ATTACHMENT 215-B ANALYSIS OF ALTERNATIVES

As a proposed major source of at least one ozone precursor (nitrogen oxides) in a designated ozone non-attainment area, the CPV Towantic Energy Center (the Project) is subject to an analysis of alternatives pursuant to Section 22a-174-3a(l)(2). The Project is also subject to review by the Connecticut Siting Council (CSC), which has evaluated alternatives, including alternate sites, and has previously confirmed that the Project has provided an appropriate balance of environmental and community impacts with the need for a reliable and efficient source of energy.

The following sections consider alternatives for the Project as currently proposed, addressing the extent to which its benefits outweigh its adverse environmental impact, including secondary impacts, cumulative impacts, and social costs. As required by CTDEEP, consideration of alternative sites as well as alternative Project sizes and technologies are discussed. Lastly, environmental control techniques and technology are summarized, with cross-referencing to Attachment G, which includes a detailed demonstration of Lowest Achievable Emission Rate (LAER) and Best Available Control Technology (BACT) for the Project.

ALTERNATIVE SITES

Consideration of site alternatives was completed in conjunction with the CSC process. As documented in the 1998 CSC application for the Project, Connecticut was selected as the study area to supplement and replace existing aging power generating assets and to provide in-state power due to transmission constraints. Due to the number of Connecticut generation assets that have subsequently announced retirement or have been identified as “at risk,” this remains true today.

Locations within the state that were projected to be net importers of electricity and supportive of economic development were reviewed. Fourteen communities were initially identified for discussion with local officials evaluating key screening criteria. On the basis of key site suitability factors – community receptivity, proximity of natural gas and electric transmission, water and sewer availability, and presence of properly zoned parcels at least 15 acres in size – three high priority sites were identified: Middletown, Naugatuck, and Oxford.

The Middletown site, although favorable in many regards faced environmental challenges associated with its former use as a mining site, included sizeable wetland areas, and presented topographic characteristics potentially challenging for air quality compliance. Naugatuck’s industrial park location was eliminated based on the need to extend underground electric transmission to the site for approximately one mile, rough topography, and lack of significant natural buffer vegetation. The Oxford site was selected based on its balance of favorable attributes.

The Town of Oxford had recently added acreage to its industrial zone, and viewed the Project as an “anchor” tenant. The 20-acre Oxford site was, and still is, directly proximate to both suitable electric and natural gas infrastructure. Water and sewer infrastructure would be extended directly within the industrial park roadway abutting the site. The following conclusions were made in the CSC application supporting selection of this site for the Project:

- The site, its location, existing infrastructure, environment and topography are characteristics that are conducive to Project development without adverse impacts to the public and the environment.
- Oxford town officials’ support is enthusiastic and receptive, since the Project meets several of the town’s objectives for its industrial development plan for the area.
- The site requires no new construction of natural gas pipelines or electric transmission lines, nor does it present a significant burden on the existing water and sewer capacities of Oxford or the surrounding area.

- Since the Oxford area and surrounding region is a net importer of energy, the Project is more likely to service existing and projected electric needs for the area and region in which it is located.

In the years since the Project's initial CSC and air permit approvals, market conditions have changed and extensions have been granted for both approvals, continuing to allow for both construction and operation. In 2012, Competitive Power Ventures, Inc., through its wholey owned subsidiary, took majority ownership of the Project entity, renamed as CPV Towantic, LLC (CPV). In considering this acquisition, CPV examined the current evolving electrical market, including the need for power in this location, as well as attributes of the site to confirm that it remained a suitable location that would meet energy demand without significant adverse environmental or community impacts.

The above-listed favorable attributes of the site remain, and have been further improved by development of the industrial park roadway and associated infrastructure to the west and the construction and operation of a compatible industrial entity (the Algonquin Gas Transmission LLC Oxford Compressor Station) immediately to the east. An additional 6 acres of industrially zoned land within the industrial park have been optioned for the Project to utilize the entire property to the north of the compressor station access drive and allow for layout optimization.

Because of its superior attributes to the alternate sites considered, as well as its status as the only available CSC-approved site, the Project site is clearly superior to any other reasonable site alternatives.

ALTERNATIVE SIZES OR ALTERNATIVE PROCESSES

Alternative Size/Project Output

As noted above, existing Project approvals reflect a 512-MW generating capability. The proposed Project update incorporates General Electric (GE) H technology to allow for generation of a nominal 805 MW using a similar design and footprint. The updated output for the Project reflects the optimal size to meet current ISO New England needs within the energy market. Note that, although the Project remains similar in physical size, adjustments have been made in specific equipment size reflecting the updated technology as well as considerations for reducing visual and downwash effects (e.g., shorter air cooled condenser, three smaller building enclosures instead of one larger building enclosure).

Alternative Generation Technologies

The CSC application for the Project evaluated a thorough list of potential generation technologies, and affirmed that combined-cycle technology utilizing natural gas as its primary fuel not only presented economic and efficiency advantages, demonstrated in practice, but was a favorable option from an environmental and acceptability perspective. Competitive Power Ventures, Inc. focuses on clean energy solutions, and also develops renewable energy facilities throughout the U.S. and Canada. However, in this region, on-shore renewable resources are not sufficiently robust to support a commercial-scale energy facility, and energy storage solutions do not yet allow for reliable power generation across the potential demand spectrum. Natural gas combined-cycle technology, as proposed, is an effective companion for renewable energy, with its ability for flexible operation and rapid starts. Combined-cycle technology utilizing natural gas as its primary fuel remains the most favorable option today from a market point of view. This was recently demonstated by ISO New England's choice of a gas-fired combined-cycle facility as the forward capacity market's proxy unit. This technology also maximizes energy efficiency and minimizes air emissions.

Alternative Fuels

The CSC application for the Project considered a range of alternatives. As noted above, wind and solar renewable energy are not currently able to support commercial energy generation at this scale. Other fossil fuels, such as coal and oil burning facilities, result in greater levels of emissions, as well as potential social impacts

associated with fuel delivery and/or storage. Natural gas, delivered via pipeline located adjacent to the site, eliminates the need for road or rail delivery, and provides efficient combustion in combined-cycle mode resulting in the lowest emissions for all fossil fuels. In selecting a backup fuel, in order to support the most reliable Project possible, the use of ultra-low sulfur distillate (ULSD) presents the lowest emitting option of liquid fuels available, and is able to be utilized by the same combustion process and equipment.

Alternative Cooling Technologies

A natural gas-fired combined-cycle electric generating facility requires cooling, particularly for the condensing of turbine exhaust steam in the steam turbine condensers. The range of cooling technologies was evaluated in the CSC application, with air cooling selected for the Project. Other cooling options such as once-through cooling and wet cooling, utilize significant greater water volume. In a community for which water conservation is a priority, selection of air-cooled condensing technology was appropriate. In considering updates to the Project, CPV investigated the range of currently available technology and has incorporated a design that reduces the size and height of the air-cooled condenser (even with the greater energy output), reducing visibility as well as the effect of downwash.

ENVIRONMENTAL CONTROL TECHNIQUE AND TECHNOLOGY REVIEW

A detailed LAER/BACT demonstration analysis is provided in Section G of this application. As outlined in that section, the Project has selected advanced pollution control technologies and add-on controls to achieve low levels of emissions when operating both with its primary fuel (natural gas) and its backup source (ULSD). In addition, the Project has continued to integrate technology improvements, for example, adding an oxidation catalyst in the recertification of BACT that occurred in 2010. The Project will employ dry-low NO_x combustion, selective catalytic reduction, an oxidation catalyst and good combustion practices utilizing the latest techniques and technologies.

SUMMARY AND CONCLUSION

The CSC review of the Project incorporated a robust and thorough consideration of the range of alternatives. The Project as proposed reflects the use of an appropriate site, the most efficient generating technology, clean fuels, and state-of-the-art pollution controls for a Project of the optimal size for successful participation in the current ISO New England forward capacity and energy markets. Air quality impacts associated with the Project will comply with National Ambient Air Quality Standards and PSD Increments, which have been established for the protection of the most sensitive members of the population. Benefits of the Project area associated with its efficient, reliable energy production and presence as an anchor tenant in a planned industrial park area. Employment opportunities associated with construction and operation will have secondary beneficial effects throughout the local community, and the Project will contribute substantial financial support to the local community. Beneficial cumulative effects will result from displacement of older, less efficient generating units. The Project has incorporated the best available alternatives in order to balance its impacts and create a beneficial source of electrical generation.