Transformers generate the sound generally characterized as a low humming. There are three main sound sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The core vibrational noise is the principal noise source and does not vary significantly with electrical load. Transformers are designed and catalogued by megavolt ampere ratings. Just as horsepower ratings designate the power capacity of an electric motor, a transformer's MVA rating indicates its maximum power output capacity. The National Electrical Manufacturers Association published NEMA Standards TR1-1993, which establish the maximum noise level allowed for transformers based on the equipment's method of cooling its dielectric fluid (air-cooled vs. oil-cooled) and the electric power rating. The transformers would likely be rated at 320 MVA and would be 15-20 feet high. This corresponds to a standard, un-quieted NEMA 85 rated transformers for this site (Lw = 109 dBA). For the purposes of the acoustic modeling, a low noise NEMA rating of 70 was assumed (Lw = 95 dBA) to meet the acoustic design goal. In addition, sound barrier walls will extend 4 to 5 feet above the top of the transformers and provide shielding to the receptors located on Derby Street to the west and the residential area to the south.