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July 22, 2016

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
PUBLIC BENEFIT DETERMINATION

PROJECT NAME : Central Utilities Plant Second Century Plant Expansion
PROJECT MUNICIPALITY : Cambridge
PROJECT WATERSHED : Charles River
EEA NUMBER : 15453
PROJECT PROPONENT : Massachusetts Institute of Technology
DATE NOTICED IN MONITOR : May 25, 2016

Consistent with the provisions of *An Act Relative to Licensing Requirements for Certain Tidelands*, I hereby determine that the above-referenced project will have a public benefit. A Certificate on the Single Environmental Impact Report (SEIR) was issued on July 1, 2016. The Certificate indicated that the SEIR adequately and properly complied with MEPA and its implementing regulations (301 CMR 11.0) and that the project could proceed to permitting.

Project Description

As described in the Expanded Environmental Notification Form (EENF) and SEIR, the project will expand the Proponent's Central Utilities Plant (CUP) to meet future energy demand, increase reliability and resilience, and meet energy efficiency and carbon emissions reduction goals. The CUP includes a Combined Heat and Power (CHP) system that provides electricity, heat, and steam to over 100 buildings on the campus of the Massachusetts Institute of Technology (MIT), including dormitories, classroom buildings, laboratories, offices, and recreational facilities.

The project will include the following components:

- Replacement of a 21-megawatt (MW) combustion turbine generator (CTG) with two nominal 22-MW gas-fired CTGs, each with a heat recovery steam generator (HRSG) with a gas fired duct burner;
- Addition of a two-MW Ultra Low Sulfur Diesel (ULSD) fired cold-start engine to start the CTGs in an emergency;
- Conversion of five boilers from ULSD fuel to natural gas;
- Seek an increase in permitting limits of two gas-fired boilers to take advantage of the energy-efficiency of the units;
- Replacement of six cooling towers with three new cooling towers (four existing cooling towers will be retained); and,
- Installation of a new gas regulator station.

The CTGs and boilers will use natural gas as the primary fuel source, and ULSD for testing purposes and as a backup fuel source when gas is not available. Use of backup fuel will not exceed 168 hours per year. The duct burners, using gas as a fuel source, will provide a supplemental heat source to the HRSGs to produce additional steam when necessary.

The new CTGs, HRSGs, pollution control equipment, and regulator station will be installed within a 184-foot by 118-ft by 63-ft high addition to the CUP. It will be constructed in a parking lot adjacent to the CUP. Air emissions will be released through a 167-ft high stack containing flues from each HRSG. The emergency generator will be mounted on the roof of the new building and will have its own exhaust stack extending 165 feet above ground level. A new gas line will be constructed to the site from a nearby gas main. Critical project components will be elevated above the 500-year flood elevation to provide resiliency from extreme storm events.

Project Site

The existing CUP commenced operations in 1995. It provides 60 percent of the electricity on the MIT campus and generates steam for heating and for cooling via steam-driven chillers. The CUP is linked to the campus by electrical, steam, and chilled water distribution systems. It is located in Building 42, which is bordered by Vassar Street to the south and Albany Street to the north. MIT buildings surround the CUP to the east and west. The facility is located on either side of the Grand Junction rail right-of-way (ROW). An elevated and enclosed walkway spans the railroad tracks.

The existing CUP includes a 21-MW CTG with an HRSG and duct burner, five boilers, a 2-MW emergency generator, and ten cooling towers. Exhaust gasses are vented from stacks ranging in height from 115 to 177 feet above ground level.

Portions of the existing CUP and the area of its proposed expansion are located within landlocked tidelands. The site does not contain any properties listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth. Four nearby buildings are listed in the State Register of Historic Places. The site is located near

three Historic Districts, including the MIT Historic District encompassing the original campus, the Charles River Basin Historic District, and the Old Cambridgeport Historic District.

The project site is located within a five-mile radius of Environmental Justice (EJ) communities in Cambridge, Boston, Brookline, Newton, Watertown, Arlington, Medford, Malden, Everett, Somerville, and Revere. According to the EEA Environmental Justice Viewer (http://maps.massgis.state.ma.us/map_ol/ej.php), the EJ communities in these municipalities are classified as: minority; income; English isolation; minority and income; minority and English isolation; income and English isolation; and, minority, income, and English isolation.

Changes Since the Filing of the EENF

The Preferred Alternative has been modified with the selection of slightly smaller Solar Titan 250 CTGs in place of the GE LM2500 CTGs considered in the EENF analysis. According to the SEIR, the use of these CTGs will allow for more efficient generation of electricity and thermal energy, and will result in lower emissions of Greenhouse Gas (GHG) and other pollutants compared to the CTGs evaluated in the EENF. The SEIR included updated GHG and air quality analyses to reflect the change in the CTGs.

The design of the building housing the new CTGs has been refined and resulted in a smaller footprint. The building will measure 184 ft by 118 ft rather than 224 ft by 118 ft as described on the EENF. The project has also been revised to include a 40-ft wide pedestrian path along the north side of the building that will connect Albany Street to the railroad ROW and other MIT buildings.

Jurisdiction and Permitting

The project is subject to a Mandatory EIR pursuant to 301 CMR Section 11.03(8)(a)(2) of the MEPA regulations because it requires a State Agency Action and will modify an existing Stationary Source with federal potential emissions that collectively will result, after construction and the imposition of required controls, in 75,000 tons per year (tpy) of GHGs based on CO₂ equivalent. The project exceeds the ENF threshold at 301 CMR 11.03 (7)(b)(2) because it consists of expansion of an existing electric generating facility by 25 or more MW. The project requires a Major Comprehensive Air Plan Approval (MCPA) from the Massachusetts Department of Environmental Protection (MassDEP).

The project requires a Public Benefits Determination and is subject to review under the May 2010 MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol (“the Policy”). In addition, the project is subject to the Executive Office of Energy and Environmental Affairs (EEA) EJ Policy.

The project requires federal air permitting under the Clean Air Act (CAA), specifically the Prevention of Significant Deterioration (PSD) permitting requirements. Pursuant to the Agreement for Delegation of the Federal Prevention of Significant Deterioration Program, dated April 2011, by the United States Environmental Protection Agency (EPA), Region I with MassDEP, MassDEP is delegated to administer the federal PSD program in Massachusetts.

The project is not seeking Financial Assistance from the Commonwealth. Therefore, MEPA jurisdiction is limited to the subject matter of required State Agency Actions that are likely, directly or indirectly, to cause Damage to the Environment as defined in the MEPA regulations. These include GHG emissions, land alteration, air quality, and tidelands.

Environmental Impacts

Potential environmental impacts of the project include emissions of air pollutants, emissions of GHG, and noise. Emissions will include 28.9 tons per year (tpy) of nitrous oxide (NO_x), 20.3 tpy of carbon monoxide (CO), 38.5 tpy of volatile organic compounds (VOC), 55.4 tpy of particulate matter (PM), 7.8 tpy of sulfur dioxide (SO₂); and 362,740 tpy of carbon dioxide (CO₂). As a result of the selection of a different type of CTG, potential pollutant levels have decreased compared to those presented in the EENF. The project will avoid, minimize and mitigate potential impacts by using clean fuels and pollution control technologies, such as selective catalytic reduction (SCR) and oxidation catalysts. The project will mitigate noise impacts by installing the CTGs and other equipment in acoustically designed enclosures and using mufflers on ventilation, intake and exhaust systems.

The project will be supported primarily by existing infrastructure. The project will increase the CUP's water use by 65,600 gallons per day (gpd) and decrease its wastewater generation by 3,200 gpd. Stormwater from the roof of the new building will be collected for use on campus and will not be directed into the City of Cambridge's stormwater system.

Tidelands

The Project proposes structural alterations and changes of use on previously filled, landlocked tidelands that are not subject to Chapter 91 (c. 91) licensing. Landlocked tidelands comprise approximately 3,400 sf of the 0.9-acre project site.

Consistent with the provisions of *An Act Relative to Licensing Requirements for Certain Tidelands* (2007 Mass. Acts ch. 168, sec.8) (the Act), which was enacted on November 15, 2007, I must conduct a Public Benefit Review for projects in tidelands that are required to file an EIR.

The legislation states the following regarding the Public Benefit Determination:

“In making said public benefit determination, the secretary shall consider the purpose and effect of the development; the impact on abutters and the surrounding community; enhancement to the property; benefits to the public trust rights in tidelands or other associated rights, including, but not limited to, benefits provided through previously obtained municipal permits; community activities on the development site; environmental protection and preservation; public health and safety; and the general welfare; provided further, that the secretary shall also consider the differences between tidelands, landlocked tidelands and great pond lands when assessing the public benefit and shall consider the practical impact of the public benefit on the development.”

The following addresses each of the considerations identified in the legislation.

1. purpose and effect of the development

The project proposes to expand MIT's existing CUP to meet future energy demand, increase reliability and resilience, and meet energy efficiency and carbon emissions reduction goals. The project includes the use of a high-efficiency Combined Heat and Power (CHP) system that will provide electricity, heat, and steam to over 100 buildings on the MIT campus, including dormitories, classroom buildings, laboratories, offices, and recreational facilities.

2. impact on abutters and the surrounding community

The project includes expansion of the CUP adjacent to the facility and construction will be limited to an existing parking lot. The project will be required to meet air quality and noise standards during construction and operation of the facility.

The design includes a 30-foot wide easement through the southern portion of the project site as requested by the City of Salem to preserve the possibility of an extension of Commercial Street to Flint Street.

3. enhancement to the property

The project will be constructed in an existing parking lot. The project will include a stormwater management system that will collect rainwater from the roof of the building and reuse it in the facility's cooling towers rather than discharging it into the City of Cambridge stormwater system.

4. benefits to the public trust rights in tidelands or other associated rights

In considering the public benefits of the project, the Act indicates that particular emphasis should be placed on the benefit to the public trust rights in tidelands. The project is located approximately 1,575 feet from the Charles River and will not affect the ability of the public to access the river. The site design incorporates walkways, lighting, seating and landscaping. The reduced footprint of the CUP will support a 40-ft wide path along the east side of the building that will provide a connection between Albany Street and Vassar Street, and associated bicycle infrastructure. The SEIR provided a cross-section of the proposed Grand Junction multi-use path in relation to existing buildings and the proposed CUP building. According to the SEIR, the project will retain an approximately 24-ft ROW that would not preclude future construction of the Grand Junction Community Path. I encourage MIT to consider design changes that could increase the width of the ROW.

5. community activities on the development site

The industrial nature of the CUP precludes public access to most of the site. A large portion of the site outside of the building footprint will be open to the public as described above.

6. environmental protection and preservation

The project has been designed to avoid, minimize and mitigate potential environmental impacts including GHG emissions, air quality, noise, stormwater, and construction period impacts and potential impacts associated with climate change. These include:

GHG Emissions

- Use variable frequency drives (VFD) for fuel gas compressor;
- Review use of high-efficiency motors and VFDs in final project design.
- Use waste heat to assist in urea vaporization;
- Use of an adsorption rotary drum dryer associated with the compressed air system;
- Construct HRSGs with surface area and piping required to implement a Medium Temperature Hot Water system;
- Use light-emitting diode (LED) lighting and an occupancy lighting system in the building expansion to reduce electricity use;and,
- Provide a GHG self-certification to the MEPA Office.

Air Quality

- Use of clean-burning fuels (natural gas and ULSD) that are low in sulfur to control particulate matter (PM) and SO₂;
- Removal of residual oil firing for existing Boilers 3, 4 and 5 and removal of ULSD firing for existing Boilers 7 and 9;
- Low-NO_x combustors and use of Selective Catalytic Reduction (SCR) to control NO_x;
- Minimize CO and VOC emissions through combustion control and use of Ammonia (NH₃) and oxidation catalysts;
- CTs include option to use dry low-NO_x combustors instead of water injection;
- High efficiency drift eliminators will minimize emissions from new cooling towers;
- Limit use of ULSD to 300 hours per 12-month period; and,
- Will comply with emission rates that meet EPA limits for off-road engines.

Noise

- Noise producing equipment (e.g. CTGs, cogeneration equipment, fuel gas compressor and drive motor, and diesel generator) will be enclosed in sound-attenuating materials, enclosures or behind sound barrier walls;
- Mufflers will be installed on the gas turbine air intake, gas exhaust, turbine enclosure and ventilation systems;
- Mufflers will be installed on the non-emergency steam vents as necessary;
- Reduced-noise fans with VFDs will be used in the cooling towers; and
- Equipment and building air ventilation paths will include treatments (mufflers, lined ducts, acoustic louvers, and local barriers) with suitable sound attenuation; and,
- The shell of the new building will be designed to reduce noise levels to 55 to 60 dBA directly outside the building walls facing the neighborhood.

Construction Period

- Use fencing and barricades to isolate construction areas from pedestrians;
- Encourage use of alternative transportation to the site by construction workers;
- Use construction equipment that meets or exceeds EPA Exhaust Emission Standards;
- Use wetting agents as necessary and covered trucks to reduce the spread of dust;
- Establish a tire cleaning area to prevent dirt from reaching city streets;
- Minimize exposed storage of debris on-site;
- Clean sidewalks and streets to minimize dust aggregation;
- Turn off idling equipment;
- Use and maintain mufflers on construction equipment and enclosures around continuously-operating equipment to reduce noise;
- Separate or shield noisy equipment from sensitive receptors;
- Divert construction waste from landfills by recycling waste material;
- Conduct a hazardous waste survey prior to the start of construction to ensure appropriate disposal of hazardous material, including asbestos; and
- Install stormwater management controls to meet City of Cambridge requirements.
- Use a Certified Industrial Hygienist to develop and implement Dust Mitigation Plan and air quality requirements during activities that could expose people to contaminated soil or groundwater or other hazardous conditions.

7. public health and safety, and the general welfare

The project will protect public health and safety, and the general welfare by using Best Available Control Technology (BACT) to minimize emissions of air contaminants and will incorporate sound-proofing to minimize operational noise.

Enforcement of Public Benefits

In accordance with M.G.L. c. 30, s. 62I, the Proponent shall file a copy of the Certificate on the SEIR and this Public Benefit Determination with MassDEP within 30 days of today's date to notify the Department that work will be conducted within tidelands. MassDEP will then have the authority to enforce the conditions outlined herein and in the Public Benefit Determination pursuant to the statute.

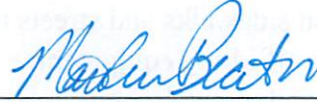
I recognize that the public benefit commitments may be subject to certain revisions as the project proceeds. If the public benefits to be provided should change, the Proponent is instructed to submit a Request for Advisory Opinion to the MEPA Office for a determination as to whether the change is sufficiently material to require the submission of a Notice of Project Change (NPC) pursuant to 301 CMR 11.10. Otherwise, the Proponent may submit a NPC without requesting an Advisory Opinion if it is clear that the change(s) are material.

Conclusion

Based on the foregoing, I hereby determine that the project will have a positive public benefit to public trust rights in tidelands. To meet the publication requirements of the legislation, this Determination will be published in the Environmental Monitor on August 10, 2016.

July 22, 2015

Date



Matthew A. Beaton

MAB/AJS/ajs