

July 28, 2017

Via Electronic Mail and Federal Express

Todd Anthony Bianco, EFSB Coordinator
RI Energy Facility Siting Board
89 Jefferson Boulevard
Warwick, RI 02888

**Re: *Invenergy Thermal Development LLC's Application to Construct and Operate the
Clear River Energy Center in Burrillville, Rhode Island
Docket No.: SB-2015-16***

Dear Mr. Bianco:

On behalf of Invenergy Thermal Development LLC and the Clear River Energy Project ("Invenergy"), please find enclosed an original and three (3) copies of Invenergy's Objection to the Town of Burrillville's July 13, 2017 Motion to Dismiss.

Please let me know if you have any questions.

Very truly yours,



ALAN M. SHOER
ashoer@apslaw.com

Enclosures

cc: Service List

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD**

**In Re: INVENERGY THERMAL DEVELOPMENT)
LLC’S APPLICATION TO CONSTRUCT THE) Docket No. SB-2015-06
CLEAR RIVER ENERGY CENTER IN)
BURRILLVILLE, RHODE ISLAND)**

**OBJECTION OF INVENERGY THERMAL DEVELOPMENT LLC TO
THE TOWN OF BURRILLVILLE’S MOTION TO DISMISS**

I. INTRODUCTION

Now comes Invenergy Thermal Development LLC (“Invenergy”) and hereby objects to the Town of Burrillville’s (“Town’s”) latest Motion, requesting the Rhode Island Energy Facility Siting Board (“EFSB” or “Board”) dismiss Invenergy’s EFSB Application (“Invenergy’s Application” or “Application”). The basis for the Town’s Motion is its assertion that Invenergy has “failed to provide complete plans as to all structures associated with the proposed facility.” See Town’s July 13, 2017 Motion (“Town Motion”), 1. This assertion is utterly false and, as discussed more thoroughly below, cannot be reconciled with the voluminous amount of materials and details with regard to structures, equipment and facilities already supplied to the Town by Invenergy.¹

Invenergy has provided the Board, the Town and the Building Inspector with substantial relevant and detailed information regarding the structures, equipment and supporting facilities in

¹ The Town also asserts that because Invenergy’s Application purportedly does not contain the requested plans, its Application is allegedly incomplete and allegedly “not in accordance” with the Rhode Island Energy Facility Siting Act (“Act”) and the Board’s Rules of Practice and Procedure (“EFSB Rules” or “Board Rules”). *Id.* at 4. Lastly, the Town contends that because of Invenergy’s alleged failure to provide complete plans, the “EFSB lacks [subject matter] jurisdiction and should therefore dismiss the Application.” *Id.* at 5. The Town’s assertions are erroneous. Invenergy has provided the Board, the Town and the Building Inspector with more than the required level of detail for its proposed plans for the structures and equipment, to enable the Town to evaluate and advise the Board with regard to the Project.

its Application, in supporting plans and documents in responses to many specific data requests, and in other information and reports filed with the Board, including supporting information in permit filings. Invenenergy has gone above and beyond in terms of providing the Town, and its Building Inspector, with the required level of detail to explain its plans for the facilities, structures and equipment necessary to support the Project. The Town's Motion ignores all of this relevant information, instead opting to demand even more than is required at this point in the process. The Town's demands for even more detailed construction and design drawings at this phase of the proceeding also cannot be reconciled with the Board's precedent, which cautions that "*it is unreasonable to require the applicant for a major energy facility to complete detailed design and construction drawings prior to a decision regarding the Board license*").²

The Town ignores this EFSB precedent and continues to request the type of materials that the Board previously deemed to be an unreasonable request, years ago, in the context of another major energy generating facility to be sited in the Town of Burrillville. Additionally, the Town's argument cannot be reconciled with the Board's Rules and process that mandates a post-licensing construction drawing permit review and separate advisory opinion process for the construction and building design permits necessary to support a major energy facility application.

This is the latest in a series of unnecessary, time consuming and misplaced motions that the Town persists on filing. The Town's opposition strategy is evidently to argue that no matter what level of detail Invenenergy provides, Invenenergy cannot provide enough detail to satisfy the Town. In other words, if the bar is to be at the level of the Town's expectations, no applicant

² See *In Re Ocean State Power*, Order No. 7, SB 87-1, dated October 25, 1988, at Section III(a), attached as **Exhibit A** (emphasis added).

will ever be able to satisfy the Town's unrealistic and unreasonable demands. Put another way, the Town's unreasonable demands for more information seeks to create a veto opportunity that does not exist in the Act or the EFSB's Rules. Although the Board has not requested an advisory opinion on whether a building construction permit should be issued at this point, the Town instead moves to dismiss Invenergy's Application.³

As explained more thoroughly herein, the Town's assertions are incorrect and the Town's Motion to Dismiss should be denied for the following reasons: (1) Invenergy's Application, which included plans and details regarding the proposed structures for the Facility, was properly deemed complete by the Board in November of 2016; (2) EFSB precedent establishes that the type of information requested by the Town need not be provided until an applicant receives a license; (3) Invenergy provided the Board, the Town and the Building Inspector with the required level of details on its plans for the component structures of the Facility and neither the Rules nor the Act require an applicant produce the type of information (detailed design, engineering and construction drawings) erroneously requested by the Town at this juncture; (4) as evidenced in the Board Rules 1.13 and 1.14, the EFSB does not require an applicant to supply detailed structural design and construction drawings until post licensing; and (5) the EFSB does not lack jurisdiction over Invenergy's Application.

II. BACKGROUND

Pursuant to the Act, Chapter 42-98, *et seq.* of the General Laws of Rhode Island and the EFSB Rules, Invenergy filed its Application to seek the approval of the Board to site and

³ In an effort to assist the Building Inspector and to answer further questions or concerns, Invenergy requested a meeting with the Building Inspector, which the Building Inspector declined. *See* Exhibit 2 to the Town's Motion, 3 (stating "we do not believe it would be productive to meet with Invenergy").

construct the Clear River Energy Center, an approximately 850-1000 MW combined cycle electric generating facility on Wallum Lake Road in Burrillville, R.I. (“CREC” or “Project” or “Facility”). The application was reviewed by the Board for completeness in accordance with Rule 1.7 and deemed complete as it provided the required contents set forth in the EFSB Rules. The Application was properly docketed on November 16, 2015.

When Invenergy’s Application was deemed complete, it contained the best information available at the time regarding the structures and the layout. *See* Invenergy’s Application, Figure 3.4-3, detailing the layout and plan for CREC. The Application also contained a detailed description of the Project and its support facilities. *See id.* at Section 3. Specifically, it contained a written description of the structures, identifying details about *the primary powerhouse building, smaller auxiliary buildings, fuel oil equipment and electrical equipment buildings, storage tanks, the switchyard, appurtenant equipment, cooling systems, transmission facilities, etc.* *See id.* at Sections 3.5.1 – 3.5.7. The site plan that was filed specifically identified the proposed location and site dimensions of each of the proposed structures and equipment (numbering 52 separate structures).

Following the Application, the Town embarked on a campaign to barrage Invenergy with data requests, many of which specifically focused on structures, equipment and supporting facilities. Invenergy answered each and every request, to the best of its ability, with the best information available at the time. For example, in response to the Town’s Data Request Nos. 2-2 – 2-5, Invenergy provided information about vacuum pumps, steam jet air ejector technologies, steam turbine drain tank and air cooled condenser duct configuration. In responses to the Town’s Data Request No. 4-25, Invenergy provided information about the fuel oil storage secondary containment berm and relevant engineering details. In response to the Town’s Data

Request No. 5-11, Invenenergy provided details regarding the unloading station area and piping linage. In response to the Town's Data Request No. 7-4, Invenenergy provided updated information, including updated dimensions, regarding the ultra-low sulfur diesel ("ULSD") storage tanks for CREC. In response to the Town's Data Request No. 12-1, Invenenergy provided information regarding the height of the stacks. In response to the Town's Data Request No. 22-3, Invenenergy provided details regarding the demineralized water tank. These are just a few relevant examples.

In addition, Invenenergy supplemented its Application with other reports and information that even further describes specific structures. In the Revised Water Supply Plan, filed with the Board on January 11, 2017, Invenenergy described the gas and steam turbines, as well as the demineralized trailers. In the Transient Operation Noise Level Evaluation report, filed with the Board on August 2, 2016 as Invenenergy's Supplemental Response to EFSB Data Request No. 1-1, Invenenergy described numerous equipment items that are listed on the figure attached to the Town's Motion as Exhibit 1 and described the proposed acoustical design and control mechanisms that will be used in each equipment item.

Also, Invenenergy responded to data requests from other parties, on questions about the specific structures, equipment and facilities proposed for the Project. For example, in response to the Rhode Island Department of Environmental Management's ("RIDEM") Data Request No. 1-1, Invenenergy explained in detail the aboveground storage tank construction standards for all CREC oil tanks; in response to RIDEM's Data Request Nos. 1-2 and 1-3, Invenenergy provided a diagram that detailed CREC's piping system as well as the preliminary conceptual design of the aboveground storage tanks.

Invenenergy also provided supporting information regarding specific structures in support

of its application for permits with other agencies. In Invenergy's Major Source Permit Application Addendum, filed with the Board on May 26, 2017, Invenergy attached Table 5, which included a revised stack height analysis, as well as additional figures which included the revised site layout and general arrangement, with specifics on each of the structures and equipment proposed for CREC. In Invenergy's Application to Alter Freshwater Wetlands, filed with the Board on May 16, 2017, Invenergy described and provided details regarding CREC's structures. Specifically, section 2.1.2.1 through section 2.1.2.6 identified additional information regarding the primary powerhouse building, small auxiliary buildings, fuel oil equipment, electrical equipment buildings, storage tanks, switchyard, appurtenant equipment and cooling systems. Likewise, the Freshwater Wetlands Application was accompanied by additional site plans that included an overall site arrangement, proposed layout plans, proposed grading plans, proposed drainage plans, and soil erosion and sediment control plans and drawings.

With regard to the proposed transmission facilities and structures, the Application discussed the transmission facilities structures, as well as interconnection information. *See* Application, Sections 3.5.7, entitled "Transmission Facilities," Section 3.6, entitled "Transmission and Interconnection," and Section 3.9.3, entitled "Electric Transmission Lines." There is also an entirely separate proceeding devoted specifically to the transmission structures, equipment and facilities. *See* SB-2017-01.

Additionally, and in an effort to provide even more information to the Building Inspector, on October 14, 2016, Invenergy supplied the Town and the Building Inspector with a conceptual plan set. The October 14, 2016 drawing package included a twenty-nine (29) page memorandum describing, in detail, the proposed design requirements and specifications for the Project, which is attached as **Exhibit B**. Section 4.2 of the memorandum, entitled "Buildings," provides

structural information regarding the buildings. **Exhibit B**, at 8. Specifically, section 4.2.2 provides structural information regarding the turbine building; section 4.2.3 discusses structural details of the administration building and section 4.2.4 states the structural information about the water treatment building. *Id.* at 8-9. Likewise, section 4.3, entitled “Structural Requirements,” articulates the requirements in which all the structures will be designed to be in accordance with and section 4.4, entitled “Structural Materials,” details information regarding the materials, workmanship and testing that will be conducted for all structures. *Id.* at 9-13.

The October 14, 2016 materials also included, for reference purposes, a set of construction drawing plans (prepared *post licensing*) for a similar Invenergy project post-licensing building permit application, in Lackawanna County, PA. These materials were intended to show the Building Inspector even further details on what a post-licensing building and construction permit set of drawings would look like, so as to provide an early view of what is anticipated, in the event that the Board grants a license to Invenergy.

Further, on June 9, 2017, Invenergy provided the Building Inspector with a revised and updated Site Arrangement and General Arrangement, prepared by HDR, Inc., dated February 16, 2017, revised April 17, 2017 (drawings 238926-0GA-C1000 – revised and 238926-0GA-C1001B – superseded by 238926-0GA-C1001C), attached hereto as **Exhibit C**; and a list of buildings, structures and equipment which detailed Invenergy’s interpretation of whether a proposed building and/or structure was considered a “principal” or “accessory” structure under the Burrillville Zoning Ordinance and its interpretation of whether the building and/or structure identified requires a height variance, which was attached to the Town’s Motion as Exhibit 1.

To claim now, as the Town does, that all these materials do not “provide complete plans as to all structures associated with the proposed facility” is a gross mischaracterization of the

information Invenergy did provide the Town. *See* Town’s Motion, 1.

III. ARGUMENT

A. The Town’s Motion To Dismiss Should Be Denied Because Invenergy’s Application, Which Included The Required Information On Proposed Structures, Was Properly Deemed Complete On November 16, 2015.

On October 28, 2015, Invenergy submitted its Application to the EFSB Coordinator for initial review, as required by Rule 1.7. The Coordinator properly coordinated his review with the Board and properly determined that Invenergy’s Application was complete. In fact, on November 16, 2015, Invenergy’s Application was deemed complete by the Coordinator and formally docketed with the Board.

At the time Invenergy’s Application was deemed complete, it contained plans for the Project and for the proposed structures. *See* Invenergy’s Application, Figure 3.4-3. The Application also contained a detailed description of the Project and its support facilities, as well as a written description of the structures, identifying details about the primary powerhouse building, smaller auxiliary buildings, fuel oil equipment and electrical equipment buildings, storage tanks, the switchyard, appurtenant equipment, cooling systems, transmission facilities, etc. *See id.* at Sections 3.5.1 – 3.5.7.

Accordingly, the Board should deny the Town’s motion solely on the grounds that the EFSB Coordinator has already deemed Invenergy’s Application complete after thoroughly reviewing the Application in accordance with the Rules.

B. The Town’s Motion To Dismiss Should Be Denied Because The Construction Permit And Engineering Drawing Plans Requested By The Town At This Stage Of The Proceeding Are Not Required By EFSB Precedent, The Act or EFSB Rules.

The Town’s latest request asks for “all structures associated with the facility, site plans, foundation plans, electrical plans, plumbing plans, building plans, engineering plans, design

plans, and all other usual and customary plans associated with the proposed CREC facility.”

Town’s Motion, 4. The Town argues that “[t]he failure of Invenergy to provide ‘complete plans as to all [fifty-five] structures’ renders Invenergy’s Application incomplete as a matter of law[.]”

Id. The Town’s assertions are untrue and incorrect. This information requested is exactly the type of information that a building official would seek to support an electrical, design and construction permit review. However, as discussed more fully below, requesting this level of detailed construction design and engineering drawings at this point in the proceeding is not reasonable, nor is it required by EFSB precedent, the Act or the EFSB’s Rules.

1. The EFSB Previously Opined That The Type Of Detailed Design And Construction Information Requested By The Town Is Not Required At This Stage Of The Proceeding.

The Town erroneously contends that “complete plans as to all structures” equates to “all structures associated with the facility, site plans, foundation plans, electrical plans, plumbing plans, building plans, engineering plans, [and] design plans.” Town’s Motion, 4. However, EFSB precedent specifically establishes that the type of detailed construction, electrical, plumbing, building and engineering drawings requested by the Town at this point in the proceeding (during the pre-hearing and advisory opinion stage), should not be prepared and filed, until *after* the Board makes its licensing determination, after Final Hearings and the Board renders a decision. *See In Re Ocean State Power*, Order No. 7, SB 87-1, dated October 25, 1988.

In the Ocean State Power EFSB final decision, which involved an application to construct an energy generating facility also in Burrillville, Rhode Island, the Board specifically stated: “*it would be impossible at this time for the Building Inspectors and Department of Public Works to comment regarding compliance with local building codes, since the specific design and final construction drawings necessary for a building code review are not available and undoubtedly*

will not be developed unless a Board license is granted[.]” Id. (emphasis added). However, instead of dismissing the application and/or denying the request for a license on the grounds that the plans submitted were incomplete because they lacked this level of information, the Board stated that “*common sense dictates that such [building] permits should not be issued until a thorough review of the design and final construction drawings and it is unreasonable to require the applicant for a major energy facility to complete detailed design and construction drawings prior to a decision regarding the Board license.*” *Id. (emphasis added).* The Board went on to state that “[i]f a license is granted such drawings can be developed[; i]f a license is denied the applicant need not be burdened with the costs of detailed final design.” *Id.*

The Board determined that the “most effective way to address this problem is to create a post licensure proceeding whereby permits of a technical nature, such as building permits, can be reviewed after the grant of a license to site a major energy facility.” *Id.* The Board specifically noted that the procedure of reviewing detailed design drawings after the Board issues a license will allow an applicant “a prompt review of its final building design *without having to commit to final design before a decision regarding the overall Board license.*” *Id.*

Subsequently, the Board adopted EFSB Rule 1.14, entitled “Post Licensure Proceedings,” which sets forth a specific post-licensing process for the review of structural engineering and construction design details and references that the Board could seek an additional advisory opinion from a building official regarding these post-licensing building and construction permits.

As discussed above, Invenenergy provided the Town with the best available information as to the proposed structures for the Project. The Town, however, seeks more, including “site plans, foundation plans, electrical plans, plumbing plans, building plans, engineering plans, design plans, and all other usual and customary plans associated with the proposed CREC

facility.” Town’s Motion, 4. The additional requested plans are exactly the type of detailed design drawings of a more technical nature that the EFSB has determined do not need to be created until after an applicant has received a license. Because the EFSB has already determined the types of plans the Town is seeking are not required under the Act nor the Rules, the Town’s Motion should be denied.

2. The Type Of Detailed Information Requested By The Town Is Not Required By The Act Or The Rules At This Stage Of The Proceeding.

Not only has the EFSB previously determined that the Town’s request for detailed design, electrical and construction plans for all proposed structures is not required until after an applicant has received a license, neither the Act nor the Board Rules state that foundation plans, electrical plans, plumbing plans, building plans, engineering plans and/or design plans are required at this stage of the proceeding.

Section 8(a) of the Act states that an EFSB application must contain, “where applicable[,] . . . complete plans as to all structures.” R.I. Gen. Laws § 42-98-8(a). Rule 1.6(b)(4) states that an application shall include “complete plans as to all structures.” EFSB Rule 1.6(b)(4). Neither the Act nor the Rules state what is considered “complete” in the materials to support an application or an initial advisory opinion. Likewise, neither the Act nor the Rules state that the level of detailed post-license permitting and construction plans requested by the Town and Building Inspector are necessary or “applicable” under the “complete plans” requirement prior to the Board rendering a licensing decision. Given the Board precedent in the Ocean State Power final decision and order and the Board’s post-licensing process, the additional detailed design and construction drawings demanded by the Town is not necessary or “applicable” as this stage in the proceeding.

In any event, without that post-licensing level of detail being required by the Act prior to

a final decision of the Board, dismissing Invenergy's Application on these grounds would be in error, especially when Invenergy has provided the Board, the Town and the Building Inspector with an enormous amount of detail providing the best available information as to the component structures for the Facility, which included complete site and layout plans for the proposed Facility, as well as specific design details regarding the different component structures of the Facility.

To point to just one example, Invenergy provided the Town and the Building Inspector with a layout of all the buildings, structures and equipment proposed on the site. *See* Site Arrangement and General Arrangement, attached as **Exhibit C**. This Site Arrangement and General Arrangement certainly represent plans as to all structures proposed for the Facility components. This Site Arrangement and General Arrangement is drawn to scale. Additionally, the Site Arrangement and General Arrangement contain the dimensions in feet (length, width and height) for all of the buildings, structures and equipment proposed on the site.⁴ These plans are

⁴ The structures and equipment listed on the General Arrangement are as follows: (1) combustion turbine inlet filter; (2) heat recovery steam generator; (3) turbine building; (4) administrative/control building; (5) switchyard; (6) air-cooled condenser; (7) fuel oil storage tank; (8) water treatment building; (9) fire pump building; (10) auxiliary boiler building; (11) CTG fuel gas dew point heater; (12) storm water detention pond #1; (13) ammonia storage tank; (14) warehouse; (15) fuel gas filter/separator; (16) emergency diesel generator; (17) GSU transformer; (18) pipe rack; (19) fire/service water tank; (20) demineralized water storage tank; (21) BOP electrical; (22) waste water tank; (23) HRSG LTE recirculation pumps; (24) hydrogen tube trailer; (25) water transfer pump building; (26) waste oil storage shelter; (27) feedwater pump building; (28) gas compressor building; (29) oil water separator; (30) CCCW heat exchanger; (31) aux. transformers; (32) SUS transformers; (33) 345 KV underground duct bank; (34) CEMS shelter; (35) generator circuit breaker; (36) LCI excitation container; (37) fuel gas flow meter; (38) fuel gas pressure regulation; (39) fuel oil equipment building; (40) sample panel enclosure; (41) fuel gas performance heater; (42) CCCW pumps; (43) workshop; (44) blowdown tank; (45) LP fuel gas dew point heater; (46) water wash drain tank; (47) duct burner fuel skid; (48) duct burner cooling air blower; (49) septic leach field; (50) septic tank; (51) nitrogen/co bottles; (52) LP regulation. *See Exhibit C*. Additionally, the General Arrangement provides UTM coordinates and elevations for the exhaust stacks, diesel fire water pump skid vent, auxiliary boiler stack, fuel gas dew point heater stack and emergency diesel generator stack. *Id.*

complete, contain the information required by the Act and the EFSB Rules and provide sufficient detail for the Building Inspector to render its advisory opinion to the Board.

The Town's Motion disregards and mischaracterizes the relevant documents Invenergy previously provided. However, it should be clear that it is erroneous and unfair for the Town to claim that Invenergy has failed to provide details and information as to the component structures of the proposed Facility, as well as the requisite site and layout plans. On the contrary, Invenergy has provided the Town and the Board with the requisite information under the Act and the EFSB Rules.

C. The Town's Motion To Dismiss Should Be Denied Because The Rules Require An Applicant That Has Received A License Produce The Information Requested By The Town During The Post Licensing Process.

As evidenced in Rule 1.13 and 1.14 of the Board's Rules, and in the Board's previous decision in the Ocean State Power matter, the EFSB does not require an applicant to supply the documents requested by the Town (detailed structural design, engineering and construction drawings) as this juncture. *See* EFSB Rules 1.13 & 1.14; *In Re Ocean State Power*, Order No. 7, SB 87-1, dated October 25, 1988.

EFSB Rule 1.13(d) recognizes that the "grant of a Board License in favor of the application shall constitute a granting of all licenses which would, absent the Act, be required for the facility *except for building, construction and occupancy permits for which final designs will not be executed until after the final decision is issued . . .*" Rule 1.13(d)(emphasis added). Also, EFSB Rule 1.14 details an entire "Post Licensure Proceedings" that begins with the filing of the final design drawings in a post-EFSB license filing for a local building permit, the arranging of a special meeting with the building official and a state building representative and the reviewing of the "final design drawings." EFSB Rule 1.14(a)(2). These Rules also establish a separate post-

licensing filing of an advisory opinion by the local building official, with regard to the post-licensing local building permit filing, after review of the “final design” structural drawings. *Id.* at (a)(3). The Town dismissively recognizes this special post-licensing process in Footnote 1 of the Town’s Motion. This post-licensing process is not so easily dismissed.

The information that the Town alleges is missing from Invenergy’s Application is the exact type of information which will be filed with the Board, Town and Building Inspector, after Final Hearings, if Invenergy is granted a license. These drawings will be provided by an Engineer, Procurement and Construction (“EPC”) contractor and will look very similar to the drawings prepared by Invenergy during a post-licensing review in a similar proceeding in Lackawanna County, PA. Also, these engineering drawings will contain all requirements and conditions that may be imposed by the Board. Therefore, because the Town and Building Inspector are, in essence, requesting final structural engineering and construction drawings that would be submitted in a post-licensing process for a building permit, this request is premature and the Motion to Dismiss must be denied.

D. Invenergy Provided The Town And Building Inspector With Much More Than “Limited” Information Regarding The Structures Associated With The Proposed CREC.

The Town also contends that the Building Inspector has received “only limited” information, insufficient to perform his advisory opinion. *Id.* at 3-4. After requesting, and receiving, the General Arrangement and Site Arrangement, along with detailed responses to what amounts to close to 1,000 data requests, many of which are focused on details regarding CREC’s equipment, structures and components, the Town continues to dismiss and ignore all of the additional and relevant structural information provided by Invenergy.

Worse, the Town seeks to avoid even reviewing all this relevant documentation.

Specifically, the Town states that the “Building Inspector does not have anything even approaching ‘complete plans as to all structures[.]’” *Id.* at 3. That is simply not true. The Town refuses to accept that Invenergy has provided the Building Inspector with an abundance of information, including complete plans as to all proposed structures for CREC. Additionally, the Town appears to believe that Invenergy must provide detailed design, engineering and construction structural plans for each of the buildings and equipment listed in the Town’s Exhibit 1 at this point in the proceeding. *Id.* at 3-4. However, again, Invenergy submits that the type of detailed engineering design and construction plans requested by the Town are not necessary for the Building Inspector to respond to the questions posed to it by the Board. *See In Re Ocean State Power*, Order No. 7, SB 87-1, dated October 25, 1988.

The Board’s April 14, 2017 Order requested that the Building Inspector render a supplemental advisory opinion to consider the new information provided since his original opinion was issued, including but not limited to the preliminary soil erosion and sediment control drawings and plans and the preliminary site plan and design drawings. The EFSB requested that the Building Inspector’s supplemental advisory opinion address:

- (1) Whether the work proposed in the municipality as part of the Facility’s construction and operation is subject to the municipality’s Erosion and Sediment Control Ordinance and, if so, whether the Applicant’s Erosion and Sediment Control Plan would conform to the Ordinance;⁵ and
- (2) Whether the Facility would meet the requirements of other municipal ordinances.

The Building Inspector was *not* asked to opine on whether a construction permit should

⁵ The Town’s Motion does not assert that Invenergy has failed to provide the necessary information for the Building Inspector to render an advisory opinion on issues related to erosion and sediment control.

be issued, i.e., whether EPC stamped drawings are in compliance with building codes. For example, complete structural design and construction drawings are not necessary to determine whether a dimensional height variance is required. A site plan, along with the dimensions for each of the buildings, is all that is necessary to determine whether the requested relief meets the standards under Burrillville's Zoning Ordinance, and Invenergy has provided that information to the Town and the Building Inspector.⁶

Additionally, as discussed in Section II above, in an attempt to provide the Town and the Building Inspector with as much information as possible and to provide the Town and the Building Inspector with a plethora of information to assist in the advisory opinion, Invenergy provided the Town and the Building Inspector with substantial relevant additional information regarding the proposed site design and the details of the proponent structures. Invenergy supplied the Building Inspector with a conceptual plan set that included proposed details for CREC, as well as a set of construction drawing plans, similar to what is anticipated in a post-licensing building permit application, for comparison with reference to another similar Invenergy project in Lackawanna County, PA. The proposed details for CREC included a memorandum describing, in detail, the proposed design requirements and specifications for CREC's proposed structures. *See Exhibit B.* As discussed above, the memorandum included multiple sections

⁶ As discussed above, the Building Inspector's review of CREC's compliance with municipal building and construction codes should not happen at this point in the proceeding, given the EFSB precedent and EFSB Rule 1.14. Therefore, any review regarding compliance of municipal ordinances must relate to matters other than structural compliance with building and construction codes. With that said, the Building Inspector can give opinions regarding whether CREC complies with other Town Ordinances, including use and variances issues, based on the information previously provided by Invenergy.

outlining structural details regarding CREC.⁷

Moreover, as outlined in Section II above, Invenergy provided many additional details regarding different Facility components in response to data requests from the Town.

Specifically, in response to the Town's Data Requests, Invenergy provided information about vacuum pumps, steam jet air ejector technologies, steam turbine drain tank, air cooled condenser duct configuration, the fuel oil storage secondary containment berm and relevant engineering details regarding the unloading station area, piping linage, ULSD storage tanks, the height of the stacks and the demineralized water tank.⁸ These are a few of the specific structure related data requests propounded by the Town throughout this proceeding.

Further, as also discussed in Section II above, Invenergy provided additional details regarding the structures of the Facility in different permit applications. *See* Invenergy's Major Source Permit Application Addendum, filed with the Board on May 26, 2017, Table 5; Invenergy's Application to Alter Freshwater Wetlands, filed with the Board on May 16, 2017, Section 2.1.2.1 through Section 2.1.2.6. Likewise, Invenergy provided further details regarding the component structures for CREC in many expert reports. *See* Revised Water Supply Plan, filed with the Board on January 11, 2017; Transient Operation Noise Level Evaluation report, filed with the Board on August 2, 2016 as Invenergy's Supplemental Response to EFSB Data Request No. 1-1. All of these relevant materials are completely ignored in the Town's Motion.

⁷ Specifically, section 4.2.2 provides structural information regarding the turbine building; section 4.2.3 discusses structural details of the administration building and section 4.2.4 states the structural information about the water treatment building. Likewise, section 4.3, entitled "Structural Requirements," articulates the requirements in which all the structures will be designed to be in accordance with and section 4.4, entitled "Structural Materials," details information regarding the materials, workmanship and testing that will be conducted for all structures.

⁸ *See* Response to the Town's Data Request Nos. 2-2 – 2-5, 4-25, 5-11, 7-4, 12-1 & 22-3.

As for transmission details, the Application provides relevant information as to the transmission line for the Facility. See Application, Sections 3.5.7, entitled “Transmission Facilities,” Section 3.6, entitled Transmission and Interconnection,” and Section 3.9.3, entitled “Electric Transmission Lines.” Also, the transmission lines are the subject of a separate EFSB Application, which contains numerous amounts of information regarding the transmission lines. See SB-2017-01.

The Town’s Motion fails to acknowledge the abundance of information and materials provided by Invenenergy with the best available information regarding the component structures for the Facility, as well as the layout and site plans for CREC. Invenenergy has provided the Town and the Building Inspector with an enormous amount of information, perhaps an unprecedented volume of information for a major energy facility license proceeding at the EFSB. Accordingly, as Invenenergy provided the Board, the Town and the Building Information with more information than is required by the Act and EFSB Rules, the Town’s Motion to Dismiss must be denied.

E. The Town’s Motion To Dismiss Should Be Denied Because The EFSB Has Jurisdiction Over Invenenergy’s Application.

The EFSB does not lack jurisdiction over Invenenergy’s Application. First, Invenenergy rejects the Town’s unsupported assertion that “the jurisdiction of the EFSB is based on ‘complete plans as to all structures associated with the proposed facility[.]’” Town’s Motion, 1. Additionally, as discussed more thoroughly above, Invenenergy’s Application includes complete plans for the proposed structures, as required by the Act and the Rules at this time in the proceeding.⁹ Therefore, even if the Board’s jurisdiction was “based on ‘complete plans as to all

⁹ The EFSB’s Rules also includes a post-licensing process. As discussed above, an applicant is not required to produce the type of plans sought by the Town, detailed engineering design and construction plans until post licensing, as it was deemed “unreasonable” to ask an applicant to provide this type of information at this stage in a proceeding. See *In Re Ocean State Power*,

structures[,]” Invenergy supplied the complete plans that are required at this stage in the proceeding, making the Town’s Motion meritless.

In 1993, the Rhode Island Supreme Court analyzed the jurisdiction of the Board and determined that “[b]y expressly stating that the siting act applies only to electric generating facilities, the General Assembly clearly indicated that the EFSB’s jurisdiction would be premised on a facility’s electric output.” *Caithness RICA Ltd. P’ship v. Malachowski*, 619 A.2d 833, 836 (R.I. 1993).¹⁰ In a separate decision, the Supreme Court stated that “[t]he EFSB has been granted jurisdiction pursuant to G.L.1956 (1988 Reenactment) § 42-98-3(A) over the siting of major energy facilities.” *Newbay Corp. v. Malachowski*, 599 A.2d 1040, 1041 (R.I. 1991).¹¹ The EFSB’s jurisdiction is premised on whether a facility meets the required electric output, not whether an application contains complete plans. *See id.* The Town’s Motion improperly confuses subject matter jurisdiction with application requirements.

Nevertheless, the Town’s jurisdictional argument is moot as Invenergy’s Application does include complete plans of the proposed Facility, its component structures, functions and characteristics to allow for sufficient licensing review by the Board, and the Building Inspector.

Accordingly, because the EFSB has proper jurisdiction over Invenergy’s Application, the

Order No. 7, SB 87-1, dated October 25, 1988. This post-licensing process should be read in conjunction with the EFSB’s requirement for complete plans and should not be ignored when determining whether the EFSB has proper jurisdiction over Invenergy’s Application.

¹⁰ In *Caithness RICA Ltd. P’ship v. Malachowski*, the Rhode Island Supreme Court analyzed whether the EFSB’s had jurisdiction over a coal-fired cogeneration facility. 619 A.2d 833.

¹¹ At the time, section 3 of the Act provided that a “[m]ajor energy facility’ shall mean facilities for the extraction, production, conversion, and processing of coal; facilities for the generation of electricity designed or capable of operating at a gross capacity of 80 megawatts or more.” *Id.* Section 3 of the Act has been amended, but section 3 still defines a “major energy facility” and that definition has *not* been amended to include a jurisdictional component regarding detailed design and construction plans, as the Town would like to suggest. *See* R.I. Gen. Laws § 42-98-3.

Town's Motion to Dismiss on these grounds must also be denied.

IV. CONCLUSION

For the foregoing reasons, Invenergy respectfully requests that the Board deny this latest Motion of the Town.

Respectfully submitted,

INVENERGY THERMAL DEVELOPMENT LLC

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Dated: July 28, 2017

CERTIFICATE OF SERVICE

I hereby certify that on July 28, 2017, I delivered a true copy of the foregoing responses to the Energy Facilities Siting Board via electronic mail to the parties on the attached service list.

/s/ Alan M. Shoer

EXHIBIT A

Order 7 - Ocean State Power: Final Decision and Order

STATE OF RHODE ISLAND
ENERGY FACILITIES SITING BOARD

IN RE:
APPLICATION OF OCEAN STATE
POWER FILED JANUARY 13, 1987
TO SITE AND CONSTRUCT A MAJOR
ENERGY FACILITY

Docket Number S. B. 87-1

FINAL DECISION AND ORDER

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STATE OF RHODE ISLAND
ENERGY FACILITIES SITING BOARD

IN RE:

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POWER FILED JANUARY 13, 1987
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FINAL DECISION AND ORDER

I. INTRODUCTION

a. Application

On January 13, 1987 Ocean State Power (OSP or Applicant) applied to the Energy Facility Siting Board (EFSB or Board), for a license to site and construct a natural gas-fired, combined cycle, electric generating facility consisting of two 250 megawatt (MW) units in Burrillville, Rhode Island. *[1 The original application called for two 235 MW units. The capacity of each unit was later increased to 250 MW.]* Either unit is a "major energy facility" subject to Board jurisdiction since each unit has greater than 80 megawatt capacity. R.I. Gen. Laws Sec.42-98-3. OSP will use natural gas to be supplied under a 20-year contract with Canadian gas producers as the primary fuel. No. 2 fuel oil will be used as a backup fuel source. Natural gas will be transported by TransCanada Pipelines from western Canada to New York State. Thereafter an existing Tennessee Gas Transmission Company (Tenneco) pipeline will transport the gas to Sutton, Massachusetts. A short pipeline from the existing Tenneco gas pipeline will be constructed to serve the proposed OSP site. A six inch oil pipeline will supply the backup fuel.

OSP's application to the Board only involves the generating facility itself, not the proposed pipeline connection, which is, at least in part, under Federal Energy Regulatory Commission (FERC) jurisdiction. Thus, the following decision only addresses the siting and construction of the two proposed 250 MW generating units.

The proposed OSP facility is to be located on a forty acre site located east of Sherman Farm Road next to a Blackstone Valley Electric Company switching station. The facility itself will occupy approximately fifteen acres, with the remaining area devoted to parking and buffer areas. The building will be approximately sixty feet high with two, one hundred fifty foot exhaust stacks and two, forty-three foot cooling towers. Existing 345 kilovolt transmission lines cross the site, so no new electric transmission lines will have to be built to support the OSP facility. An Algonquin Gas Company pipeline also crosses the site. A proposed pipeline from a pumping station to be located along the Blackstone River in Woonsocket will supply cooling water for the facility. The facility will recycle cooling water and has been designed for a zero-water discharge.

OSP will supply power to the Boston Edison Company, New England Power Company, Eastern Utilities Associates, and the Newport Electric Corporation through the New England Power Pool (NEPOOL). OSP projects service will begin approximately twenty-seven months after construction commences. OSP Exhibit 25 at 5.

The OSP application initially projected a cost in 1986 dollars of \$160.8 million dollars for the first unit and a first-year cost of generation of 5.9 cents per KWH. At the estimated 20-year life of the initial unit, the levelized cost of generating, i.e. OSP's cost, was estimated at 6.4 cents per KWH. OSP Exhibit 1 at 23.

b. Energy Facility Siting Board

The Board is composed of the Chairman of the Public Utilities Commission, who serves as Chairman of the Board, the Director of the Department of Environmental Management, and the Chief of the Office of Statewide Planning. Edward F. Burke chaired the Board through the initial phases of this application, but resigned as Chairman of the Public Utilities Commission and, therefore, the Board effective May 1, 1988. His successor as Chairman of the Public Utilities Commission, James J. Malachowski, recused himself from serving as Chairman of the Board for this application, because of his prior duties as state coordinator for the Ocean State Power Project Environmental Impact Statement (EIS), while Director of the Governor's Office of Intergovernmental Relations. Pursuant to 1988 Rhode Island Public Law, Chapter 39, Chairman Malachowski designated former Public Utilities Commissioner Mary N. Kilmarx, then Deputy Director of the Governor's Office of Energy Assistance, to serve as Chairperson for the remainder of hearings in this matter.

c. Travel

The preliminary hearing in this matter convened on April 13, 1987, and the Preliminary Decision was issued on May 22, 1987. Order No. 1. This decision was subsequently modified on September 23, 1987 to include consideration of both generation units. Order No. 2. Representatives of OSP, the Audubon Society of Rhode Island (Audubon), the Division of Public Utilities and Carriers, the Department of Environmental Management, and the Statewide Planning Program appeared at the preliminary hearing. Subsequently, the Town of Burrillville (Town) and the Concerned Citizens of Burrillville/Uxbridge (Concerned Citizens) intervened as parties. Order No. 4. *[2 While the Concerned Citizens intervened, no attorney appeared to represent the organization and cross-examine or present witnesses at evidentiary hearings held at the Board's Providence offices. Members of Concerned Citizens did testify at the evening hearings held in Burrillville.]*

The Preliminary Decision designated the following municipal and state agencies to act at the direction of the Board for the purpose of rendering advisory opinions regarding issues identified in the Preliminary Decision: 1) City of Woonsocket Zoning Board of Review, 2) City of Woonsocket Office of Building Inspector, 3) City of Woonsocket Department of Public Works, 4) Town of Burrillville Zoning Board of Review, 5) Town of Burrillville Office of Building Inspector, 6) Rhode Island Water Resources Board, 7) Rhode Island Department of Transportation, and 8) Rhode Island Department of Environmental Management (DEM). As required by statute, the Board also received separate advisory opinions from the State Planning Council as to socio-economic impact and conformance with the state guide plan, and the Public Utilities Commission as to need. R.I. Gen. Laws Sec.42-98-9(D), (E). At the request of the Board, DEM submitted an advisory opinion as to overall environmental impact. Preliminary Decision at 15.

On January 7, 1988, pursuant to statutory requirements, the Board convened the final hearing in this matter. Prior to this date, OSP had requested that the Board suspend final hearings until a draft environmental impact statement was prepared and published by the FERC. In its Preliminary Decision, the Board concluded that an EIS was essential to its deliberations. Id. at 5-7. Since FERC must approve the construction of the gas pipeline connector, which may have significant environmental impacts, an EIS is required under the National Environmental Policy Act, 42 U.S.C.A. Sec.4321 et seq., and such an EIS must encompass both the pipeline and generating facility. The Board granted permission to suspend, Order No. 3, and an additional suspension occurred on May 10, 1988. 5/10/88 Tr. 37.

FERC published the draft EIS in March 1988 and final hearings reconvened on May 23, 1988 at which time OSP and the Town presented testimony in support of the OSP application. The Board received public testimony at an evening public hearing in Burrillville on June 8, 1988 and suspended further hearings until after the publication of the final EIS. 6/8/88 Tr. 153. FERC published the final EIS on July 8, 1988 and hearings reconvened on August 2, 1988. A second evening hearing was held in Burrillville on August 16, 1988. Final testimony was received on September 2, 1988.

d. Legislative Charge

The Board was created to consider the need for energy facilities "in relation to the overall impact of such facilities upon public health and safety, the environment and the economy of the state", and to insure that such facilities are "planned for, considered and built in a timely and orderly fashion". R. I. Gen. Laws Sec.42-98-1(A); Sec.42-98-2(A). To accomplish that goal, the Board was designated as the "licensing and permitting authority for all licenses, permits, assents, or variances which, under any statute of the state or ordinance of any political subdivision of the state, would be required for siting, construction or alteration of a major energy facility in the state of Rhode Island". Id. Sec.42-98-7(A).

The Board's ability to comprehensively consider all aspects of the OSP application in a timely manner has been significantly complicated by the lateness in which the EIS was sought by OSP, the piecemeal manner in which information has been submitted to the Board and the statutory exemption from Board jurisdiction of most substantive DEM permits. Id. Notwithstanding that the proposed energy facility will impact the environment and must obtain federal approval for importation of gas and construction and siting of the gas pipeline from Sutton, Massachusetts, an EIS was not sought by the Applicant until spring of 1987, after filing of the initial application with the Board. Because statutorily mandated hearings had to convene prior to the promulgation of the EIS, the Board was compelled to suspend hearings on various occasions to comply with the statutory sixty day hearing limit. Id. Sec.42-98-11(A). Had the EIS been submitted prior to the commencement of final hearings, these proceedings could have been conducted more efficiently.

In addition, the Board now faces the task of ruling on the license prior to the final DEM decisions on air, water and wetlands permits. Thus, it has not been possible for the Board to comprehensively consider all environmental permits. This is not a criticism of DEM; applications for permits sought by OSP are necessarily complex and voluminous. This simply points out that the Board cannot achieve the comprehensive review intended by the General Assembly.

Finally, confusion has arisen over the Board's adjudicatory role. Because the Board has a discreet application before it, it must sit as an adjudicatory body ruling on that application. Certain parties to this hearing have sought to have the Board serve as a planning body. In particular, members of the public have requested that the Board determine the best possible site for an energy facility in Rhode Island, notwithstanding that a specific application, and not an energy plan, is before the Board.

e. The Board's Response

The Board's response to these difficulties is based on the Energy Facility Siting Act's (Act's) policy directive that the Board consider a comprehensive range of issues in a timely manner. Thus instead of dismissing the application or taking no action whatsoever until a final EIS was published, the Board chose to conduct hearings and continue the Board process while the EIS was developed. This decision to go forward, however, always assumed that hearings would not end until a final EIS was published and considered by the Board, the parties, and the public. By proceeding in this manner, the Board could respond promptly to the application, given the practicalities of this situation, while preserving the rights of the parties and the public's access to full information and participation in the process. In addition the Board on its own initiative sought information and supplemented the record, always subject to comment and challenge by the parties.

Given the strict statutory time frame for the conduct of final hearings, the Board suspended the conduct of the hearings on three different occasions without objection by the parties, so that the statutory time limit on final hearings would not be exceeded. In the Board's opinion this was the most practical way to balance timeliness with a comprehensive review of all issues.

The Act does mandate a planning process undertaken by the Statewide Planning Program to establish state energy plans, goals and policies. *Id.* Sec.42-98-2(E). In contrast to a planning body, the Board is mandated to consider applications and approve or disapprove licenses for specific energy facilities. Thus, the Board in the first instance is an adjudicatory body which must pass on the specific application presented to it. While the Board must consider planning documents and the relationship of a specific application to state and local plans, the Board has the power only to determine whether a specific application will be in accord with plans and programs and whether the impact of the facility is acceptable.

II. NEED

a. Regional Increase in Energy Demand

To obtain a Board license the Applicant must show that "construction of the proposed facility is necessary to meet the needs of the state and/or region for energy of the type to be produced by the proposed facility" and that "a proposed facility is cost-justified and can be expected to produce energy at the lowest reasonable cost to the consumer". *Id.* Sec.42-98-11(B); see also Preliminary Decision, Issue 1 and 6. The Board on its own initiative determined that alternative means of generation should also be investigated. Preliminary Decision, Issue 9.

Since the Act mandates that the Public Utilities Commission (Commission) conduct an investigation and render an advisory opinion as to the need for any proposed facility, R. I. Gen. Laws Sec.42-98-9(D), and since the EIS also did a separate need analysis, the Board did not undertake an independent investigation of the need for the OSP facility. The Commission's findings in its Docket No. 1889 Advisory Opinion, as shown below, are consistent with the conclusions made by the FERC staff in the final EIS and, in fact, generated little or no controversy during the Commission's Docket No. 1889 hearing and the final hearings before this Board. The major participants in the Board hearings, OSP and Audubon, participated in the Docket No. 1889 hearing.

Energy demand and peak power demand are growing in New England. A NEPOOL study forecasts that the annual energy growth is 1.7%, summer peak demand growth is 2.7% and winter peak is 1.5%. EIS at 2-6. Other studies reviewed in the EIS assume a 2.2% to 4.5% annual load growth. While estimates of future load growths may vary widely according to the assumptions on which the estimates are based, it is clear that peak demand in New England has actually been increasing faster than any of the forecasts. The system peak reached in January 1988 had been projected by NEPOOL for the winter of 1993-4. Absent NEPOOL's Operating Procedure 4, which curtailed the load by approximately 500 megawatts, it is estimated that the peak would have equaled the 1995-6 forecasted winter peak. *Id.* at 2-26. The Board has also taken notice that, since publication of the EIS, system peaks in July and August of 1988 also greatly exceeded the NEPOOL forecast.

No information was submitted to the Board which contradicts the conclusion that energy demand is growing in New England. One study, however, did challenge the need for additional generating capacity to meet that load growth. The New England Energy Policy Council in its Power to Spare report in 1987 concluded that, by increasing the efficiency in which energy is used, the need for additional generation could be reduced or eliminated for the foreseeable future. The New England Energy Policy Council raises important points regarding the role of energy conservation and efficient usage. The Rhode Island Public Utilities Commission and Governor's Office of Energy Assistance have long emphasized the importance of conservation and efficiency. NEPOOL demand projections have already been significantly reduced to reflect conservation and load management activities of its member utilities. *Id.* at 2-52. We believe, however, that to have so substantial an impact as to preclude the need for new generation, such policies would have to be adopted and implemented immediately on a region-wide basis to the full extent of their technical potential. To institute such policies on that basis would require considerable time before energy saving devices and policies could gain public acceptance and become widely used. *Id.* at 2-25. Thus, we do not believe that the New England Energy Policy Council Power to Spare report provides a basis to conclude that there is no need for OSP generation.

b. Public Utilities Commission Advisory Opinion

The Commission in its Docket No. 1889 advisory opinion examined in-state generating capacity, long-term need and short-term need. As to in-state capacity, the Commission concluded that, since the proposed units would almost double and triple, respectively, the current minimal in-state generating capacity of 267.25 megawatts, the proposed units are "needed from the standpoint of pure self-sufficiency". Exhibit OSP 3 at 8. The State Planning Council concurs. Exhibit OSP 4, Finding 1. Even if OSP is added to the generating capacity in Rhode Island, in-state generating capacity will be much less than the statewide demand for electric power. *Id.* at 2-23.

As to long-term need, the Commission considered, as did the EIS, the "NEPOOL Forecast of Capacity, Energy, Loads and Transmission, 1987-2002" (1987 CELT Report) which projected a need for the next unit of regional generation in 1995. Exhibit OSP 3 at 6. In addition the Board took notice of the 1988 CELT Report. Both reports are consistent with the EIS conclusion that "a need for power will occur in the mid to late 1990s." EIS at 2-25.

As to short-term need, the Commission considered the possibility of delay in obtaining energy from the Seabrook Nuclear Power Station and indeed the distinct possibility that no power will ever be generated by Seabrook and concluded that prudent planning dictated the short-term need for the proposed OSP units. Exhibit OSP 3 at 6-7.

In addition to need, the Act conditions the grant of a license on a finding that the energy produced by OSP will be cost-justified and can be expected to produce energy at the lowest reasonable cost. R. I. Gen. Laws Sec.42-98-11(B)(2). The projected busbar power cost from units 1 and 2 current and leveled over twenty years, is 8.8 cents and 9.07 cents per KWH respectively. EIS at 2-24. This compares favorably with potential oil and coal generation and rehabilitation of existing plants. *Id.* While domestic and Canadian hydro-power and PURPA avoided cost generation may potentially produce lower cost power, nothing in this docket has shown that there is a realistic potential that such low cost sources of power will be available by the mid-1990s in amounts that will obviate the need for the OSP units. New nuclear generation of course is too speculative to be considered as a reasonable alternative.

Based on the above, the Board concludes that the generating capacity from the proposed OSP units 1 and 2 will be necessary to meet the electric generation needs of the state and the region, since all scenarios project the need for additional energy by the mid-1990s and since the proposed units will substantially increase generation capacity in Rhode Island. Cost data show that projected OSP costs per kilowatt hour will be below alternative forms of generation, except hydro-power and PURPA

avoided cost generation. Since there is no basis in the record to conclude that alternative forms of generation will obviate the need for OSP units 1 and 2 and since common sense dictates that a diverse mix of generation capacity is prudent, we conclude that proposed units 1 and 2 are cost-justified, will produce energy at the lowest reasonable cost and that alternative means of generation will not obviate the need for the units. See Preliminary Decision, Issues 1, 6 & 9.

III. LOCAL GOVERNMENT

While Board authority preempts local governmental authority over town licenses, etc., that would ordinarily be required for a major energy facility, town consideration of major energy facility impacts is essential to any Board finding regarding socio-economic impact. This Board has attached great weight to local governmental actions in this docket.

a. Building Permits and Other Technical Permits

In its Preliminary Decision, the Board requested advisory opinions from the Woonsocket and Burrillville Zoning Boards of Review respectively as to whether a variance or special exception should be granted for the proposed OSP Blackstone River intake structure and as to whether a variance or special exception should be granted for the OSP facility itself. Preliminary Decision at 13. In addition, the Board requested advisory opinions from the Woonsocket Office of Building Inspector, the Woonsocket Department of Public Works and the Burrillville Office of Building Inspector regarding compliance with building code provisions, etc. Id. The Board received advisory opinions from the Woonsocket and Burrillville Zoning Boards of Review. It did not receive advisory opinions from the Building Inspectors or Department of Public Works and the Board concludes that it would be impossible at this time for the Building Inspectors and Department of Public Works to comment regarding compliance with local building codes, since the specific design and final construction drawings necessary for a building code review are not available and undoubtedly will not be developed unless a Board license is granted for the OSP units. A similar problem has occurred regarding DEM review of the permit for OSP's waste water clarification system. 9/1/88 Tr. 112.

This situation presents a technical and not insignificant problem for the Applicant and the Board. The Board is the licensing and permitting authority for "all licenses, permits, assents or variances which under any statute of the state or ordinance of any political subdivision of the state would be required for siting, construction or alteration of a major energy facility." R.I. Gen. Laws Sec.42-98-7(A). As with any structure, a building permit is required for construction of an energy facility in Burrillville or Woonsocket. Thus, the Board has the authority and obligation to issue such permits.

But common sense dictates that such permits should not be issued until a thorough review of the design and final construction drawings and it is unreasonable to require the applicant for a major energy facility to complete detailed design and construction drawings prior to a decision regarding the Board license. If a license is granted such drawings can be developed. If a license is denied the applicant need not be burdened with the costs of detailed final design.

The most effective way to address this problem is to create a post licensure proceeding whereby permits of a technical nature, such as building permits, can be reviewed after the grant of a license to site a major energy facility. In this way the applicant can be assured of a prompt review of its final building design without having to commit to final design before a decision regarding the overall Board license. Such a procedure will protect the public, because final construction drawings will be reviewed for building code compliance.

In absence of express legislation the Board believes it has the power under Sec.42-98-7 and Sec.42-98-18 of the Act to establish such a post licensure proceeding by regulation and intends to proceed with the promulgation of such regulations.

b. The Advisory Opinions

i) Burrillville

While it would have been most helpful to the Board to have received a detailed written report from the zoning boards regarding the issues identified in the Preliminary Decision, such reports have not been provided. Instead the Board has considered the actions of the Zoning Boards, as summarized below, as advisory opinions.

The proposed site for the OSP facility is located in an F5, residential-agricultural zone. According to Burrillville Town officials the F5 designation was not intended to limit development in F5 zones to agricultural-residential usage, but simply was a designation for land outside of the developed core areas of the Town. Exhibit OSP 19 at 134; 8/16/88 Tr. 97. Other uses, such as sewage treatment plants and solid waste facilities are allowed by special exception in an F-5 zone. Zoning Ordinance Town of Burrillville, Appendix A, (1988).

William Flanagan, President of the Burrillville Town Council, testified that the Council believed OSP's economic contribution to the Town would be substantial, with little offsetting impact on infrastructure. Town Exhibit 13 at 4. Accordingly, the Town revised its zoning ordinances to allow for construction of the OSP facility.

On December 28, 1987 an electric generating facility was defined as a special exception for an F5 zone by unanimous vote of the Burrillville Town Council. Town Exhibit 2. This was preceded by the Planning Board's recommendation that an electric generating facility be allowed by special exception in F5 zones. Id.

On April 13, 1988 the Town signed a Tax Treaty and Agreement with OSP. Town Exhibit 1. Under the terms of the tax treaty, OSP will make payments in lieu of taxes of 2.5 million to 5 million dollars per year according to a schedule set out in the agreement. Id. at 2. In addition, OSP has committed to a one-time \$200,000 payment to the Town to fund property value relief. OSP Exhibit 8j; Town Exhibit 13 at 9. This fund will be administered by the Town under rules established by the Town for the benefit of property owners whose property values may be adversely impacted by the OSP facility. Finally OSP has agreed to a \$100,000 annual payment for approximately 20 years to the Town, \$70,000 of which must be used for educational scholarships. Id.

On April 19, 1988, the Burrillville Zoning Board by unanimous vote granted the special exception to site the facility the height variances for the building, exhaust stacks, and cooling towers. Exhibit OSP 19 at 205.

ii) Woonsocket

On December 14, 1987 the Woonsocket Zoning Board of Review by unanimous vote approved a variance for OSP to build a water intake structure on the bank of the

Blackstone River in Woonsocket. Exhibit OSP 21. The structure will house pumps that will pump cooling water from the Blackstone River and transmit it via pipeline to the OSP site in Burrillville. The Zoning Board found that the flood plain of the River would not be affected by the structure and stipulated that the variance be subject to Department of Environmental Management regulations.

c. Conclusion

Based on the above actions of the Town of Burrillville and the City of Woonsocket, the Board concludes that the proposed OSP facility will meet the ordinances and requirements of local government. See Preliminary Decision, Issue 4.

IV. SOCIOECONOMIC IMPACT

a. The Issues

Before a license can be issued, the Act requires the Board to find that the proposed facility will "enhance the socio-economic fabric of the state." R.I. Gen. Laws Sec.42-98-11(B) (3). To make such a determination the Board considered three issues: the overall socio-economic impact of the facility on the state, its consistency with the state guide plan, and, because of local concern about traffic impacts, the impact of traffic on the local community during construction and operation. Preliminary Decision, Issues 2, 3 & 10. Consideration of social and economic issues of necessity overlap with environmental considerations, especially as to impacts on the local community. Thus some issues discussed below in this section will be addressed in the following section which addresses environmental impacts.

b. Consistency with State Guide Plan

While the State Planning Council (Council) found that the OSP project is consistent with most elements of the State Guide Plan, OSP Exhibit 4 at 4-6, its placement in, and impact on, a rural-residential area makes it inconsistent with the "general goals, policies, and land use map of the State Land Use Policies and Plan." Id. at 4. The Council, however, found that:

Because of the unique and statewide impact of power generating facilities; this project may be deemed consistent if it can be shown that its probable net negative impact to the natural resources, rural character and future development of the surrounding area, will be appreciably less significant than its positive contribution to the state's economic and energy resources, and that the same positive contribution to the state's economy and energy resources are not feasible in another location.

Id. at 4.

c. Socio-Economic Impact

The Council prepared an advisory opinion, as to socio-economic impact which considered energy, employment, social and economic impacts and which concluded that "the OSP proposal should on balance, be beneficial to the socio-economic fabric of the state." OSP Exhibit No. 4 at 2.

As to energy impacts the Council looked favorably on the proposed site's proximity to transmission lines and the additional generating capacity that would be available to Rhode Islanders. Id.

The employment impact of seventy-five workers during operation and approximately three hundred during construction was viewed favorably by the Council, but was not considered a major impact on Rhode Island, since employees would be drawn from Massachusetts and Connecticut as well as Rhode Island. Id.

Estimated revenues to the Town of \$65,000,000 to \$75,000,000 over twenty years far exceeded the \$760,000 to \$960,000 infrastructure cost to the Town over the same period. Id. at 3. In addition the Council found that the State would benefit from corporate and employment related taxes which would generate more benefits than costs to state government.

The Council came to no express conclusion regarding social impacts alone, but noted that the facility would be located on land zoned for residential and farming uses. The Council recommended that a "suitable mechanism should be considered to compensate the [neighboring] landowners." Id.

The Board held two evening public hearings in the Town to allow members of the local community to address the Board with their concerns. The first hearing was scheduled specifically at the request of Concerned Citizens. While this group of neighboring landowners formally intervened, they did not participate in the formal hearings at the Board offices and requested that the Board allow them to state their concerns as members of the public rather than formal intervenors.

A total of thirty-six people testified at the two evening public hearings, although many of the same individuals testified at both hearings. A number of representatives of local and state government testified in support of the project. The majority of individual landowners and representatives of Concerned Citizens opposed the project. The major concerns addressed by these individuals at both hearings focused on OSP's potential impacts on property values, the rural character of the Town and on traffic and noise impacts. Many sought guaranteed compensation for any future decrease in property values. The following will address land use and property value concerns and traffic impacts. Noise impacts will be addressed in the next section which deals with environmental issues.

d. Land Use

The location of the proposed facility in what is currently a residential area, has generated the most controversy in these proceedings. Individual homeowners' concerns about potential impacts on property values have been echoed by the FERC staff and in the comments by EPA as well as the Council. The FERC and neighbors of the proposed OSP facility have suggested that OSP be required to compensate neighboring land owners for adverse economic impacts. EIS at 5-14, 15. OSP proposes to create a \$200,000 economic impact fund to be administered by the Town, but opposes mandatory compensation or buyout of neighboring residents.

Because the Board has been created to evaluate both local and statewide impacts of major energy facilities, but has no mandate to maintain economic status quo, the Board questions its authority to require this, or any, Applicant to purchase neighboring residential property or compensate neighboring residents, because of economic impact. Indeed, over the long run, the economic impacts of an energy facility may enhance the value of neighboring property. This is not to say that it would be unwise to purchase neighboring property in this case and the Board supports the creation of a fund to mitigate any adverse economic impacts. But, the major reason the Board will not order mandatory compensation or buyout is that such a solution does not focus on the real problem, i.e. OSP's potential impact on the rural character of the area and future development of the area.

Nor does the Board find the Applicant's position persuasive on this point. OSP claims that the Town's decision to grant a special exception to QSP should end the Board's inquiry regarding land use. The Town's grant of a special exception, however, is advisory only. The Board may accept, reject or modify the opinion. R.I. Gen. Laws Sec.42-98-11 (C).

The Council's advisory opinion, OSP Exhibit 4, identified the key land use issue before the Board, when it found that the project is inconsistent with the State Guide Plan, but may be deemed consistent if statewide benefits exceed local adverse impacts. There are obvious statewide benefits to the project, but since the Board must consider the socio-economic fabric of the entire State, R.I. Gen. Laws Sec.42-98-11(C), the Board must examine the OSP's impact on the rural character and future development of the surrounding area.

At the outset, it is important to note that although the land use in the area near the plant is largely single family residential, this is not the exclusive use in the area. The Blackstone Valley Electric switching station, power lines and natural gas pipelines are located in close proximity to the proposed OSP site. Nor is an F-5 zone in Burrillville exclusively residential or agricultural. Airports, heliports, sawmills and sewage treatment plants, incinerators and solid waste disposal facilities are allowed in F-5 zones by special exception in addition to electric generating facilities. Zoning Ordinance, Town of Burrillville, Appendix A (1988).

OSP's potential negative impacts on rural character and future development can best be mitigated by focusing on the transition area between land uses, i.e. in this case the transition between energy facility and residential land use. Sound planning dictates that there be a transition or buffer area between differing land uses, particularly where the change is abrupt.

The need for a buffer is particularly apparent to the north and south of the proposed site. It is in these areas that residential uses are closest to the proposed facility. To the west of the proposed facility, there is an existing switching station, Blackstone Valley Electric property and an electric transmission line right of way which provide a buffer. To the east, there is a large parcel of Blackstone Valley Electric property which, because of the existence of wetlands, has limited development potential. This land lies between the proposed site and the Rhode Island Black Hut Management area and, if left in its present state as the Board urges, should provide adequate protection for the management area.

It is difficult to quantify the size of a buffer area that will be necessary to mitigate impacts to the north and South of the site and any attempt to quantify such a buffer area is to some extent arbitrary. For certainty, however, some quantity must be specified. To that end, the Board observes that the Applicant, itself, has placed the proposed facility approximately 300 feet from its property line when it was able to do so, i.e. on the easterly side of OSP property. Even a 300 foot vegetated buffer between the energy facility and the less intense residential use would serve to lessen the opportunity to change neighboring land use to commercial and industrial and therefore would serve to maintain the rural character of the area.

The Board has authority to issue a license "on any condition the Board deems warranted by the record." R.I. Gen. Laws Sec.42-98-11(C). We conclude that a 300 foot buffer area is consistent with sound planning principles, with the enhancement of the socio-economic fabric of the State, with mitigation of unacceptable harm to the environment and is within the broad mandate of the Board's authority under the Act. We will, thus, require the Applicant to maintain approximately a 300-foot buffer between the operational part of the site and neighboring land uses. The boundary of the operational part of the site shall be the fence line enclosing the facilities. OSP Exhibit DR-9. If OSP does not currently own sufficient property to maintain a 300-foot buffer, as may be the case to the north and south of the site, OSP shall offer to purchase conservation easements or full title to property to establish such a permanent buffer zone and ensure that no future development takes place.

We recognize that, without condemnation powers, OSP may not be able to purchase such easements. Accordingly, we will only require that OSP make a good faith effort to acquire such property interest, where necessary, by making a timely offer to purchase appropriate title or easements at fair market value. Such offers need not be of indefinite duration and may be withdrawn, if unaccepted, one year after the date of this decision.

As suggested by the EIS and as agreed to by the Applicant, the Board will also require that a buffer zone be maintained between the facility and the family cemetery and Crow Hollow area at the Sherman Farm Road site. EIS at 5-15.

e. Traffic

The project is consistent with the transportation elements of the State Guide Plan, OSP Exhibit 4 at 5, but neighboring landowners have expressed concern about truck traffic during construction and, in particular, in the event that the gas supply is interrupted and pipeline oil supplies must be supplemented by truck delivery.

An oil pipeline will be extended to the site and, if the gas supply is totally interrupted, the pipeline will be able to supply on a continuous basis approximately thirty percent of the fuel requirements for both units over a ten day period. 9/1/88 Tr. 32. Six days fuel supply will be stored in tanks on site. Id. at 28. But if both generating units are to operate at full capacity while burning only oil, the pipeline oil supply will have to be supplemented by approximately one hundred truckloads of oil per day. EIS at 2-86, 87. It is the one hundred truckload per day projection that has caused most concern.

The need for oil truck deliveries to the site, however, is unlikely. OSP will have a twenty year contract for gas supply and if the gas supply is interrupted, because of accident or sabotage of the gas pipeline, economic considerations dictate that major efforts will be made to repair the line quickly.

The same economic considerations, along with environmental requirements, make it unlikely that the facility will operate for long periods with oil for a fuel. If the facility is burning oil, the economics of the NEPOOL Power Dispatching System are such that the plant would be dispatched as a "peaking" unit which would generate only during times of peak demand or twenty to thirty percent of the time. 9/1/88 Tr. 30. With gas as a fuel the units will be dispatched as base load units which will generate continuously. The air quality permit which must be obtained from DEM will have, if issued, emission limits that will effectively limit oil burning to about sixty days per year at full capacity. 9/1/88 Tr. 33. Finally, any impact caused by oil truck deliveries can be mitigated by dividing such traffic among the three approaches to the site, Aldrich Street, Sherman Farm Road and Douglas Pike.

Since the likelihood of continuous oil truck deliveries to the site is so remote, additional consideration of potential impacts from oil truck traffic is unnecessary.

Traffic during construction may cause temporary impacts. However, the majority of construction will take place during normal working hours, will not be different from the traffic associated with any other large construction project and will end after the construction is completed.

Traffic during operation of the site should not be a problem, since only approximately thirty-five staff will be present on site at any one time. OSP Exhibit 25 at 9. Thus we conclude that the foreseeable traffic impacts do not present an obstacle to granting a license for the facility. See Preliminary Decision, Issue 10.

f. Conclusion

We conclude that the statewide socio-economic impact of the proposed facility is substantially greater than the costs that will be incurred as a result of the facility. While there may be impacts on the rural character and future development of the Town, the Town has voluntarily submitted to those impacts and the required buffer area will mitigate such impacts. The extent of any impact on neighboring individuals is unknown, but the \$200,000 fund established voluntarily by OSP will provide some relief if impacts are adverse.

Because we find below that the impact of the facility on natural resources is acceptable, to the extent that the Board has jurisdiction over such impacts, and that other alternative sites have been considered and rejected, we conclude that the project may be deemed consistent with the state guide plan. Id., Issue 3. We further find that the proposed facility will enhance the socio-economic fabric of the state. Id., Issue 2.

V. ENVIRONMENTAL

a. Board's Responsibility

The Board has the obligation to assure that the siting of any major energy facility will "produce the fewest possible adverse effects on the quality of the state's environment; most particularly, its land and its wildlife resources; the health and safety of its citizens, the purity of its air and water; its aquatic and marine life, and its aesthetic and recreational value to the public." R.I. Gen. Laws Sec.42-98-2(C). Before a Board license can be issued, the Board must make an express finding that "the proposed facility will not cause unacceptable harm to the environment." Id. at Sec.42-98-11 (B) (3).

At the outset of hearings regarding this application, the Board concluded that an overall environmental assessment of the proposed energy facility was needed. The Board's initial comments are worth restating:

An EIS is essential to the Board's deliberations. While the Board does not have jurisdiction over major environmental permits, e.g. permits required under the Clean Air Act, state policy requires that a major energy facility 'produce the fewest possible adverse effects on the quality of the state's environment' and the Board must implement that policy in its final decision. Thus, we conclude that the Board has both the responsibility and power to evaluate all individual and cumulative environmental impacts of the proposed facility before arriving at a final decision regarding the OSP application. Preparation of an EIS is the most efficient way of identifying those impacts for board review.

Preliminary Decision at 6.

The Applicant in this matter prepared a comprehensive and formidable environmental review of the estimated impacts of the proposed facilities and updated this review during the course of the hearings. This information has provided the foundation of the Board's review. There is, however, a need to analyze such information carefully and critically. The Board continues to believe that the best way in which to analyze environmental data is by the preparation of such data by an independent entity or, at a minimum, review of such data by an independent entity. The EIS prepared by the FERC and the advisory opinion prepared by DEM has immeasurably assisted the Board in its review of environmental data.

As will be shown below, the Board has relied on OSP information for the foundation environmental data and has used the EIS and DEM advisory opinion to critically evaluate this information. Comments by the public, Audubon, the Environmental Protection Agency (EPA) and the U.S. Fish and Wildlife Service (Fish and Wildlife) have likewise been used to evaluate critically these data and advisory opinions.

In the instant case, air, wetland, and major water permits are exempt from the Board's jurisdiction. R.I. Gen. Laws Sec.42-98-7(A). This has complicated the Board's review. Since the Board is under a strict statutory time frame to evaluate an application and render a decision, the Board has been unable to wait until major environmental permits have been finally issued or denied. Thus the Board's final decision has been rendered on the best available environmental data and is, of course, contingent upon the Applicant obtaining necessary permits from DEM.

Coastal Resources Management Council (CRMC) permits are also exempt from the Board's jurisdiction, id., but the CRMC determined that it would not take any action regarding the OSP application.

b. Potential Impacts

i) Water Quality

Cooling for both units of the OSP facility will require approximately 4.4 million gallons per day (mgd) of water. OSP initially indicated that cooling water would be obtained from the Scituate Reservoir via a pipeline that would extend from North Providence to Burrillville. See Generally OSP Exhibit 1A. Hence, the Board's designation of the Rhode Island Water Resources Board as an agency that would render an advisory opinion regarding the use of the Scituate Reservoir. OSP's later decision to utilize the Blackstone River as the exclusive source of water eliminated the need for a Water Resources Board advisory opinion.

DEM has independent authority over the two major water quality permits, the "401" permit for withdrawal of water from the Blackstone River and the permit for the onsite wastewater clarification system. As to the latter permit, DEM states that additional information must be submitted before a decision can be made regarding the

wastewater clarification system. DEM Exhibit 1 at 10. Such information will probably not be available until the Board renders its decision, since it is unlikely that the Applicant will proceed with final design of the wastewater clarification system until the decision on a Board license has been made. Thus, the Board is unable to comment further on this particular aspect of the application, other than to conclude that no information has been submitted to question the feasibility of such system and the ability of OSP to design a system satisfactory to DEM.

Discharge of cooling water should not be a problem, since the facility has been designed as a closed-loop system, i.e. cooling water will be recycled and, in the event of plant failure, there is adequate capacity to impound cooling water on site. A potential problem could arise if the closed loop system failed such that continual operation of the plant would require a discharge of cooling water. Since the Applicant has not made provision for a water discharge, a license must be conditioned on plant shutdown in the event the closed loop cooling system fails.

Withdrawal of approximately 4.4 mgd of river water gives rise to the major environmental problem associated with the OSP facility and the Applicant presented studies regarding potential impacts on metals concentrations, aquatic life and dissolved oxygen (DO) levels in the river. A study addressing DO mitigation measures was also presented.

OSP's biological survey of the Blackstone River concluded that only minor reduction of down stream habitat would result from the withdrawal of cooling water and that, since fish populations in the immediate vicinity of the proposed intake structure are low, withdrawal of cooling water would have minimum impact on fish populations in the Blackstone River. OSP Exhibit 17 at 4-3, 4.

The metals study focused on two flow scenarios, 7Q10 and 1Q10. The 7Q10 scenario estimates the lowest weekly flow expected in ten years, is a commonly used low flow parameter and was the basis for evaluation of chronic toxicity impacts. According to OSP "water quality modeling and aquatic toxicity testing demonstrate that there will be only insignificant 'di minimus' impacts on the water quality of the Blackstone River as a result of the proposed withdrawal." OSP Exhibit 18 at v.

Potential impact on DO presents more significant problems. Under 7Q10 flow conditions, river flow will be approximately 102 CFS. OSP Exhibit 16 at 2-16. The minimum dissolved oxygen content set by present DEM water quality criterion is 5.0 milligrams per liter. OSP concludes that under most scenarios the withdrawal of cooling water will not lower the DO level in the river below 5.0 milligrams per liter and in extreme cases the withdrawal impact will be less than 0.3 milligrams per liter. Id. at 2; OSP Exhibit 8(f) at 20-23.

DEM by its July 19, 1988 Water Quality Certification Agreement with OSP has required OSP to implement DO mitigation measures whenever the cooling water withdrawal impact is greater than 0.5 milligrams per liter or when DO in the river is below 6 milligrams per liter. OSP Exhibit 31. The need for DO modification will be based on a matrix developed by DEM. Id. at Exhibit A.

OSP has developed an extensive list of alternatives to mitigate any impact on DO concentrations. The potential alternatives would increase aeration of river water by diversion of water over the Thundermist Dam, additional aeration at the Woonsocket Waste Water Treatment Plant by mechanical or passive means and aeration of the Blackstone River itself. OSP Exhibit 8(f) at 20-23.

While the DEM agreement deals with DO concentrations, it does not address other potential impacts, particularly impacts which might occur when river flow falls below the 7Q10 level. The FERC, EPA and Fish and Wildlife have expressed such concerns. FERC concludes that although the withdrawal of cooling water will have minimal impact on 7Q10, 102 CFS river flows, the 4.4 MGD withdrawal would constitute over 32% of the much lower minimum daily flow recorded on the river in Woonsocket. EIS at 4-7. EPA's comments on the final EIS have expressed concern about metals concentrations, aquatic habitat and the cumulative impact of this project with other "reasonably foreseeable proposals for water withdrawals from the Blackstone". Audubon Exhibit 4 at 2. Fish and Wildlife has expressed similar concerns. Audubon Exhibit 5. All three agencies recommend that OSP develop a backup water supply or be prohibited from withdrawing water when the river reaches a low flow of 7Q10 (i.e. 102 CFS) (FERC & EPA) or 208 CFS (Fish & Wildlife).

The Water Quality Certification Agreement does not end our inquiry into the potential impacts on the Blackstone River. While impacts at the low flow, 7Q10 level may be acceptable for short periods of time, there is, of course, no guarantee that river flow will not decrease below the 7Q10 level. Historic data has shown that at times the river flow dips well below the 7Q10 level and we do not accept the proposition that OSP should be allowed to withdraw water at low flow periods even if such periods coincide with an intense regional need for power. Thus, we conclude that a withdrawal of water should be conditioned on adequate river flow.

We note that the problem of water supply during periods of low river flows is one of the Applicant's own making. Suggestions have been made throughout these hearings that the Applicant obtain a backup water supply to utilize during periods of low river flow, but no alternative supplies have been suggested by the Applicant.

Practicality requires that a numerical limit be established to indicate when water withdrawal must terminate. Any such limit is to some extent arbitrary. Fish and Wildlife has suggested a 208 CFS level, however, we find no justification in the record for the 208 CFS level. In contrast, the 102 CFS 7Q10 level suggested by EPA and FERC is a commonly used low flow parameter which would indicate that the river is being stressed. We find that the 102 CFS 7Q10 level is the appropriate trigger for limitation on water withdrawal and prescribe the following limitations. If river flow at the proposed intake structure or the nearest gauging station in Woonsocket falls below 102 CFS for 24 hours, the Applicant will have 12 hours to take action to mitigate its impact on the river flow. If after an additional 12 hours (or 36 hours total) the river flow is still below 102 CFS, the Applicant shall reduce its water intake by 50% until such time that the river flow reaches 102 CFS. If after an additional 12 hours (or 48 hours in total) the river flow is still below 102 CFS, the Applicant will immediately cease all water withdrawal until the river flow is above 102 CFS.

To insure proper monitoring, the Applicant shall install a continuous real time flow gauge in the Blackstone River at or near the proposed intake structure to monitor river flow or shall make arrangements to use any existing continuous real time flow gauge located near the proposed intake structure. The data from such gauge shall be continuously telemetered to OSP and DEM, if DEM so requests, and shall be made available to the public and state and federal government agencies.

We thus conclude that, conditioned on OSP's compliance with the DO limits and mitigation actions prescribed by DEM and the withdrawal limits ordered by the Board, water can be supplied to the proposed facility without unacceptable adverse impacts. See Preliminary Decision, Issue 7. We note that the above restriction on water withdrawal addresses DEM's concerns about alternative cooling systems and backup water supply. DEM Exhibit 1 at 23.

ii) Air

OSP must obtain a Prevention of Significant Deterioration (PSD) permit from DEM for the discharge of air emissions. The PSD permit is exempt from Board jurisdiction. R.I. Gen. Laws Sec.42-98-7(A). OSP submitted extensive environmental data regarding air emissions in its initial application, OSP Exhibit 1A, and subsequently submitted its entire PSD permit application. OSP Exhibit 10.

The principal emissions from the OSP facility will be nitrogen oxides and carbon monoxide. EIS at 4-20. Much lower levels of volatile organic compounds and particulate matter will also be emitted. Id. Oil burning, if this back-up fuel must be used, will increase the emission levels for nitrogen oxides, carbon monoxides and volatile organic compounds and will also produce significant levels of sulfur dioxide. Id. DEM, however, will restrict oil burning operation under the PSD permit to 1300 hours or 54 days per unit. DEM Exhibit 1 at 18. Thus air emissions associated with oil burning will have significant limits.

The OSP facility will obviously have an impact on air quality, but the EIS has concluded that emissions will be below National Ambient Air Quality Standards:

"all predicted concentrations are well below the ambient standards, and there is no reason to expect that any standard would be threatened or exceeded at any location as a result of the operation of the OSP facility."

EIS at 4-24.

The only controversy regarding air emissions is the selection of the best available control technology which is a requirement of the PSD permit and which is entirely within DEM jurisdiction. While the selection of control technology may affect the economics of the OSP facility, the Board is unable to consider this impact since its decision must be issued before the DEM will issue its final permit in November 1988. DEM Exhibit 1 at 6. The information now before the Board shows that the OSP facility will comply with air quality standards and based on this information, the Board concludes that the OSP facility will comply with state and federal air quality standards.

iii) Noise

Along with water quality concerns, the concern about noise impacts caused the most controversy in these hearings. Audubon, FERC staff, DEM and numerous residents expressed great concern about construction noise levels and, in particular, operational noise levels. Forty-five to fifty residences may be impacted by noise from the operation of the facility. The nearest residence is located 1200 feet from the site and approximately fifteen other existing residences are located between 1200 and 2000 feet of the proposed site. Another thirty to thirty-five residences are located within 3000 feet of the site. OSP Exhibit 8(c) at 16, 23.

There are no Rhode Island regulations or guidelines regarding the regulation of noise. FERC recommends that the day/night sound level at the nearest residence be limited to 55 dbA.[3 "dbA" is a weighted measure of sound intensity and frequency and is used to measure sound impacts on the human ear. EIS at E-2.] EIS at 4-40. Massachusetts does not have noise regulations, but has established guidelines which limit noise impacts to 10 dbA above existing background ambient sound levels. Id.

The Applicant conducted the only noise studies at the site and there is some inconsistency between the two studies conducted by the Applicant. One study showed equivalent sound levels[4 Equivalent sound levels represent the weighted average sound energy over a specific time period. For a constant source of noise the instantaneous sound level is the same as the equivalent sound level. The day/night sound level is the weighted average sound level over 24 hours with additional weighting to reflect the quieter evening hours. EIS at E-2; OSP Exhibit 8c at 19.] as low as 29 to 33 dbA with an average equivalent sound level of 36 to 41 dbA. Id. Another study by the Applicant showed equivalent sound levels of 44 to 45 dbA and a day/night sound level of 48 to 49 dbA. OSP Exhibit 8(c) at 29. The EIS concludes that projected operational sound levels at the nearest residences in Massachusetts would nearly meet the Massachusetts's guidelines during quiet hours and would comply with the guidelines in all other periods. EIS at 4-41. At the closest residence in Rhode Island the projected sound level would exceed the Massachusetts's guidelines by 6 to 10 dbA. Id.

At the next to last hearing day on September 1, 1988, OSP offered to guarantee an equivalent sound level of 43 dbA at the nearest residential property, 9/1/88 Tr. 16, which is a four dbA improvement over initial projections. OSP Exhibit 8c at 23. (Equivalent sound levels and day/night sound levels were initially projected at 47 and 53 dbA respectively at the nearest residence. Id. at 28.) OSP has a guarantee from the equipment supplier of an equivalent sound level of 55 dbA at its property line, but OSP will design for 50 dbA at the property line and spend an additional \$2 million dollars to attenuate noise. 9/1/88 Tr. 15, 16; OSP Exhibit DR-15. If an equivalent sound level of 43 dbA is exceeded at an existing residence occupied by current residents, OSP will offer to purchase the property at fair market value. Id.

We believe that the OSP proposal to in effect guarantee no more than an equivalent 43 dbA sound level at the nearest residence provides substantial protection to neighboring property owners. The corresponding day/night sound level will be below the FERC recommended 55 dbA level and will substantially comply with the Massachusetts's guidelines, even though these guidelines have not been adopted by Rhode Island.

A protocol will have to be developed to particularize the method of measurement and the measurement time period. OSP should undertake to develop such a protocol in cooperation with the Town and the neighboring residents. If an impasse develops over development of the protocol, the matter can be referred to the Board for final resolution.

iv) Wetlands

Construction activity at the Sherman Farm Road site will result in the clearing of approximately 20 acres and the filling of about one-half acre of wetland area. OSP Exhibit 1A at 4-15; EIS at 4-43. The EIS concludes that the wetland area is too small to fall under DEM jurisdiction, id., and although DEM has not yet issued a wetlands permit, it anticipated in its advisory opinion that OSP would be able to conform with the requirements of the Rhode Island Wetlands Act. DEM Exhibit 1 at 7.

As to the oil and water pipeline construction, DEM concludes that locating these pipelines along existing highway rights-of-way will result in insignificant alterations to wetlands. Id. at 6. For this reason, DEM has opposed the FERC recommendation that the oil and water pipelines be located in off-road easements.

The DEM advisory opinion is consistent with the FERC's conclusion that alterations to wetlands will be insignificant. Even the EPA and Fish and Wildlife do not disagree with the FERC conclusion, although both argue that another site should be chosen for the OSP facility, in part because of wetland impacts. Both the EPA and Fish and Wildlife base their objections to the Sherman Farm Road site on their conclusions that better alternative sites exist, not on significant impacts on wetland areas at the Sherman Farm Road site. Audubon Exhibit 4 at 3; Audubon Exhibit 5 at 8.

Although wetland regulation is exempt from the Board's jurisdiction, R.I. Gen. Laws Sec.42-98-7(A), our review of the record indicates that wetlands impacts at the Sherman Farm Road site and along the oil and water pipeline will be insignificant, if the pipelines are located along existing highway rights-of-way.

v) Cooling Tower Emissions

The Applicant introduced three studies regarding the potential impacts from the two cooling towers: Potential Impacts of Cooling Tower Emissions on Vegetation and

Wildlife, Human Health Risk Assessment Associated with Ocean State Power Cooling Tower Emissions, and Cooling Tower Environmental Impact Assessment. OSP Exhibits 10 (d), (e) and (h). All studies concluded that cooling tower emission impacts on vegetation, human health and road safety would be minimal. The EIS concurred. EIS at 4-27, 4-44 to 46.

Audubon presented Dr. Keith Killingbeck, a plant ecologist, who made three "observations" regarding the studies, but did not contradict the ultimate conclusions reached by the studies and the EIS. Dr. Killingbeck argued only that more study was required.

The only evidence before the Board overwhelmingly shows that any impacts associated with cooling tower emissions will be minimal, if detectable at all. We disagree that additional studies regarding cooling tower emissions are necessary before a Board license can be issued. This matter has been adequately examined.

vi) Visual

The one hundred fifty foot emission stacks, the forty-three foot cooling towers and the sixty foot main building structure will, of course, be visible from the surrounding area. This impact is unavoidable and will occur at any site. The Applicant should make every effort to preserve the existing forest for a visual buffer and enhance this buffer where possible. Maintenance and enhancement of the three hundred foot buffer will be a specific requirement of the Board license.

vii) Air Cooling

EPA, Fish and Wildlife, DEM and Audubon have urged that OSP reduce or eliminate its need for Blackstone River water by using air cooling instead of water cooling. Evidence regarding the potential use of air cooling shows that such use would increase the size of the facility, be noisier, reduce the available energy output and increase project costs. 9/2/88 Tr. 9.

The use of air cooling has been proposed primarily to eliminate impacts on the Blackstone River and to obviate concern about potential malfunctions of the zero discharge cooling system. By our decision to limit water withdrawal during periods of low flows we have addressed the concern about impacts on the Blackstone River. Since we have required the facility to shut down if the zero discharge cooling system fails, we have addressed concerns about potential water discharges from the site, itself. Since these requirements address the concerns raised about water cooling and since air cooling will cause other environmental impacts, there is no need to require air cooling or further studies.

viii) Down Stream Hydro-power Generators

Withdrawal of water from the Blackstone River during periods of low flow could potentially have an impact on downstream hydro-electric generators by reducing the amount of water available for generation. No evidence was submitted regarding the potential for and extent of such an impact, but OSP agreed to compensate any downstream hydro-electric generator for losses resulting from OSP's withdrawal of cooling water. 9/1/88 Tr. 85.

ix) Non-exempt Permits

While the majority of DEM permits are exempt from Board review, DEM permits issued for fuel oil storage, oil spill prevention and countermeasure plans and individual sewage disposal systems fall under Board authority. Preliminary Decision at 14. At the time the DEM advisory opinion was submitted in August 1988, the substance of OSP's application for fuel oil storage and the spill prevention and countermeasure plan had been reviewed and approved by DEM. DEM Exhibit 1 at 4. Only the designation of individuals for notification purposes remained to be completed before DEM recommended final approval. Id.

An opinion regarding an individual sewage disposal system became unnecessary, when OSP decided that the on-site waste water clarification system would treat sanitary waste from the facility. Id.

x) Oil and Water Pipelines

A six inch oil pipeline and water pipeline will carry cooling water and oil for backup fuel to the site. Both pipelines will be constructed in the same trench for the majority of their routing and the route plan proposed by OSP will confine the pipelines to the shoulder of Victory Highway, Douglas Pike and West Ironstone Road for the majority of the pipelines' length. OSP Exhibit 1A at Fig. 2-6. The water pipeline will also have to traverse Woonsocket city streets. The Town has required that the oil pipeline be double-walled for its entire length within the Town to prevent possible groundwater contamination resulting from potential leakage. OSP Exhibit 19 at 203-204.

FERC has concluded that "to the extent technically and environmentally feasible" OSP should reroute the oil and water pipelines along Providence and Worcester Railroad spur lines, an abandoned rail line and along an existing 345 kilovolt (kv) transmission line so as to avoid impacts during construction on neighboring residents. EIS at 5-14 and 2-110. DEM disagrees and recommends that, due to the increased impact on wetland areas, if the pipelines are located outside highway rights-of-way, the pipelines should be constructed in highway rights-of-way. DEM Exhibit 1 at 20. The Department of Transportation in its June 1988 advisory opinion indicates that an acceptably designed pipeline can be constructed in state highway rights-of-way, provided that design and construction standards are met. Nor did the location of the pipelines present any controversy during the hearings on this application.

We agree with DEM that the Applicant's proposed routing is preferable to the FERC proposed routing. We do not believe that the EIS adequately addresses wetlands impacts associated with the rerouting of the oil and water pipelines. Any impact on neighboring residents, a concern noted in the EIS, will be temporary in nature, while impacts on wetlands due to construction disturbance have the potential to be permanent. We will thus approve the Applicant's proposed routing of the oil and water pipelines. OSP Exhibit 1A at Fig. 2-6.

OSP has argued to the Board that double-walled pipeline for the entire length through the Town of Burrillville is unnecessary. The only necessity should be protection where the pipeline traverses groundwater aquifers. We agree and will require that the oil pipeline be double-walled only in such areas.

C. Conclusion

Based on economic considerations and the limits of the air emissions permit which OSP must obtain, the Board concludes that it is unlikely that oil will be burned by the OSP facility for any extended time period and that the burning of oil will not cause unacceptable adverse impacts. See Preliminary Decision, Issue 8. Based on the

above review of state permits that are required by DEM and that would be required by Board jurisdiction, the Board concludes that the OSP facility will meet the requirements of state laws, rules and regulations and will not, indirectly or directly, cause unacceptable harm to the environment. Id., Issues 4, 5.

VI ALTERNATIVE SITES

In the initial application the Applicant identified three geographic areas located in western Massachusetts, eastern Massachusetts and northwest Rhode Island and one specific site, the Buck Hill site in northwestern Rhode Island, as potential alternative sites for its facility. OSP Exhibit 1A at 5-9. The FERC alternative site analysis was far more comprehensive. It began with 82 possible sites, identified by FERC staff, interested parties, and the Applicant, EIS at 2-97, and ended with the identification and comparison of two primary alternative sites, the Bryant College site and the Ironstone site, with the Applicant's proposed Sherman Farm Road site. Id. at 128. The Board did not undertake an independent search for alternative sites. See Preliminary Decision at 10.

The Applicant's analysis and rejection of its alternative Buck Hill site was based entirely on the Sherman Farm Road site's ownership and accessibility to gas and electric transmission lines. The western and eastern Massachusetts regions were rejected because of difficulties with connecting to the bulk electric transmission grid. OSP Exhibit 1A at 5-10. The Buck Hill site, which is also located in Burrillville, was rejected because it did not have an electric transmission substation on site and, because the land is owned by Algonquin Gas Transmission Company, which is not involved in the OSP project and indeed is a competitor of Tenneco. The EIS considered the Buck Hill site, but ranked it below the Bryant College and Ironstone sites. EIS at 2-124 to 129.

The Bryant College site is located in Smithfield, Rhode Island, southeast of the Sherman Farm Road site. Oil, water and gas supply pipelines for this site would be similar to those planned for the Sherman Farm Road site. A new electric transmission switching station, however, would have to be constructed to allow the interconnection of a generating facility with the bulk power grid. Location at this site would have less impact on neighboring residents even though the nearest residents are approximately 1200 feet from the site. EIS at 2-128.

The Ironstone site is located in Uxbridge, Massachusetts to the east of the Sherman Farm Road site near the Rhode Island border. This site would have to be rezoned for electric generation usage. Water, gas and oil supply lines would be similar to those designed for the Sherman Farm Road site, but water supply would be complicated if water from the Blackstone River in Rhode Island was pumped to the Massachusetts site, since a Rhode Island permit to take water out of Rhode Island would be needed. As with the Bryant College site, a new switching station would have to be constructed to allow interconnection with the bulk power grid.

The EIS concludes that the Sherman Farm Road, Bryant College and Ironstone site "are all considered to be feasible for the development of the proposed power plant and ancillary facilities." Id. at 2-147. FERC concludes that the greatest environmental impact would occur at the Bryant College site, but that the impact on neighboring residences would be less at the Bryant College and Ironstone sites than at the Sherman Farm Road site. FERC concludes that the Ironstone site is the most favorable followed by the Sherman Farm Road site and the Bryant College site. Id. at 2-148.

EPA and members of the public, have urged the Board to consider the Ironstone site as the preferable site for the OSP facility. The Chairman of the Uxbridge Board of Selectmen has urged that the Board consider new alternatives and that OSP begin discussions with Uxbridge representatives about the use of the Ironstone site. 8/16/88 Tr. 46. The Board, however, has no jurisdiction over a Massachusetts site and we find the the Uxbridge Chairman's comment disingenuous. The comment came on the last day of public testimony in spite of the fact that OSP's application and its intent to construct at the Sherman Farm Road has been well publicized for at least two years. Nor has the Town of Uxbridge rezoned the site for industrial usage or expressed interest in locating the OSP facility in Uxbridge. Thus, the Board is hard-pressed to seriously consider Uxbridge's belated request that the Board require, even if the Board had authority to do so, further discussion regarding the Ironstone site.

Audubon has urged, through the testimony of Dr. Oliker, that the Bryant College site is preferable, because of the possibility of piping hot water to Providence for urban district heating. Audubon Exhibit 1. Use of excess heat for urban district heating is an admirable goal, but the possible transport of hot water from Smithfield to Providence is far too speculative to be considered realistic in 1988 or the foreseeable future.

There is no statutory requirement to find the best possible location for a major energy facility. Indeed, within the context of an adjudicatory hearing on a specific application to the Board, it is impossible to require siting at the best possible alternative site, if such an alternative can be realistically identified, since the Board has the duty under the Act to fairly and in a timely manner respond to all applications. The designation of a best possible site or a ranking of possible sites must be left to the planning process required by Section 2(A) of the Act. The Board's responsibility regarding this application, similar to the analysis conducted by the FERC in the EIS, is to determine whether the proposed siting of a major energy facility is acceptable or whether there is a major factor which must prohibit the use of the particular site for that energy facility.

As to the OSP facility, we find, as did the FERC, that the Sherman Farm Road site is a reasonable and acceptable location for a major energy facility. See Preliminary Decision, Issue 11. Its primary drawback is the proximity of the site to neighboring residences and its potential impact on the rural character and development of the Town. The mitigation measures described below will lessen these impacts and, as stated above, the statewide benefits of such a facility far outweigh the local impacts. While alternative sites may exist that appear, absent detailed analysis, to be equally acceptable, the existence of such sites, even in Rhode Island where the Board has jurisdiction, does not provide a basis to reject the Sherman Farm Road site.

VII MITIGATION/CONDITIONS

Based on the above discussion, the Board will place the following conditions on the siting and construction of the OSP facility:

- 1) If the flow in the Blackstone River at the cooling water intake structure or the nearest gauging station in Woonsocket falls below 102 CFS for a 24 hour period, the Applicant shall take action to mitigate its impact on the river flow. If after another 12 hours (36 hours total) the flow remains below 102 CFS, the Applicant shall reduce its cooling water withdrawal by 50% until such time that the flow in the river reaches 102 CFS. If after an additional 12 hours (48 hours total) the flow in the Blackstone River remains below 102 CFS, the Applicant shall cease its cooling water withdrawal until such time that the flow in the river reaches 102 CFS.
- 2) A real time flow gauge must be installed in the Blackstone River at or near the proposed location of the intake structure. Flow gauge readings must be continuously telemetered to OSP and, if requested to DEM, and made available for inspection by state and federal agency personnel and the public.
- 3) There shall be compliance with all DEM requirements regarding dissolved oxygen mitigation measures.

4) If the waste water clarification system or any part of the zero discharge water system fails, the facility must be shut down until such time that the zero discharge system becomes functional.

5) Should noise levels at any existing residence, occupied by current residents, exceed 43 dbA, equivalent noise level, the Applicant shall offer to purchase that residential property at fair market value. The Applicant shall develop a protocol in consultation with the Town and neighboring residents which will particularize the method of measurement and the measurement time period.

6) A buffer of approximately 300 feet from the fence line enclosing the operational part of the site shall be maintained. If 300 feet extends beyond OSP's property line, OSP shall offer to purchase a conservation easement or the title to property to maintain a 300 foot buffer. OSP shall maintain the buffer area in its natural forested state and shall enhance the existing vegetation with plant species selected to maximize visual screening and noise attenuation.

7) The oil pipeline shall be constructed with double walls within the limits of any groundwater aquifer zone.

8) The following pipeline construction requirements shall be observed:

i) pipeline construction work will be performed under the direction of a registered professional engineer.

ii) any work which damages roadway shoulders will require replacement of the entire shoulder.

iii) roadway pavement repair will be in accord with Rhode Island Department of Transportation specifications and directions.

iv) any pavement markings which are lost as a result of pipeline construction work will be replaced in kind.

v) the details of bridge crossings must have prior approval of the Rhode Island Department of Transportation.

9) A buffer zone shall be maintained between construction work and the family cemetery and Crow Hollow area on the OSP property.

10) Except where necessary to avoid unreasonable delay, episodic noise events, such as blasting and steam blowdowns, shall be scheduled and notice shall be given so as to cause minimal interference with neighboring residential and business activities.

11) To the extent possible construction traffic approaching the site shall be confined to Sherman Farm Road.

12) Architectural plans for the pumphouse at the Blackstone River shall be reviewed with the Blackstone Valley National Heritage Corridor Commission and the DEM Division of Planning and Development.

13) Construction activities shall be confined to normal working hours so as to cause minimal interference with neighboring residential and business activities unless work outside normal hours is necessary to avoid unreasonable delay.

14) The Applicant shall apply for and obtain all state and local building and construction permits which would be required absent the Board's review of this project.

15) The Applicant shall provide DEM with all necessary designation of individuals and other required information regarding the oil spill prevention and countermeasure plan.

While the Board can issue cease and desist orders and conduct show cause hearings when evidence of non-compliance is presented, EFSB Board Rule of Practice and Procedure No. 1.14 (b), the Board has no permanent staff and no current means of monitoring compliance with the above conditions. The authority to enforce compliance is an empty vessel, unless regular monitoring occurs during construction. To ensure compliance with these conditions, the Board intends to hire a qualified engineer or construction manager, independent of the Applicant, to monitor compliance with the terms of this Decision and Order for the Board. Such engineer or construction manager will be staff of the Board for the purposes of this application and the expenses associated with the engineer or construction manager shall be borne by the Applicant. R.I. Gen. Laws Sec.42-98-17 (B). Therefore as a final condition of the Board license:

16) The Applicant shall pay for all costs incurred by the Board to retain an engineer or construction manager to monitor the Applicant's compliance with the conditions of this Board license during construction.

VIII. CONCLUSION

The Board finds that there is a regional and state need for the electric energy that OSP will produce, that such electric energy is cost-justified and will be produced at the lowest reasonable cost, that the facility will comply with all laws, regulations and ordinances, that the project will enhance the socio-economic fabric of the state and that the environmental impacts of the project are acceptable. Thus subject to the conditions set out above, the Board grants a license to site and construct the two 250 MW generation units described in the OSP application.

This Board license constitutes approval of:

(i) a fuel oil storage permit and a spill prevention and countermeasure plan which, absent the Board's jurisdiction, would be under Department of Environmental Management's jurisdiction,

(ii) a special exception for the siting of the OSP facility in Burrillville and height variances for the OSP building and emission stacks, which, absent the Board's jurisdiction, would be under the Burrillville Zoning Board of Review's jurisdiction, and

(iii) a variance for the siting of the pumphouse and intake structure in Woonsocket, which absent the Board's jurisdiction, would be under the Woonsocket Zoning Board of Review's jurisdiction.

This Board license does not approve and the Applicant must still obtain when necessary:

- (i) Rhode Island Department of Transportation utility and construction permits for the design and construction of oil and water pipelines,
- (ii) Woonsocket Office of Building Inspector and Department of Public Works building and construction permits for the design and construction of water intake and pumphouse structures and oil and water pipelines,
- (iii) Burrillville Office of Building Inspector building and construction permits for the design and construction of the OSP structures and oil and water pipelines,
- (iv) all other necessary state and local building and construction permits and
- (v) all necessary DEM permits.

The Applicant may apply to the Board for approval of any of the above building and construction permits if the appropriate local or state authority does not issue such a required permit in a timely manner, improperly refuses to issue such a permit or places improper or unnecessary conditions on the grant of such a permit.

Accordingly it is hereby

(7) ORDERED:

Ocean State Power is granted a license to site and construct two 250 MW combined cycle generating units at the Sherman Farm Road site in Burrillville, Rhode Island together with appurtenant facilities and oil and water pipelines in Burrillville and Woonsocket, Rhode Island, as described in its January 13, 1987 application as modified during the hearings, and subject to the following conditions:

- 1) If the flow in the Blackstone River at the cooling water intake structure or the nearest gauging station in Woonsocket falls below 102 CFS for a 24 hour period, the Applicant shall take action to mitigate its impact on the river flow. If after another 12 hours (36 hours total) the flow remains below 102 CFS, the Applicant shall reduce its cooling water withdrawal by 50% until such time that the flow in the river reaches 102 CFS. If after an additional 12 hours (48 hours total) the flow in the Blackstone River remains below 102 CFS, the Applicant shall cease its cooling water withdrawal until such time that the flow in the river reaches 102 CFS.
- 2) A real time flow gauge must be installed in the Blackstone River at or near the proposed location of the intake structure. Flow gauge readings must be continuously telemetered to Ocean State Power and, if requested, to the Department of Environmental Management and shall be made available for inspection by state and federal agency personnel and the public.
- 3) There shall be compliance with all Department of Environmental Management requirements regarding dissolved oxygen mitigation measures.
- 4) If the waste water clarification system or any part of the zero discharge water system fails, the facility must be shut down until such time that the zero discharge system becomes functional.
- 5) Should noise levels at any existing residence, occupied by current residents, exceed 43 dbA, equivalent noise level, Ocean State Power shall offer to purchase that residential property at fair market value. Ocean State Power shall develop a protocol, in consultation with the Town of Burrillville and the neighboring residents, to particularize the method of measurement and the measurement time period.
- 6) A buffer of approximately 300 feet from the fence line enclosing the operational part of the site shall be maintained. If 300 feet extends beyond its property line, Ocean State Power shall offer to purchase a conservation easement or the title to property to maintain a 300 foot buffer. Ocean State Power shall make every effort to maintain the buffer area in its natural forested state and shall enhance the existing vegetation with plant species selected to maximize visual screening and noise attenuation.
- 7) The oil pipeline shall be constructed with double walls within the limits of any groundwater aquifer zone.
- 8) The following pipeline construction requirements shall be observed:
 - i) pipeline construction work will be performed under the direction of a registered professional engineer.
 - ii) any work which damages roadway shoulders will require replacement of the entire shoulder.
 - iii) roadway pavement repair will be in accord with Rhode Island Department of Transportation specifications and directions.
 - iv) any pavement markings which are lost as a result of pipeline construction work will be replaced in kind.
 - v) the details of bridge crossings must have prior approval of the Rhode Island Department of Transportation.
- 9) A buffer zone shall be maintained between construction work and the family cemetery and Crow Hollow area on the OSP property.
- 10) Except where necessary to avoid unreasonable delay, episodic noise events, such as blasting and steam blowdowns shall be scheduled and notice shall be given so as to cause minimal interference with neighboring residential and business activities.
- 11) To the extent possible construction traffic approaching the site shall be confined to Sherman Farm Road.
- 12) Architectural plans for the pumphouse at the Blackstone River shall be reviewed with the Blackstone Valley National Heritage Corridor Commission and the Department of Environmental Management Division of Planning and Development.
- 13) Construction activities shall be confined to normal working hours so as to cause minimal interference with neighboring residential and business activities unless work

outside normal working hours is necessary to avoid unreasonable delay.

14) Ocean State Power shall apply for and obtain all state and local building and construction permits which would be required absent the Board's review of this project.

15) Ocean State Power shall provide to the Department of Environmental Management all necessary designation of individuals and other required information regarding the oil spill prevention and countermeasure plan.

16) Ocean State Power shall pay for all costs incurred by the Energy Facilities Siting Board to retain an engineer or construction manager to monitor the Ocean State Power's compliance with the conditions of this Energy Facilities Siting Board license during construction.

DATED AND EFFECTIVE AT PROVIDENCE, RHODE ISLAND THIS 25th DAY OF OCTOBER, 1988.

Mary N. Kilmarx
Chairperson

Daniel W. Varin
Associate Director of Administration for Planning

Robert L. Bendick, Jr.
Director, Department of Environmental Management

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Order 7 - Ocean State Power: Final Decision and Order
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EXHIBIT B

1 INTRODUCTION

The Clear River Energy Center ("Facility") shall be configured as a nominal 850 – 1,000 MW, dual one-on-one single shaft (2, 1x1 single shaft), duct fired, combined cycle generation station. The two units will be installed in phases. The first unit (Unit 1) shall be installed in Phase 1 and the second unit (Unit 2) shall be installed in Phase 2. The common balance of plant (BOP) systems shall be designed for both units and installed in Phase 1.

The proposed location of buildings at the Facility is as shown on the project conceptual site arrangement drawing 238926-0GA-C1001B.

The following sections specify the general design requirements for the Facility buildings.

2 SUMMARY OF WORK

Contractor shall furnish and install enclosed structural steel buildings as identified below in accordance with the latest state building code and with all applicable interior equipment foundations, drainage, electrical, mechanical, HVAC, and life safety systems intended for proper function.

- Combined Administration/Control and Maintenance/Warehouse Building with storm shelter
- Turbine Building (one per Power Island)
- Feedwater Pump Building (one per Power Island)
- BOP Electrical Building (one per Power Island)
- Water Treatment Building
- Auxiliary Boiler Building
- Gas Compressor Building
- Fuel Oil Equipment Building
- Fire Pump Building
- Switchyard Control Building

Structural and architectural provisions shall be provided complete including all shallow and deep foundations, lifting equipment, steel structures, and protective coatings.

3 DESIGN BASIS

The power station Facility, including the buildings shall be designed and constructed over the entire ambient condition range.

The Facility shall be designed in compliance with all applicable laws and regulations. In particular, the Facility shall comply with all relevant federal and state environmental and occupational health and safety regulations.

3.1 CODES AND STANDARDS

The following codes, standards, and publications of the latest issue in effect at date of the Agreement shall be used in the design and installation of the Work.

**Invenergy Clear River Energy Center
Specification for Building Design**

ACI	American Concrete Institute
AHRI	Air-conditioning, Heating, and Refrigeration Institute
AISC	American Institute for Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International
AWS	American Welding Society
CRSI	Concrete Reinforcing Steel Institute
IBC	International Building Code
IES	Illuminating Engineers Society
ISA	International Society of Automation
ISO	International Standards Organization
MBMA	Metal Building Manufacturers Association
NACE	National Association of Corrosion Engineers
NAIMA	North American Insulation Manufacturers Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
SDIS	Steel Deck Institute Standards
SJIS	Steel Joint Institute Standard
SMACNA	Sheet Metal and Air-conditioning Contractors National Association
SSPC	Society of Protective Coatings
UL	Underwriters Laboratories

Adoption of alternative standards shall be subject to Owner's prior approval. When requested, Contractor shall provide one English language copy of the requested alternative for Owner's sole use.

Contractor shall be consistent in their application of codes and standards in execution of the Work.

3.2 FORBIDDEN MATERIALS

Equipment and materials or any other temporary or permanent items which contain PCBs, asbestos or asbestos bearing materials, nuclear sources, lead based paint ($>1.0 \text{ mg/cm}^2$), or

**Invenergy Clear River Energy Center
Specification for Building Design**

0.5% by weight), methyl ethyl ketones (MEK), or mercury are prohibited from use at the Facility.

3.3 SITE CONDITIONS

Elevation

Site elevation shall be established at 575 feet above mean sea level (MSL) for the main power block. Grading around foundations and exposed concrete slabs shall be sloped to assure proper drainage away from foundation structures.

Precipitation

Point precipitation frequency estimates Burrillville, RI:

- Annual average, inches 47.18 **
- 10 year, 24-hour, inches 5.05*
- 25 year, 24-hour, inches 6.24*
- 100 year, 24-hour, inches 8.40*
- Average Snowfall Total 33.80**

**Data based on NOAA Atlas 14 point precipitation frequency estimates (Mansfield, NJ)*

***Based on NOAA Normals of the US 1981-2010 (Providence, RI)*

Dry Bulb Ambient Temperature

Temperatures are from 2013 ASHRAE fundamentals handbook for Providence, RI.

- 50 Year Extreme High Temperature 104.3 °F
- 1% Incident Temperature 86.7 °F (52% RH)
- Annual Average Mean Temperature 51.8 °F
- 50 Year Extreme Low Temperature -8.9 °F

3.4 BASIC STRUCTURAL DESIGN CRITERIA

Structural design criteria for the facilities buildings shall be in accordance with Section 4.

3.5 BASIC HVAC DESIGN CRITERIA

HVAC design criteria for the facilities buildings shall be in accordance with Section 5.

3.6 BASIC FIRE PROTECTION DESIGN CRITERIA

HVAC design criteria for the facilities buildings shall be in accordance with Section 6.

3.7 PAINTING AND COATING

This section outlines the general requirements and scope of painting and lining for the buildings.

Finish colors shall be selected by Owner from among the paint manufacturer’s standard colors. The “Paint/Lining System Application Table” contained herein includes specific definition of primer and finish paints and lining materials, touch-up, and application of galvanizing and other similar materials.

Standards

The following specific codes and standards apply:

American Concrete Institute (ACI)

**Invenergy Clear River Energy Center
Specification for Building Design**

- 222R Protection of Metals in Concrete Against Corrosion
- 515.1R Guide to the Use of Waterproofing, Damproofing, and Decorative Barrier Systems for Concrete

ASTM International (ASTM)

- A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D520 Standard Specification for Zinc Dust Pigment
- D3359 Standard Test Method for Cross Hatch Adhesion Test of Coatings
- D4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

International Concrete Repair Institute (ICRI)

- 310.1R Guideline for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion

Society of Protective Coatings (SSPC)

- AB1 Mineral and Slag Abrasives
- AB2 Cleanliness of Recycled Ferrous Metallic Abrasives
- AB3 Ferrous Metallic Abrasive
- PA2 Measurement of Dry Coating Thickness with Magnetic Gages
- SP1 Solvent Cleaning
- SP3 Power Tool Cleaning
- SP6 Commercial Blast Cleaning
- SP10 Near-White Blast Cleaning
- SP11 Power Tool Cleaning to Bare Metal
- SP13 Surface Preparation of Concrete
- Paint 20 Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)
- Paint 30 Weld-Through Inorganic Zinc Primer

National Association for Corrosion Engineers (NACE)

- SP0178 Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

Paint/Lining System Tables

Table 1- Paint/Lining Systems Application Table

Item to be Coated	Exposure	Coating System (Note 1)	Color (Note 2)
Structural Steel			
Structural steel, Pre-engineered building structural steel	Interior, <220°F, SSPC Environmental Zone 1A	A	
Structural steel, Pre-engineered building structural steel	Interior, <220°F, corrosive environment	D	

**Invenergy Clear River Energy Center
Specification for Building Design**

Item to be Coated	Exposure	Coating System (Note 1)	Color (Note 2)
Structural steel, Pre-engineered building structural steel	Interior, < 220 °F, non-corrosive, fire proofed		
Structural steel, Pre-engineered building structural steel	Exterior	Z	
Miscellaneous Steel			
Handrails, guardrails, ladders, safety cages	Interior and Exterior	Z	
Grating, stair stringers, toe and kick-plates, stair treads, checkered floor plate	Interior and Exterior, ≤220°F, noncorrosive	Z	First and last stair tread nose shall be safety yellow.
Metal siding, roofing and gutters	Exterior	20 year warranty	
Ductwork			
Ductwork; HVAC and other, interior and exterior, <220°F		E, I,	Silver / aluminum
Ductwork, Stacks, and Similar; Other than HVAC, interior and exterior, 220°F to 750°F +		K, L	Match system
Ductwork; Exposed doors, frames, supports, and ports, interior and exterior, (insulated)		H	Match balance

Notes:

1. See Paint/Lining Systems Table below. Where modifier number (second digit) is not used, either parent coating type may be used (e.g., B1 or B2, where B is specified).
2. Physical color samples shall be submitted to Owner for approval for all exterior paint colors.

Table 2 - Paint/Lining Systems

Step	Surface Prep/Paint or Coating	DFT (mils)
A - Inorganic Zinc		
Initial Surface Prep:	SSPC-SP6	
1st Coat:	Inorganic zinc silicate primer, gray-green pigment	3.0-4.0
Repair Surface Prep:	SSPC-SP3/11	
Touch-up:	Organic zinc epoxy primer	3.0-4.0
D - Inorganic Zinc Primer, Polyamide Epoxy Finish		
Initial Surface Prep:	SSPC-SP6	
1 st Coat:	Inorganic zinc primer, gray-green pigment	3.0-4.0
2 nd Coat:	Polyamide epoxy	4.0-6.0
Repair Surface Prep:	SSPC-SP3/11	

**Invenergy Clear River Energy Center
Specification for Building Design**

Step	Surface Prep/Paint or Coating	DFT (mils)
Touch-up:	Organic zinc primer, same finish coat	
E – Inorganic Zinc Primer, Epoxy Mastic, Urethane Finish		
Initial Surface Prep:	SSPC-SP6	
1 st Coat:	Inorganic zinc primer, gray green pigment	2.0-3.0
2 nd Coat:	High build epoxy mastic	4.0-6.0
3 rd Coat:	Aliphatic urethane	2.0-3.0
Repair Surface Prep:	SSPC-SP3/11	
Touch-up:	Organic zinc primer, same intermediate and finish coats	
H – Epoxy Primer, Epoxy Finish		
Initial Surface Prep:	SSPC-SP6	
1 st Coat:	High build epoxy primer	4.0-6.0
2 nd Coat:	High build epoxy	4.0-6.0
I – Epoxy Primer, Epoxy, Urethane Finish		
Initial Surface Prep:	SSPC-SP6	
1 st Coat:	Epoxy primer	2.0-3.0
2 nd Coat:	High build epoxy	4.0-6.0
3 rd Coat:	Aliphatic urethane	2.0-3.0
Z – Hot Dipped Galvanizing		
Initial Surface Prep:	SSPC-SP6	
Coating:	ASTM A123, A153, or A767	per ASTM
Repair:	ASTM A780	per ASTM
Painted Surface Prep:	ASTM D7396	

Table Notes:

1. When top coating over inorganic, zinc silicate primers, a mist coat is necessary to avoid bubbling. A mist coat may be a thinned coat or applied by a quick pass of the spray gun prior to applying the full coat, but allowing sufficient time for solvent evaporation. Please consult coating manufacturer's technical product data sheets for further details.
2. Two coats of Epoxy at 4.0 – 8.0 mils DFT per coat can be substituted for two of Acrylic if desired.
3. Acid containments shall be rated for full immersion; system shall be Carboline Semstone, Blome TL 400 HWM vinyl ester resin lining with fiberglass reinforcing, or Owner approved equal.
4. Chemistry of cargo must be specified along with product concentration, temperature, etc.
5. See Paint/Linings Application Table above.

3.8 SIGNAGE

Contractor shall provide complete signage for the Facility. Within the Site, Contractor shall provide signs for the following:

- Signs identifying each building and enclosure shall be placed over each entrance
- Room numbers on doors, room names for conference rooms, building-internal signs for restrooms, and emergency egress
- General directions to assembly points for inclement weather throughout the Facility
- Areas requiring hearing protection, other personal protection equipment (PPE), confined space access, heat stress, chemicals, or similar safety instructions
- Required NFPA 704 placards
- Locations where extra care is needed to enter (e.g., flammable material storage, forklift traffic areas, other)
- Locations where manual drain valves are included on secondary containment areas (e.g., describing when valves are to be opened/closed)
- General directions to safety shower/eyewash stations
- Required signage for arc flash areas on all equipment rated at above 300 V
- Floor plaques that provide an overview of building floor plan and state the floor number or letter, at the entrance/exit of stairwells and elevators
- Painted floor area marking space required for equipment maintenance (e.g. shaft, rotor, tube, motor control center drawers, fire extinguishers, pull spaces)
- Painted indoor floor areas for preferred walkways
- OSHA safety and emergency response signs
- Design floor loading for all above ground level/elevated platforms and grated areas serviced by hoists.
- Design capacity for all lifting points, monorails, gantries, and cranes
- Underground utility corridor signs
- Electrical equipment enclosures, and electrical safety signs therein
- Fire protection system access/direction signs
- Building column identification at ground level and elevated platforms
- Any signage required by federal, state, or local regulations
- Cautionary paint or tape where applicable (e.g. low hanging pipes or beams, trip hazards, high voltage, etc.)

4 STRUCTURAL/ARCHITECTURAL

4.1 SUMMARY

Contractor shall furnish the buildings listed in Section 2.0 – Summary of Work. This section outlines the minimum structural and architectural requirements for buildings.

4.2 BUILDINGS

Unless noted otherwise, all buildings shall be metal sided-metal frame pre-engineered type structures. The Administration/Control Building and the Warehouse/Maintenance building shall have structural precast wall system.

4.2.1 General Building Requirements

Structures shall be designed to support and provide personnel access to the mechanical equipment and piping/electrical/control systems directly or indirectly associated with power generation. All enclosed and non-enclosed structures shall have permanent grating, platforms, ladders, and stairways for personnel access that meet the requirements of the state OSHA. All penetrations and openings through grating shall have banding. Structures and equipment components shall be supported by suitable concrete foundations either bearing on existing soil or if required, for heavier equipment and structures, supported on deep foundations (piles).

For all buildings and enclosures, an applicable (future) collateral loading should be provided in wall and roof framing to allow future conduit, cable tray, and mechanical piping to be top-supported (especially for any pre-engineered buildings). If collateral loading is not needed in a specific structure, the unity stress for all members should be limited to 0.9. For buildings with significant piping and tray, a lower unity stress allowance shall be used coupled with increased load factors on primary framing that shall be affected. All wind girts shall be designed to support their own vertical dead weight rather than be supported by liner panel or temporary means so that they do not warp.

Contractor shall provide Owner with complete design calculations for each building, enclosure, or other structure signed and sealed by a professional engineer, registered in the State that account for all applicable loading and code requirements.

Liner panels on the insides of all buildings shall be used to absorb sound and protect insulation, while also providing a hard surface for maintenance. For general areas, the liner panel shall match the outer wall panel. Liner panels in areas of high traffic or where materials shall be stored on the inside shall consider thick sections or even 3-foot high row of concrete masonry. The minimum liner and wall and roof metal panel gauge thickness that shall be allowed for any building or enclosures is 24 gauge, without Owner approval. All roof and wall panels shall be protected with galvanizing base coat and finish painting coat with a minimum guaranteed service life of 30 years (warranty required). The finish coating film integrity shall be for 30 years service against cracking, flaking, chipping and peeling, with chalking and fading resistance covered for at least 25 years. Gutter systems shall be similarly coated, with debris guards provided.

See following articles for additional building requirements.

4.2.2 Turbine Building

The turbine building footprint shall be designed to accommodate the selected Power Island Supplier's recommended component laydown and maintenance requirements within the concrete section of the operating floor. The synchronous generator rotor removal pull space shall be completely within the building volume and shall not require removal of a wall panel or disassembly of the generator exciter enclosure to remove the rotor with the bridge crane. Generator isophase bus shall be routed outside of the rotor removal space.

4.2.3 Administration Building

The Administration/Control Building main conference room shall be designed as a storm shelter area. The storm shelter shall be designed in accordance with the ICC/NSSA 500 Standard for the Design and Construction of Storm Shelters.

4.2.4 Water Treatment Building

The water treatment building shall be provided with an office/laboratory room. The laboratory shall include a fume hood, lab sink, and counters with cabinets above and below, lab bench, a computer station with desk and chair, and testing equipment consisting of a pH meter, conductivity meter, turbidity meter, spectrophotometer, hardness titrator, lab demineralizer and other standard laboratory equipment.

4.3 STRUCTURAL REQUIREMENTS

4.3.1 General

Design shall be in accordance with the applicable codes and regulations and industry standards referred to in this section. The design criteria discussed in this section shall govern the technical requirements for designing civil/structural elements.

Work shall be produced in accordance with the rules applicable to Professional Engineers practicing in the State, using due standards of care, skill and diligence. Design drawings and specifications produced shall be sealed by a Professional Engineer licensed to practice in Rhode Island.

4.3.2 Codes and Standards

In addition to the codes and standards identified in Section 03 – Facility Design Basis, relevant aspects of the Rhode Island State Building Code, the 2012 International Building Code (IBC), and the editions of the American Concrete Institute (ACI) code and American Institute of Steel Construction (AISC) code incorporated by reference.

Structural design shall be in conformance with the latest standard accepted edition listed in in the table below, to the extent they apply, unless the building code requires a more conservative design.

American Concrete Institute (ACI)

117/117R	Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary
301	Specifications for Structural Concrete
315	Details and Detailing of Concrete Reinforcement
318/318R	Building Code Requirements for Structural Concrete and Commentary
350R	Environmental Engineering Concrete Structures
351.R1	Grouting between Foundations and Bases for Support of Equipment and Machinery
351.R2	Static Foundations for Equipment and Machinery
351.R3	Dynamic Foundations for Equipment and Machinery
360R	Guide to Design of Slabs-on-Ground
530/530.1R	Building Code Requirements for Masonry Structures and Specifications for Masonry Structures and Commentaries

American Institute of Steel Construction (AISC)

303	Code of Standard Practice for Structural Steel Buildings and Bridges
341	Seismic Provisions for Structural Steel buildings
360	Specification for Structural Steel buildings

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American Society of Civil Engineers (ASCE)

- 7 Minimum Design Loads for Buildings and Other Structures
Structural Design of Air and Gas Ducts for Power Stations and Industrial Boiler Applications

American Welding Society (AWS)

- D1.1 Structural Welding Code-Steel

Association of Iron and Steel Institute (AISI)

Specifications of the Design of Cold Formed Structural Steel Members

Metal Buildings Manufacturer Association (MBMA)

Metal Building Systems Manual

Precast Prestressed Concrete Institute (PCI)

Manual for Structural Design of Architectural Precast Concrete

Research Council On Structural Connections (RCSC)

Specification for Structural Joints Using ASTM A325 or A490 Bolts

Steel Deck Institute (SDI)

Design Manual for Composite Deck, Form Decks and Roof Decks –
Publication No. 30

Diaphragm Design Manual

Steel Joist Institute (SJI)

Standard Specifications, Loads Tables and Weight Tables for Steel Joists
and Joist Girders

4.3.3 Design Loads

Design loads and load combinations for all buildings, structures, structural elements and components, handrails, guardrails, and connections shall be determined according to the criteria specified below, unless the applicable building code requires more severe design conditions. Loads imposed on structural systems from the weight of all temporary and permanent construction, occupants and their possessions, environmental effects, differential settlement, and restrained dimensional changes shall be considered.

Wind, seismic, and snow loading shall be in accordance with IBC or local jurisdictional building code, whichever is more stringent.

4.3.3.1 Wind Loads

Wind design shall be in accordance with:

- 3 second gust = 139 mph
- Exposure category = C

4.3.3.2 Seismic Loads

Seismic design shall be in accordance with SBC-1 2013 Table 1608.1 and Chapters 11 thru 15 of ASCE 7-10 as applicable, utilizing the inputs below:

- Job site (soil) class = D (Code Default)
- Mapped MCE_R spectral response accelerations, $S_s = 0.175g$

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- Mapped MCE_R spectral response accelerations, $S_1 = 0.063g$
- Spectral acceleration for short periods, $S_{DS} = 0.187g$
- Spectral acceleration for a 1-second period, $S_{D1} = 0.101g$
- Seismic Design Category, $SDC = B$
- Importance factor, $I_E = 1.25$
- Seismic design criteria may be adjusted by Owner based on future geotechnical investigation and report

4.3.3.3 Snow Loads

Snow loads applied to exposed equipment and buildings shall be in accordance with SBC-1 2013 Table 1608.1 and Chapter 7 of ASCE 7-10, utilizing the inputs below:

- Ground snow load, $p_g = 35$ psf
- Importance factor, $I_S = 1.1$

4.3.3.4 Live Loads

The live loads used in the design of buildings and structures shall be the maximum loads likely to be imposed by the intended use or occupancy, but shall not be less than the minimum uniform design live loads. Components of the structural system may be designed for a reduced live load in accordance with the local building code. Roofs shall be designed to preclude instability resulting from ponding effects by ensuring adequate primary and secondary drainage systems, slope, and member stiffness.

Live loads used in the design of buildings and structures shall be the maximum loads likely to be imposed by the intended use or occupancy, but not less than the following minimum uniform live loads:

- Turbine operating deck floor = 150 psf
- Ground floor slabs = 250 psf
- Storage areas = Weight of stored material, but no less than 150 psf
- Other concrete floors = 100 psf
- Grating floors = 100 psf
- Checker Plate floors = 100 psf
- Stairs = 100 psf

4.3.3.5 Construction Loads

Construction or crane access considerations may dictate the use of temporary structural systems. Special considerations shall be made to ensure the stability and integrity of the structures during any periods involving use of temporary bracing systems.

4.3.3.6 Buildings and Other Structures

Except for the administration/control building and warehouse/maintenance building superstructure support systems shall consist of pre-engineered steel moment frame construction with bracing in the orthogonal axis direction as required or custom designed steel braced frame structures and/or steel moment frame structures. Position of bracing shall meet spatial requirements for access and maintenance. The superstructure shall provide an integrated gravity and lateral load resisting system to transfer loads to the reinforced concrete foundation.

4.3.3.7 Concrete

Except as otherwise specified, or where precast structural elements can reduce cost and meet or exceed cast-in-place reinforced concrete performance, all concrete shall be reinforced cast-in-place concrete designed in accordance with ACI 318, *Building Code Requirements for Structural Concrete*, and other applicable structure specific codes and standard.

Exposed concrete floors within the water treatment, chemical lab building and chemical feed area are to have a steel-trowel finish and be sealed to impart chemical resistance where such exposure is possible.

Duct banks which run under roads and maintenance areas shall be adequately reinforced to withstand anticipated loads, supported by deep foundations if necessary by design, and shall be marked with a permanent dye to identify it as electrical ductbank.

4.3.3.8 Concrete Masonry Block Work

Structural masonry design shall be in accordance with the latest edition of ACI 530, *Building Code Requirements for Masonry Structures*.

4.3.3.9 Steel Structures

Design and construction of steel structures shall utilize standard design practices as defined by local building codes and standards, but not less than those defined below.

System	Criteria
Deflection, floors and roofs, live load only	Span/360, vertical, unless attached to more rigid, brittle members
Deflection, floors and roofs, dead and live load combined	Span/240, vertical
Deflection, roof beams and boiler girders	Span/360, vertical
Deflection, girts	Span/360, horizontal
Deflection, grating (100 psf uniform load)	1/4 inch maximum
Deflection, crane and hoist support beams	Span/800, vertical (with impact), Span/1000 vertical (without impact)
Deflection, duct plates (between stiffeners)	Span/100, normal operations only
Deflection, duct plate stiffeners	Span/240, normal operations only
Unbraced length, pipe bracing in ducts	$KL/r = < 120$, checked for vortex shedding in flow and thermal restraint forces

4.3.3.10 Pre-Engineered Buildings

Design of the structural framing, by pre-engineered metal building (PEMB) manufacturer, shall be in accordance with the MBMA Metal Building Systems Manual.

Framing configurations shall conform to the architectural floor plans.

Prior to any pre-engineered building package being shipped to Site for erection, a letter of certification signed and stamped by a professional engineer registered in the State shall be provided to Owner and shall include the following information and state that the building meets all applicable Contract and code requirements:

- Column base loads (for each load combination)
- Column base loads (for envelope solution)

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- Allowable loads for framing members
- Critical reactions and locations
- Critical shears and locations
- Critical moments and locations

4.4 STRUCTURAL MATERIALS

Materials, workmanship, and testing shall be in accordance with the appropriate specifications, standards and codes. Methods of quality control shall be clearly established and documented for all structural Work (e.g., concrete, steel, connections, anchors, other) by Contractor, including the Submittal of test records to Owner. Third party shall be used to complete any special inspections and for Site quality control functions (soils, asphalt, concrete, steel, connections, other).

Working methods shall ensure the construction of stable structures able to withstand all applied loadings during construction and for the design life of the Facility without collapse, failure or excessive deformation such as to cause any damage, loss of function or any durability problems.

4.4.1 Structural Steel

Structural steel shall be detailed and fabricated in accordance with the *AISC Code of Standard Practice* and the *AISC Specification for Structural Steel Buildings*. Construction of steel structures shall use materials as defined in the table below:

Material	Criteria
General use steel shapes, plates, appurtenances	Multicertification ASTM A36/A572, Grade 50, or ASTM A992.
Steel tube, rectangular or square	ASTM A500, Grade B
Bolts	ASTM A325, A490, F1852, F2280
Weld filler metal	70 ksi tensile strength
Extreme corrosion-resistant stainless steel	ASTM A167, type as required
Guardrail and handrail pipe	1-1/2 inch nominal diameter, ASTM A53, Type E or S, Grade B for new construction.
Steel grating	3/16 inch by 1-1/4 inch bearing bars, galvanized. Furnish with serrated surface for exterior applications
Toeboard, banding, kickplate and grating panel ends	ASTM A36 or ASTM A1101, galvanized
Anchor bolts, sized for design loads	ASTM F1554, ASTM A193, Type 316 stainless steel
Miscellaneous channels, angles, plates, and embedded shapes	ASTM A36
Stair stringers	ASTM A36, C10 minimum
Stair treads	Steel grating, galvanized, cast abrasive or bent checker plate nosings

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Material	Criteria
Metal deck, roof	1-1/2 inch profile depth (or as required by design), 22 gauge minimum, galvanized
Metal deck, form	1-1/2 inch profile depth (or as required by design), 18 gauge minimum, galvanized.
Checkered steel floor plate	ASTM A786 (0.25 inch thick)

Where structural components are subject to severe corrosion due to chemical exposure but not elevated temperatures, Contractor may use FRP (fiber-reinforced polymer) material produced for structural application. All structural shapes shall be capable of carrying their intended load, contain ultraviolet (UV) light inhibitors and be flame retardant per ASTM E-84 Class 1 with flame spread of less than 25.

Provisions of Section H1.3 of the AISC Manual of Steel Construction shall not be used when any biaxial bending may occur under any loading case. Provisions of H1.1 shall be satisfied for all biaxial bending and compression load cases. All bolted connections in primary building, enclosure, and structure members shall be bolted using A325 or A490 bolts. Direct-tensioning indication devices (“squirters”), or tension controlled bolts, for both secondary and primary members shall be used. Secondary members may be bolted using A307 bolts.

4.4.2 Structural precast wall panels

Precast concrete wall panels shall be detailed and fabricated in accordance with the *Precast Prestressed Concrete Institute standards* at a PCI certified production facility and /or NPCA/ANCI certified production facility. Panels shall have a minimum thickness required by design to support panel self weight, gravity, roof snow loads, wind loads, and erection loads.

Reinforcing fabric shall be stainless steel deformed wire in accordance with ASTM A1022, or carbon fiber mesh C-Grid® by Carboncast

Wall panels shall be built and erected in accordance with production, erection, and interface tolerances established by PCI.

4.5 ARCHITECTURAL REQUIREMENTS

4.5.1 General

The buildings and building systems shall be designed based on the applicable codes and requirements as determined by the Rhode Island State Building Code.

Contractor shall perform a building code analysis and establish occupancy and type of construction for each building.

The design and material selections in the interior building/office areas shall be driven by functionality and established Owner architectural standards and sustainability goals. The overall Project seeks an Envision™ rating for sustainable infrastructure. Sustainable criteria based on the LEED New Construction v3, 2009 rating system is noted where applicable. Contractor shall provide related material data sheets showing applicable sustainable attributes of materials with Submittals. The Facility does not seek a LEED rating. The buildings shall be designed for accessibility complying with applicable law.

4.5.2 Architectural Codes and Standards

Normally occupied areas such as control rooms shall be designed in general accordance with the requirements of the latest applicable building codes and standards. Allowable variances and applicable local code interpretations should be established before project

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commencement.

Fire rated assemblies shall be provided when required by building or fire codes. Penetrations through partitions shall be provided with fire stops per NFPA. Insulation shall be used for sound and thermal control in walls between and around finished rooms and air-conditioned areas.

4.5.3 Exterior Architecture Criteria

The exterior architectural systems provide a durable, weathertight enclosure to protect systems and personnel and allow for a controlled interior environment.

Exterior architectural systems shall conform to the following general design criteria:

Item	Criteria
Walls	Walls shall consist of insulated metal wall panel or Insulated precast concrete panels were required. Building enclosures may also be pre-engineered; exposed surfaces to be non-reflective.
Roofs	Metal standing seam roofing. Built-up roofing or single-ply membrane over metal deck may also be used. Flat roofing shall be used unless Owner approval is provided. Solar reflectance of materials shall be considered. Solar Reflectance Index (SRI) of materials: Low slope roofing with SRI > or = 78, steep slope roofing or curved roof area with SRI > or = 29 preferred. Roofs on the turbine building and other membrane roofs shall have parapet walls installed around the perimeter.
Thermal insulation	Incorporated into the walls and roofs for thermal design.
Louvers	Include stormproof louvers as required by the ventilation design.
Windows	Include windows, frames, and glazing. Selection shall be based on Facility and environmental requirements.
Personnel doors	Hollow, metal type personnel doors. Insulation and fire rating criteria shall be dictated by the interior and environmental requirements.
Equipment access doors	Double mandooors (for smaller equipment access) and/or large exterior metal curtain doors, motor operated with weather seals, windlocks, and backup manual chain operators.
Masonry block	Consist of concrete block, which may be utilized for enclosure and separation purposes.
Finish painting	Exterior steel materials not galvanized or factory finished shall be finish painted. Colors shall be selected by Owner. Exposed surfaces to be non-reflective. See previous section for painting systems of structural components. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials.

4.5.3.1 Acoustical Insulation

Acoustical insulation shall be incorporated into the walls and roofs of the Turbine Building. The minimum acoustical performance requirements are summarized in the table below. The transmission loss (TL) values are octave band-specific and expressed in terms of dB. The

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values equate to an overall STC 35 which can be achieved using 24 gauge steel cladding coupled with high-density internal acoustic insulation and perforated liner.

Absorptive Surface	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Barrier or Enclosure (dB)	10	16	17	24	32	41	49	52	57

If a more stringent design than the minimum requirements specified above is required to satisfy the far field noise guarantees of the Agreement, Contractor shall be responsible for design and installation of a complete system of noise abatement that satisfies the guaranteed requirements.

4.5.3.2 Interior Architecture Criteria

The interior architectural items shall provide a functional, low maintenance, aesthetically pleasing environment. Interior architectural items shall conform to the following general design criteria:

Item	Criteria
Partitions	Partitions for general unfinished plant areas shall be constructed of masonry, metal wall panel. The complete administration/control building interior, including the storm shelter masonry and all structural steel, shall be furnished with a drywall finish.
Windows	Interior fixed windows as required by the occupancy. Rated and nonrated glazing shall be installed in accordance with fire retardant criteria where applicable.
Personnel doors	Hollow, metal type personnel doors. Insulation and fire rating criteria shall be dictated by the interior and environmental requirements. Wood doors are not allowed.
Concrete slabs	Warehouse, maintenance shop and mechanical/electrical areas – concrete slab sealed with concrete hardener. Sealants shall be low-VOC materials.
Ceilings	Ceilings in the administration/control building and finished areas of the Facility shall consist of suspended, exposed grid, lay-in acoustical type systems. Wet areas shall consist of moisture resistant materials. The use of sustainable, low-emitting materials containing recycled content and that are regionally located is desired where possible.
Floor coverings	Floor coverings in the administration/control building and finished areas of the Facility shall a tile suitable for high traffic areas, commercial modular carpet tiles for office and general areas. Floor coverings in control and electrical equipment rooms shall be static dissipative and shall incorporate epoxy coatings. High moisture areas shall incorporate unglazed ceramic tiles. The use of sustainable, low-emitting materials containing recycled content and that are regionally located is desired where possible.
Wall coverings	Glazed wall tiles shall be used in shower and toilet rooms for maintenance and sanitary requirements. All other finished area wall

Item	Criteria
	coverings shall be identified in the painting section. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials.
Interior drywall	Smooth, clean, and dry surface preparation; a primer coat (0.5-3.0 mils) of sealer or thinned finish coat as recommended by the paint manufacturer; and a finish coat (1-2 mils) of low gloss acrylic latex paint. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials, per VOC limits of LEED New Construction v3, 2009.
Finish painting	Interior areas shall be coated where required for chemical resistance, light reflection, or aesthetics. Interior masonry walls shall be coated a gloss finish. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials, per VOC limits of LEED New Construction v3, 2009.
Sanitary facilities	Toilet and shower facilities, associated accessories, and janitor closet with mop station shall be provided where required to meet code and Facility requirements. Low-flow flush and flow plumbing fixtures shall be utilized where applicable.
Raised floor areas	The administration/control building control room, DCS equipment room, electrical room and communications area shall have raised floors furnished with anti-static carpet tiles.

4.6 ARCHITECTURAL MATERIALS

4.6.1 Concrete Masonry Units

Concrete masonry Units shall be hollow, normal weight, nonload-bearing, Type 1 conforming to ASTM C 129, or load bearing Grade N, Type 1 conforming to ASTM C 90.4, as appropriate. Concrete masonry Units shall be reinforced as required. Masonry Units shall not be used for structures designed to resist fluid loads such as basins.

4.6.2 Preformed Metal Siding

Preformed metal siding panels shall be fabricated from galvanized sheet steel. Exterior and interior face panels shall be 22 gauge minimum. Exterior siding shall be either an insulated or an uninsulated field-assembled system as required by this specification. Uninsulated siding panels shall meet the same finish and strength characteristics as the insulated siding system.

The wall system shall be designed to withstand the specified wind loading with practical and economical support girt spacing.

Exterior panel surfaces exposed to weather shall be coil coated with a finish designed to withstand all Site-specific conditions. The siding finish color shall be selected by Owner, from among the siding manufacturer's standard colors if possible. The final finish shall be non-reflective. The interior surface of the exterior panels shall be finished with manufacturer's standard baked-on enamel finish. When required, the interior liner panels shall be galvanized sheet steel. Exposed panel surfaces shall have manufacturer's standard gloss white baked-on enamel finish.

4.6.3 Precast Concrete Wall Panels

Precast concrete wall panels exterior surface shall have a texture and color/coating as selected by Owner. A 12 inch x 12 inch sample coupons shall be submitted for approval by the Owner. Where applied coatings are selected, the coating shall be compatible and adhere to concrete and shall be acrylic, epoxy, or polyurethane based. Coating shall be selected to provide the least maintenance cost for the 30 life of the plant.

Where specified, the architectural wall finish schedule interior surfaces shall have a texture and color, finish as selected by Owner. 12 inch x 12 inch sample coupons shall be submitted for approval.

After a color, texture, and finish are selected a minimum 4ft x 4ft full scale panel mock-up shall be erected in the vertical position at the site for final approval. Owner has the right to reject the field erected mock-up.

Panel shall have an insulated core to meet or exceed the energy code requirements and not less than the thermal requirements of the building design.

Panels shall be sealed to resist water penetration and streaking

Panel joints shall be detailed showing industry standard joint thickness, backer rods, and sealant depth.

4.6.4 Roofing

Roofing for all major structures shall consist of the following roofing systems. The completed roofing system shall meet the requirements for a Factory Mutual Class I rating and fire code requirements for the type of building. Five-inch gutters shall be provided to direct rainwater to the storm sewer system.

- Acoustical standing seam metal roofing; or
- White synthetic single layer membrane over insulation and a metal deck; or
- Stone covered built-up roofing over insulation and metal deck.

Standing seam roof panels shall have a slope within the range of 1/2 to 1 inch of rise per 12 inches of run, but not less than required by local code. Standing seam roof decks shall have acoustical insulation built into the roofing panel or as a separate component of the roof system, placed directly below the roof panel. Minimum of R-19 fiberglass blanket insulation with UL 25 or less flame spread rating shall be used and attached to the ceiling with metal components such that there shall be no sagging. Standing seam roof panels shall have hidden (nonexposed) fasteners. Roof panel gage and shape of panels shall be sufficient to withstand all design loadings without excessive deflection or vibration.

Built-up and single membrane roof systems shall have a minimum slope of 1/4 inch per foot toward the roof drains. Roof drains with expansion joints shall be provided at the low edge of the roof and shall be located as determined by the detailed design. The roof drains shall be set in galvanized steel pans and flashed appropriately.

A membrane and roof expansion joint shall be used to separate areas where a major change in structural framing occurs.

Cant strips and vertical wood nailers shall be attached to the roof decks with expansion clearance from walls and parapets with insulation placed in the clearance space.

Snow guards shall be provided at all roof edges.

All gutters and downspouts shall be heat traced to minimize icing.

4.6.5 Metal Roll-Up Doors

Roll-up doors shall be constructed of interlocking roll-formed galvanized steel slats to withstand a minimum of 25 psf wind pressure. Roll-up doors shall be motor-operated with a manual chain operated backup feature. Provide uninsulated door curtains for the maintenance shop roll-up doors.

4.6.6 Hollow Metal Doors, Frames, and Hardware

Interior personnel doors shall be flush hollow metal on pressed steel door frames and shall include hinges, locksets, closers, weather-stripping, and accessory hardware. Fire doors and frames shall conform to NFPA 80 for the class of door furnished.

Doors shall meet the requirements of Steel Door Institute (SDI) - recommended specifications 100-91, Grade II, Model 2. Doors shall be heavy-duty seamless-composite construction using 18 gauge galvanized face sheets. Door frames shall be formed of 16 gauge steel to the sizes and shapes required.

Doors and frames in the outer limits of environmentally controlled areas shall be fully insulated. Where fire doors are required, the door, frame, and hardware shall bear a certification label from Underwriter's Laboratories for the class of opening and rating.

Exterior doors shall have roofs, awnings, or overhangs to protect personnel from snow.

All doors shall be finished with glass and glazing to help prevent the doors from being opened into oncoming traffic. Glass and glazing shall conform to the requirements for glazing materials for Category II products in accordance with the Safety Standards for Architectural Glazing Materials 16 CFR 1201, and installed in accordance with the publications of the Flat Glass Marketing Association.

4.6.7 Windows

Windows shall consist of aluminum frames with insulated and tinted glazing as used in commercial or industrial applications. The windows shall be weather tight including low-E insulated glass in thermally broken aluminum frames.

4.6.8 Louvers

Louvers shall be both the operable and inoperable types, fabricated of extruded-aluminum section alloy and provided with stainless steel fastenings and removable aluminum bird screen. Louvers shall have a paint finish meeting the specified finish requirements for the adjacent siding. Blades shall be storm proof. The louver-free area shall be a minimum of 50 percent of the louver face area. Louvers shall be designed for manual or gravity operation. Louvers shall be designed to meet wind loads.

4.6.9 Floor Finish

Floor finishes shall generally be concrete, steel troweled to a smooth surface and finished with a seal hardener.

Floors in personnel areas shall be unglazed ceramic tile in high traffic areas and commercial modular carpet tiles in offices and low traffic finished areas.

Exposed concrete finishes shall be repaired according to ACI 301-10, 5.3.7 - *Repair of Surface Defects*. Allowable hole size to be no greater than 1/4 inch.

The toilet facilities shall receive unglazed ceramic mosaic tiles.

4.6.10 Protective Coatings for Architectural Elements

Contractor shall prequalify all coatings and colors with Owner prior to purchase. See Section 03 - Facility Design Basis, Article 3.13.8 - Painting/Lining System Tables for coating requirements of structural elements (steel, concrete, and masonry block).

4.6.11 Doors, Roll-up Doors and Frames

All exterior doors (personnel) and frames shall receive Supplier's standard zinc-rich primer in the shop and finish coat in the field with a minimum ISO 12944 C5 coating classification, or equivalent door manufacturers recommended finish.

Roll-up doors shall be primed and finish coated in the Supplier's shop. Touch-up shall be performed as required with a compatible primer using SSPC-SP 3, Power Tool Cleaning standard.

Interior man doors (personnel) and frames that have both sides exposed to an interior environment shall receive Supplier's standard primer in the shop and finish coat in the field with an ISO 12944 C3 environment finish, or equivalent door manufactures recommended finish.

4.6.12 Masonry Walls and Concrete Floors

Surfaces exposed to chemical contaminants shall be coated with polyester- or vinylester-based coatings.

Concrete floors in electrical, DCS, and switchgear rooms shall have epoxy coatings and be static dissipative.

Exposed (visible) interior masonry wall surfaces in office areas shall have a surface preparation that is clean, dry and free of contaminants; a primer coat thickness rate per paint manufacturer of masonry filler; an intermediate coat (2-3 mils) of low gloss acrylic latex; and a finish coat (2-3 mils) of low gloss acrylic latex.

See Section 03 - Facility Design Basis, Article 3.13.8 - Painting/Lining System Tables for coating requirements of masonry block elements.

4.6.13 Gypsum Wallboard

Exposed surfaces shall receive one coat of sealer and two coats of compatible acrylic finish.

5 HVAC DESIGN CRITERIA

The following articles define the HVAC requirements for the Facility buildings.

5.1 DESIGN CONDITIONS

Climatic conditions for the design of HVAC systems shall be based on the criteria listed in Section 2 – Design Basis. The climatic data set from the 2013 ASHRAE Fundamentals Handbook shall be used for design calculations. For heating design the 99.6 percent parameters shall be used. For ventilation design, the 0.4 percent design parameters shall be used. For air conditioning design, the 1.0 percent parameters shall be used.

5.2 DESIGN REQUIREMENTS

In addition to the codes and standards listed in Section 2 – Design Basis, the HVAC systems shall be designed to the following specific codes and standards:

Acoustics Society of America (ASA)

S12.2 Criteria for Evaluating Room Noise

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American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

- 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- 55 Thermal Environmental Conditions for Human Occupancy
- 62.1 Ventilation for Acceptable Indoor Air Quality
- 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings

Sheet Metal & Air-Conditioning Contractors' National Association (SMACNA)

- 006 HVAC Duct Construction Standards - Metal and Flexible

Buildings, enclosures, and interior spaces shall be heated, ventilated, and air-conditioned, to provide proper environmental control to meet equipment protection and safety requirements as well as to provide personnel comfort in areas normally occupied. For areas that are not continuously occupied, the HVAC systems shall be designed to provide a minimum level of personal comfort when maintenance activities are being performed.

The following areas shall be designed to maintain the minimum conditions as listed below:

INDOOR DESIGN CONDITIONS					
Building/Room Name	Cooling Design Temp, F	Heating Design Temp, F	System Type	Redundancy	Filtration
Offices & Administration Areas	72	72	HVAC	Multiplicity	Yes
Control Room	72	72	HVAC	Redundant	Yes
DCS Rooms, UPS Rooms, Electronics Rooms	72	72	HVAC	Redundant	Yes
Laboratory Rooms / Sample Panel Rooms	72	72	HVAC Exhaust	Multiplicity	Yes
Electrical Equipment Rooms	85	55	HVAC	Multiplicity	Yes
Battery Rooms	77 ±2	77 ± 2	HVAC Exhaust	Multiplicity	Yes
Turbine Building	Ambient + 20	45	H&V	Multiplicity	None
Water Treatment Bldg, Feedwater Pump Bldg, Gas Compressor Bldg, Aux Boiler Bldg	Ambient + 15	55	H&V	Multiplicity	None
Warehouse	Ambient + 15	55	H&V	Multiplicity	None
Workshop	Ambient + 15	72	H&V	Multiplicity	None

Notes:

1. Systems with multiplicity shall be configured as (n+1) redundancy. Redundant systems shall be configured with full backup (100 percent) capability redundancy.
2. Filtration requirements shall be in accordance with the recommendations of ASHRAE 62.1. Filters shall be at least a MERV 6 rating.
3. Electrical equipment rooms shall not exceed 104 °F (40 °C) under any operating condition during the loss of one item of HVAC equipment.

5.2.1 Air Changes

Air changes per hour for the administration building, control room, remote offices, laboratory rooms, and other occupied areas shall comply with ASHRAE 62.1.

Battery rooms shall have sufficient fresh airflow to maintain less than 0.8 percent hydrogen concentration in the room based on manufacturer's data for hydrogen gas release.

5.2.2 Design Pressure

The pressure in individual portions of the Administration Building shall be maintained positive in relation to the exterior, storage areas, vehicle maintenance/garage areas, and the vestibules. Toilet rooms, janitor's closets, and any other similar areas shall be maintained negative and exhausted directly to the outdoors with respect to adjacent building spaces. Administration areas (excluding areas that are exhausted to the outdoors) may use plenum returns, however all items in the ceiling to be plenum rated.

5.2.3 Hours of Operation

The Facility is a 24-hour per day operation. Contractor is responsible for coordinating with Owner to determine the areas/buildings that may utilize some type of night set-back or ventilation reduction.

5.3 COMBUSTION TURBINE AND STEAM TURBINE BUILDING

The ventilation philosophy shall be designed to use displacement ventilation (thermal buoyancy) concepts.

The building roof shall use a continuous ridge vent (or equivalent for flat roofs) to release air to the outdoors. The ridge vent shall include motorized dampers, bird screen, and weather hood to prevent precipitation from entering the building. Low velocity makeup air to the building shall be provided from makeup air units. The makeup air units shall consist of intake damper, inlet filters, redundant fans, and indirect natural gas fired or electric heaters. The makeup air units shall be shop fabricated assemblies. Each makeup air unit shall be capable of increasing the makeup air to above freezing during cold ambient conditions to prevent localized freezing of equipment and piping systems inside the building. Ductwork and diffusers shall be used along the perimeter of the building to supply makeup air at grade, mezzanine, and operating deck levels as needed. Provide sufficient capacity in the makeup air unit sizing, such that the loss of one makeup air unit does not affect overall building temperatures (localized affects are acceptable near the unit that is out of service). The size of the makeup air units shall be sufficient to limit the number of wall penetrations. Makeup air units shall be fully accessible around the perimeter for inspection and maintenance activities.

Localized areas within the building that require spot cooling shall be ventilated using circulating fans.

5.4 WATER TREATMENT BUILDING

The water treatment building shall be ventilated using power wall ventilators with a continuous ridge vent on the roof for exhaust. The ventilators shall be located at grade to allow access for maintenance.

Natural gas fired or electrical unit heaters shall be located within the building to provide heating. The heaters shall be positioned as close to grade/floor as allowed by equipment or structures, and not causing personnel hazards.

The office and laboratory room located in the building shall be provided with a ground-mounted packaged HVAC system to provide complete temperature and humidity control for personnel comfort and equipment protection.

5.5 BATTERY ROOMS

Battery Rooms shall be under negative pressurization and vented directly to the outdoors by exhaust fans. Battery room temperature shall be based on manufacturers' recommendations for life and charging considerations. Battery rooms shall be provided with HVAC to maintain a temperature of 77 ± 2 °F. Rooms shall be exhausted by 2 x 50 percent exhaust fans.

Provide a hydrogen sensor in the battery room with an externally mounted alarm and control panel outside the room (Sensidyne SensAlarm plus or equal). High hydrogen levels or loss of ventilation shall alarm on the local panel.

5.6 ADMINISTRATION BUILDING AND CENTRAL CONTROL ROOM

The Administration Building HVAC systems shall be in accordance with the recommendations of ASHRAE standard 90.1. The Administration Building HVAC systems shall use a VAV type design that incorporates energy recovery of the exhausted air. HVAC units shall include outdoor air economizers for use in cold weather operation.

The HVAC system shall be provided with zone temperature control. Interior control zones must not exceed 600 sf per zone for open office areas or a maximum of four offices per zone for closed office areas. Exterior perimeter zones on north, south, east and west sides of the building shall be separate zones. Corner offices shall be a dedicated zone. Perimeter zones shall not exceed 300 sf. Independent zones should be provided for spaces such as conference rooms, entrance lobbies, kitchen areas, and physical fitness areas.

The Control Room and associated adjacent electronics rooms located inside the Administration Building shall be provided with a separate redundant HVAC system from the administration area's system to provide complete temperature and humidity control for personnel comfort and equipment protection. Failure of any major piece of HVAC equipment shall not cause a failure of the Control Room's or equipment room's HVAC operation.

All HVAC controls shall be designed as direct digital control (DDC). Provide a "front end" computer with all control software including a graphics package that provides visual, on-screen graphics to locate control points and features for the Administration Building and Central Control Room systems.

Prepare floor plans for seating numbers to determine individual space design occupancies. These occupancies shall be incorporated in the load calculations. Heat producing office equipment shall be coordinated with Owner as the design progresses. Calculations shall be in accordance with the ASHRAE Handbook of Fundamentals. Internal equipment gain shall not be used as part of the heating load calculations (loads are not modeled to allow lowering of the base heating load). For the cooling load calculations, the people load is assumed at peak occupancy levels for each space.

HVAC systems shall be designed to limit noise. The systems shall be designed for a NC40 level in accordance with ANSI/ASA S12.2.

5.7 MAINTENANCE/WAREHOUSE BUILDING

The maintenance office shall be provided with a packaged HVAC system. The warehouse workshop area shall be provided with heating and ventilation. Provide a welding booth in the workshop with dedicated ventilation system to remove welding fumes from the building. The welding booth shall be 6 feet wide, 9 feet tall, and 4 feet deep.

5.8 HEATING, VENTILATION AND AIR-CONDITIONING EQUIPMENT

HVAC rotating equipment (AHUs, ACUs, CDUs, and fans) shall be vibrationally isolated from their supporting structures and shall be purchased completely assembled, tested and balanced by the manufacturer. HVAC equipment and systems shall be designed such that components which require maintenance are easily accessible.

All HVAC systems that require ductwork shall be designed to utilize low-pressure ductwork. All ductwork shall be tightly sealed, and rigidly supported. Supply and return ductwork serving air-conditioned areas shall be internally lined in accordance with SMACNA installation details for the entire distribution system. Exhaust systems in air-conditioned areas does not require insulation. Ductwork in non air-conditioned areas does not require insulation. Ductwork in the Administration Building or any other room or area with finished spaces shall be installed in the walls and ceiling and not exposed to view.

Smoke and fire dampers as well as fire rated caulks and sealants for fire rated wall penetrations associated with the ductwork shall be included in the design as required by NFPA and Building Codes.

Ducted systems shall be flow tested and balanced.

6 FIRE PROTECTION

The Facility shall be equipped with a fire protection system that will provide fire protection for the buildings.

The fire protection system is comprised of the fire water supply, water-based fire suppression systems, alarm and detection system, clean agent systems, and portable fire extinguishers.

6.1 CODES AND STANDARDS

In addition to the codes and standards listed in Section 2 – Design Basis, the fire protection systems shall be designed to the Rhode Island Fire Safety Code and the following specific codes and standards:

National Fire Protection Association (NFPA)

NFPA 1	Fire Prevention Code
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 11	Standard for Low-, Medium-, and High-Expansion Foam
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 15	Standard for Water Spray Fixed Systems for Fire Protection
NFPA 16	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
NFPA 20	Standard for the Installation of Stationary Pumps for Fire Protection
NFPA 22	Standard for Water Tanks for Private Fire Protection
NFPA 24	Standard for the Installation of Private Fire Service Mains and their Appurtenances
NFPA 25	Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

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NFPA 30	Flammable and Combustible Liquids Code
NFPA 54	National Fuel Gas Code
NFPA 55	Compressed Gases and Cryogenic Fluids Code
NFPA 56	Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm and Signaling Code
NFPA 73E	Standard for Safety in the Work Place
NFPA 75	Standard for the Protection of Electronic Computer/Data Processing Equipment
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 85	Boiler and Combustion Systems Hazards
NFPA 90A	Standard for the Installation of Air-Conditioning and Ventilating Systems
NFPA 101	Life Safety Code
NFPA 110	Standard for Emergency and Standby Power Systems
NFPA 170	Fire Safety and Emergency Symbols
NFPA 220	Standard on Types of Building Construction
NFPA 241	Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 400	Hazardous Materials Code
NFPA 750	Standard on Water Mist Fire Protection Systems
NFPA 780	Standard for the Installation of Lightning Protection Systems
NFPA 850	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
NFPA 2001	Standard on Clean Agent Fire Extinguishing Systems

6.2 GENERAL

All fire protection materials or services that require approval in accordance with NFPA shall be FM or UL approved. The "Authority Having Jurisdiction" shall be the State Fire Marshal. Contractor is responsible for contacting the AHJ and determining if any local codes or rules apply to the Facility. All recommendations of NFPA 850 shall be considered as required in the design of the Facility unless specified differently herein.

6.3 FIRE PROTECTION DESIGN BASIS DOCUMENT

Contractor shall prepare a fire protection design basis document (DBD) in accordance with NFPA 850, Chapter 4 and submit to Owner prior to sending to the AHJ. The approved DBD shall be periodically updated during the design phase of the Facility (including the buildings) and reissued.

6.4 FIRE ALARM AND DETECTION

The custom-designed fire alarm and detection system shall be in accordance with NFPA 72. The fire alarm system shall be an intelligent addressable type using FlashScan™ signaling

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line or equivalent circuits. Contractor shall provide a master Fire Alarm Control Unit (FACU) located in the Central Control Room (CCR). All local FACUs shall be connected to the master FACU.

Local FACUs shall accept signals from initiating devices or other FACUs, alarm in the CCR, and process the signals to determine the required output functions, such as provide local alarms and annunciation and/or initiate release of the fire suppression systems.

The CT local FACU shall be connected to the master FACU.

Smoke detection systems shall be provided in the areas specified herein, and as recommended by NFPA 850. Aspirating type smoke detectors shall be provided for electronics and electrical rooms.

Contractor shall provide a shared public address/emergency notification capability into the master FACU. Loud speakers and other notification devices shall be placed throughout the Facility to allow both emergency communications, and regular employee paging. Contractor shall provide the following functionality:

- Speakers shall be located such that paging and emergency announcements can be heard throughout the Facility.
- Ability to make an announcement on the system using the Business Telephone System

6.5 FIRE WATER SUPPLY

The Facility's fire water supply shall come from the Service/Fire Water Storage tank. Contractor shall review and verify the suitability of the water supply to meet the Facility's requirements.

A motor-driven fire pump, diesel-driven fire pump, and a motor-driven jockey pump shall be provided in accordance with NFPA 20. The diesel-driven fire pump shall use ultra low sulfur diesel fuel. The fire pumps shall take suction from a dedicated water volume in the service/fire water storage tank and discharge to the service main (yard loop).

The pumps shall supply the design maximum water demand for any automatic suppression system plus flow for fire hydrants or hose stations per NFPA 850 requirements. The pumps shall have a 10 percent or 10 psi margin on head, whichever is greater.

The electric-motor and diesel-engine-driven fire pumps shall incorporate both manual and automatic start features. A manual start switch shall be on the associated local pump controller and on a mimic panel located in the CCR master FACU. Automatic start shall be initiated by pressure switch in accordance with standard NFPA practice. Once started, the pump(s) shall continue to run until manually stopped at the associated local pump controller. A jockey pump shall be provided to maintain water pressure in the fire water main. During fire conditions, the motor-driven fire pump shall start automatically when pressure in the fire water distribution header drops below a set point. If the pressure in the header continues to drop, the diesel engine fire pump shall automatically start.

6.6 FIRE SERVICE MAINS

The main fire header shall loop around the Facility with service main branch lines to buildings, auxiliary structures, enclosures, yard fire hydrants and water-based suppression systems. The fire service main shall be designed to NFPA 24.

Underground piping material shall be HDPE or ductile iron. Above ground piping material shall be carbon steel. The service main piping minimum size shall be 10 inches.

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Buildings with fire suppression systems shall have dual feeds from the loop system to ensure both systems are not taken out of service due to a single line break.

Header valves for suppression system isolation should be provided with electronic feedback to the fire control panel. Header PIV are to be provided without tamper switches.

6.7 FIRE PROTECTION SYSTEMS

The table below outlines the minimum fire detection and suppression systems to be provided for the Facilities buildings and structures.

Area or Equipment	Suppression System	Detection
CT enclosures	Clean Agent or Water Mist	Cross Zoned Heat Detectors
ST Building: ground floor, mezzanine, and platforms subject to oil flow, oil spray, or oil accumulation	Wet Pipe Sprinkler	Frangible Bulb
ST Building - above the operating floor	Portable Extinguishers	Local Smoke and/or Heat Detectors
Electrical Rooms (switchgear, MCC, etc.)	Portable Extinguishers	Aspirating Smoke Detector
Administration building	Wet pipe Sprinkler	Smoke Detection and Frangible Bulb
Central control room	Portable Extinguishers	Smoke Detection
Maintenance Workshop	Wet Pipe Sprinkler	Frangible Bulb
Warehouse	Wet Pipe Sprinkler	Smoke Detection and Frangible Bulb
Water Treatment building	Wet Pipe Sprinkler	Frangible Bulb
Feedwater Pump Building	Wet Pipe Sprinkler	Frangible Bulb
Auxiliary Boiler Building	Portable Extinguishers	Smoke Detection
Gas Compressor Building	Wet Pipe Sprinkler	Frangible Bulb
Diesel Fire Pump Room	Wet Pipe Sprinkler	Frangible Bulb

6.8 WATER BASED FIRE SUPPRESSION SYSTEMS

Sprinkler and fixed spray systems shall be designed and installed in accordance with NFPA 13 and NFPA 15, respectively. Water Mist Fire Protection may be proposed as an alternative.

6.8.1 Steam Turbine

Sprinkler systems for the steam turbine shall be designed to Factory Mutual Data Sheet 7-101.

The Power Island turbine building ground floor shall be provided with containment walls and drainage in accordance with NFPA 850 Article 5.5. Trench drains shall be used to contain and remove lube oil from the building and minimize the size of fire sprinkler areas within the turbine building. Containment walls shall be provided under and around the STG to prevent the spread of burning lube oil to other areas, in accordance with the insurance provider’s requirements.

In addition to the NFPA codes, the sprinkler systems for the steam turbine shall be designed to Factory Mutual Data Sheet 7-101. The following deviations and corresponding alternates to FM Global Data Sheet 7-101 are to be provided:

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Section	FM Scope Description	Alternate Scope to be Provided
2.2.4.2	Locate oil conditioning systems in a cut-off room of 1 hour construction or outside the turbine building.	Oil conditioning systems to be located on grade floor of the Steam Turbine Building. No cut-off room is required.
2.2.2.1	Provide enhanced fire resistance for structural steel.	Not required if lube oil conditioning skid is located at grade (Concrete turbine pedestal, lube oil reservoir at grade, building steel exposure mitigated by curbing and drainage).
2.2.3.1	Provide an engineered spill containment and emergency drainage system that shall "contain and drain" mineral oil released from lubrication oil systems. Ensure containment is adequate for the quantity of oil in the reservoir.	The design includes drains to a permanent plant drain system that includes containment (oil/water separator) with electric driven pump discharge per NFPA 850 requirements.
2.2.3	Design emergency drainage capacities and floor pitch (to drains) in accordance with FM Global Property Loss Prevention Data Sheet 7-83, <i>Drainage Systems for Ignitable Liquids</i> , or equivalent design criteria, to provide a discharge flow rate equal to the combined water spray and sprinkler demand plus 750 gpm hose stream.	NFPA based 500 gpm hose stream criteria shall be utilized for supply and drainage flow rates.
2.2.5	Control, Seal, and Lube oil Piping	Steam turbine manufacturer's standard piping design shall be used.
2.3.5.F	Provide automatic sprinkler protection for cable trays where quantity presents significant fire loading.	Automatic sprinkler protection of cable trays is not to be provided.
2.4.1.1	Provide a water supply capable of meeting the maximum design sprinkler discharge flow rate plus 750 gpm for hose streams.	NFPA 850 criteria of 500 gpm shall be used. This exception applies across Data Sheet 7-101.
2.4.1.3	Install automatic sprinklers in accordance with Data Sheet 2-0, <i>Installation Guidelines for Automatic Sprinklers</i> . Install automatic water-spray systems in accordance with Data Sheet 4-1N, <i>Water Spray Fixed Systems, for Fire Protection</i> .	NFPA design basis to be used.
2.4.1.10	If fire pump(s) are needed, use FM Approved fire pumps, controllers and drivers as applicable. Install them in accordance with recommendations in DS 3-7, <i>Fire Protection Pumps</i> . If electric motor driven pumps are used, supply power from a source that shall not be interrupted in the event of loss of power to the Station.	NFPA design basis to be used.
2.4.2	Provide one of the following protection methods over oil pumps and conditioning equipment where pressurized releases could result in spray fires that could expose the roof, operating floor, turbine, generator, or other critical targets	Subparagraph D shall be used - FM approved spray shields on flanges of piping shall be provided.
2.4.4.1.b	Provide a fixed, automatically actuated water spray system with directional-spray nozzles or automatic sprinkler protection for the control oil system containing mineral oil.	An FM approved fire resistant fluid shall be utilized, therefore a spray water system is not to be provided.

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Section	FM Scope Description	Alternate Scope to be Provided
2.4.4.3	Direct Connected Exciter Enclosure CO2 system.	A CO2 based protection system is not to be provided for the static excitation design.

6.9 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

Clean agent suppression systems shall be designed in accordance with NFPA 2001.

Clean agent systems shall use INERGEN or NOVEC. Halon is prohibited. Carbon dioxide suppression systems shall not be applied without Owner approval for their use.

6.10 FIRE EXTINGUISHERS

Portable multipurpose dry chemical extinguishers shall be located throughout the Facility. These extinguishers shall be sized, rated, and spaced in accordance with NFPA 10. Supplemental CO₂ extinguishers having a minimum rating of 20B:C shall be located to serve electrical equipment rooms and control rooms.

EXHIBIT C



- NOTES:**
1. WETLANDS DELINEATION PROVIDED BY ESS GROUP, INC., WALTHAM, MA. SURVEY CONDUCTED JULY 2015.
 2. SURVEY PERFORMED BY WATERMAN ENGINEERING COMPANY, EAST PROVIDENCE, RI. SURVEY DRAWING: REVISED SUBDIVISION_12.06.16.DWG
 3. SET-BACK FROM FUTURE CONSTRUCTION. ROW FOR SINGLE OR DOUBLE CIRCUIT.
 4. SEE DRAWING C1002 FOR CONSTRUCTION LAYDOWN EXTENTS AND REQUIREMENTS.

- LEGEND**
- INDICATES EXISTING PROPERTY LINES FROM SURVEYOR
 - INDICATES PROPOSED PROPERTY LINES BY HDR
 - INDICATES EXISTING DELINEATED WETLANDS
 - INDICATES CONSTRUCTION LAYDOWN EXTENTS
 - INDICATES SECURITY FENCE
 - INDICATES A80 AQUIFER ZONE

SITE ARRANGEMENT
 SCALE: 1" = 250'-0"
 NORTH



ISSUE	DATE	DESCRIPTION	EDC	ASH	DWM	-
1	04/17/17	REVISED FOR PERMIT	EDC	ASH	DWM	-
			DWN	ENGR	CHK	APPV

**PRELIMINARY
 NOT FOR
 CONSTRUCTION
 OR
 RECORDING**

**CLEAR RIVER ENERGY LLC
 CLEAR RIVER ENERGY CENTER**

SITE ARRANGEMENT	
FILENAME	C1000-0GA-238926.dwg
SCALE	AS NOTED
SHEET	238926-0GA-C1000