

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE: INVENERGY THERMAL DEVELOPMENT LLC's :
APPLICATION TO CONSTRUCTION THE : DOCKET No. SB-2015-06
CLEAR RIVER ENERGY CENTER IN :
BURRILLVILLE, RHODE ISLAND :

THE TOWN OF BURRILLVILLE'S DATA REQUESTS TO
INVENERGY THERMAL DEVELOPMENT LLC
(BY TOPIC)

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NOISE

1-1 Please explain in detail whether the proposed facility will fully comply with the Town's noise ordinance.

RESPONSE:

As explained in Section 6.9 of our Energy Facility Siting Board Application, noise produced during normal operation of the CREC facility will comply with the A weighted limits in the Town of Burrillville noise Code of Ordinances. CREC must also conform to levels approved by the Rhode Island Energy Facilities Siting Board, ("EFSB"). The Project performed an evaluation of the Town of Burrillville's Code of Ordinances, as it relates to the noise performance standard in an effort to arrive at a noise level design goal that was both respectful of the Code's intent to protect the community from excessive noise, yet commercially feasible to achieve and consistent with previous EFSB approvals. The Town of Burrillville noise Code of Ordinances, which generally limits both broadband (A-weighted) to an equivalent level of 43 dBA and specific octave-band Facility noise levels at nearby residences, (see Table 1 below). The Town of Burrillville's Code, however, also states that is not applicable in instances where "[t]he facility generating the noise has been granted a permit or license by a federal and/or state agency and the authorization to operate within set noise limits". The CREC Project proposes to comply with the same stringent noise limit imposed by the EFSB on Burrillville's Ocean State Power Project (and other EFSB approved projects), namely the broadband A – weighted limit of 43 dBA at the closest residence.

The Burrillville noise limits, specifically in the low-frequency octave-bands (31.5 Hz, 63 Hz, and 125 Hz), are among the most stringent that we have seen in the United States. Compared to octave band noise limits used in other US jurisdictions (*see Table 1*), the Burrillville Ordinance is significantly more restrictive. This is particularly relevant since low-frequency emissions are generally more difficult to mitigate than are high-frequency noise emissions. Invenergy Thermal Development, LLC ("Invenergy") examined the design approaches needed to comply with the Town's octave band ordinance. Achieving the broadband portion of the code (43 dBA) is feasible for normal operation modes, by using extensive controls as shown on Table 9, including placing the combustion turbines within buildings. Achieving the octave band limits was not feasible for all octave bands during normal or transient operating modes. Attaining the unusually restrictive octave-band limits was found to require extraordinary mitigation measures that were determined to be technically infeasible. Invenergy performed an evaluation of the noise produced during transient operating modes and the type of controls that would be needed to meet the broad band requirements. The Transient Noise Level Evaluation Report is included as **Exhibit A**. For normal operations, the expected octave band noise is shown on Table 1, which shows the Clear River Energy Center ("CREC" or the "Project") expected octave band and A weighted noise levels.

Table 1: Octave-Band Noise Level Limits by Other Regulating Bodies (dB)										
Frequency	Octave-Band Center Frequency (Hz)									A-Weight
	31.5	63	125	250	500	1000	2000	4000	8000	
Appleton, WI¹	74	73	68	63	57	51	46	42	39	60
Fairfax County, VA²	70	69	64	59	53	47	42	38	35	55
Illinois State³	69	67	62	54	47	41	36	32	32	51
New Jersey State⁴	86	71	61	53	48	45	42	40	38	50
Portland, OR⁵	68	65	61	55	52	49	46	43	40	55
Seminole County, FL⁶	68	67	66	59	52	46	37	26	17	55
CREC	60.1	61.8	54.4	43.7	37.6	35.1	27.7	12.7	0	43
Burrillville, RI	53	52	48	44	40	37	33	29	28	43

As shown on Table 1, which is a summary of the data included in Appendix E, the CREC expected octave band limits are below the limits stated in the Town Code for all but three of the levels corresponding to the lower octave bands. The octave band noise limits listed for other US jurisdictions (*Table 1*), where found based on a search of similar ordinances that included octave band limits. The list is not presented as a complete list but rather as a representative list of ordinances that have such stipulations. The noise expected for transient modes of operation are discussed in the response to question 1.5.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

1 - Appleton Municipal Code, Chapter 12, Article IV; 2001. Limit for industrial emitter onto residential zone between 10 p.m. and 7 a.m.

2 - Fairfax County Code, Chapter 108, Article 4; 1976. Limit for any noise source at residential receiver.

3 - Illinois Administrative Code, Title 35, Part 901; 2007. Limit for industrial (Class C) emitter to residential (Class A) receiver between 10 p.m. and 7 a.m.

4 - New Jersey Administrative Code, Title 7, Chapter 29; 2012. Limit for industrial emitter to residential receiver between 10 p.m. and 7 a.m.

5 - Portland City Code, Title 18; 2010. Limit for continuous industrial emitter to residential receiver between 10 p.m. and 7 a.m. Octave bands are enforced at the discretion of the Noise Control Officer.

6 - Seminole County Land Development Code, Chapter 30, Part 68; 2014. Limit at industrial property lines abutting residential districts.

NOISE

1-2 Please explain in detail whether and to what extent the facility will seek relief from the Town's noise ordinance limitations.

RESPONSE: The Project will comply with the A –Weighted broad band limit of 43 dBA which is consistent with approved EFSB Orders for other power plants. This limit will apply to normal steady state operation of the Project. The Project will seek relief from meeting all of the octave band limits for normal operations and from achieving the A –Weighted broad band limit of 43 dBA for transient modes. The expected transient noise limits are shown in our response to question 1.5.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-3 Please explain in detail the difference in expected noise levels between start up and shut down operations and normal operations.

RESPONSE CREC operation is expected to be typical of other base load power generation facilities and should be running at normal operating level more than 80% of the time. This means that start up and shut down will be somewhat frequent events occurring typically once a month during winter and summer conditions and once a week or even daily during the spring and fall. Noise produced from the various components will vary depending upon the plant load and its mode of operation. Noise produced from these components is from motors, pumps and ancillary equipment skids, as summarized in Table 1.3.1 which was included in the Noise Evaluation report included as Appendix E in the EFSB application and modified to show number of components operating or their percent load during normal and start up or shut down conditions.

Table 1.3.1: Major Sources of CREC Noise		
Equipment Description *Denotes located indoors	Normal Operations⁷	Start Up/Shut Down
H Class combustion turbines	2	30% - 50%
Steam Turbine generators	2	30%
Air Cooled Condenser (ACC) - 18 Cells	2	50%
Ammonia Forwarding Pump	1	50%
Ammonia Injection Skids	2	50%
Auxiliary Boiler Building	1	100%
Auxiliary Transformers	2	2
Boiler Feedwater Pumps	2	50%
Closed Cooling Water Heat Exchangers	2	2
Condensate Pumps	2	2
Combustion Turbine Air Inlet Filter Housings	2	2
Combustion Turbine Lube Oil Modules	2	2
Combustion Turbine Enclosure Ventilation Fans	2	2
Combustion Turbine Exhaust Diffusers	2	50%
Demin Water Pumps	2	25%
Fuel Gas Compressor After Coolers	2	1
Fuel Gas Dew Point Heater	1	1

⁷ - Quantity active during full load operation. For pumps and compressors installed in sets of 2 or 3, it is assumed that one set will be reserved for backup and remain on standby.

Fuel Gas Metering and Regulating Station	1	1
Generator Step-Up Transformers	2	2
Heat Recovery Steam Generators (HRSG)	2	50%
Steam Turbine Bypass Valves	0%	6
HRSG Duct Burner Skids	2	0%
HRSG Exhaust Stack	2	50%
HRSG Piping and Valve Systems	2	50%
Miscellaneous Small Transformers	8	8
Roof-Mounted HVAC Fans	21	21
Scanner Cooling Air Blowers	2	0%
Service Water Pump	1	1
Vacuum Pumps	2	1
Waste Water Pump	1	1

The above table indicates the expected number of components that will operate during normal conditions and during start up and shut down. The expected noise for these two modes of operation and other transient modes of operation is included in the response to Question 1.5 below.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-4 Please explain in detail the expected noise level that will be generated during steam releases.

RESPONSE: Steam releases are considered an upset or emergency condition which is not expected to occur and if it does, it should be an infrequent event. The noise level at the nearest residence is predicted to be 49 dBA.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-5 Please explain in detail the expected noise levels that will be generated during (a) normal operations, (b) startup operations, (c) normal shut down operations, (d) steam releases, and (e) emergency shut down operations. Please provide details for both natural gas operations and fuel oil operations. Please identify the models used to project the noise levels during each such phase of operations (a) through (e).

RESPONSE: As indicated in Section 6.9 of Invenergy's EFSB application and on page 28 of Appendix E a three-dimensional, computer-generated acoustical model of operations activities was developed using SoundPLAN® 7.3/7.4 and industry-standard prediction methods to estimate noise levels at nearby receivers. Noise levels during CREC operations are outlined in the attached report and summarized below:

- a. The expected noise levels that will be generated during normal operations, 43 dBA
- b. Startup operations, 46 dBA
- c. Normal shut down operations, 45 dBA
- d. Steam releases, 49 dBA
- e. Emergency shut down operations, 50 dBA

The noise levels for fuel oil operations are expected to be identical to the noise produced during natural gas operations since fuel oil operations would require the oil pumps and associated water injection pumps to operate in lieu of the gas compressor and all of these pumps are located indoors

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-6 Please explain in detail all noise suppression/mitigation efforts that are being proposed by the facility.

RESPONSE: As indicated in Section 6.9 of Invenergy's EFSB application and on page 34 of Appendix E, the proposed extensive acoustical design of the CREC includes;

- installation of the combustion turbines and steam turbines within buildings;
- high-performance silencers installed within the air intake ductwork of the combustion turbines to reduce high-frequency (spectral) compressor and turbine blade aerodynamic noise;
- silencers installed on fans providing ventilation air for the combustion turbine enclosure compartments;
- low-noise air cooled condensers and closed cooling water heat exchangers;
- combustion turbine exhaust diffuser is located within the building;
- combustion turbine exhaust noise attenuated via the SCR/HRSG units and high-performance exhaust stack silencers;
- auxiliary boiler FD fan intake silencer banks;
- low-noise GSU transformers; thicker casings for the HRSG boilers and transition ducts;
- buildings enclosing the auxiliary boiler, gas compressors, boiler feed water pumps and water treatment equipment;
- acoustical enclosures over the duct burner skids; acoustically louvered ventilation openings for the auxiliary boiler and generation buildings;
- the installation of a low-noise steam bypass system including low-noise valves and steam discharge stack resisters (disk stack);
- silencers on startup vents, blowdown and drains tank vents; and silencers on safety release vents.

The specific noise attenuation features included in the CREC design were shown on Table 9 of Appendix E, shown below:

Table 9: Proposed Acoustical Design	
Equipment Item	Control
Air Cooled Condenser	Low-Noise Design
Auxiliary Boiler	Enclosed within a Building
Auxiliary Boiler FD Fan Intake	High-Performance Duct Silencer Banks
Auxiliary Boiler Louvered Ventilation Openings	Acoustical Louvers
Auxiliary Boiler Startup Vent and Blowdown Tank	Vent Silencers
CCW Heat Exchanger	Low-Noise Design
Combustion Turbine Air Intakes	High-Performance Air Intake Silencers
Combustion Turbine	Enclosed within a Building
Combustion Turbine Ventilation	Ventilation System Silencers
Combustion Turbine Exhaust Diffusers	Enclosed within a Building
Combustion Turbine Exhausts	Exhaust Mitigated via SCR/HRSGs and High-Performance Exhaust Stack Silencers
Duct Burner Skids	Acoustical Enclosures
Fuel Gas Compressors	Enclosed within a Building
Generation Building Louvered Ventilation Openings	Acoustical Louvers
GSU Transformers	Low-Noise Design
HRSG Blowdown Tanks	Vent Silencers
HRSG Boiler Feedwater Pumps	Enclosed within a Building
HRSG Boilers and Transition Ducts	Thicker Casing
Steam Safety Release Vents	Vent Silencers
Steam-Turbine	Enclosed within a Building
Steam turbine bypass system	Low Noise valves and steam discharge stack resisters
Steam Turbine Drains Tank	Vent Silencers
Water Treatment Equipment	Enclosed within a Building

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenenergy

DATE: March 31, 2016

NOISE

1-7 Please explain in detail the additional noise to be generated by the proposed on site compressor.

RESPONSE: The noise generated from the on-site gas compressor has been included in Invenergy's estimate for the Project, as such there will be no additional noise generated from the on-site gas compressor. The compressor will be located in a building which will have necessary acoustical features to meet the noise limits CREC is proposing.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-8 Please explain whether the facility will be able to maintain compliance with the Town's overall 43 dBA noise limit (applicable at the nearest houses) during all non-emergency operating conditions, including most importantly, normal startups and shut downs.

RESPONSE: Please see response to questions 1.2 and 1.5 above.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy.

DATE: March 31, 2016

NOISE

1-9 Please explain why is there no mention of the potential noise impact during normal startup and shut down in the noise section of the permit application.

RESPONSE: Invenergy considered noise during start up and shut down to be a transient condition. The start and shut down plant design and expected noise levels that would result from those operating scenarios are dependent upon the Power Island equipment supplier, which had not been selected at that time. The specification for the Power Island ("PI") equipment included requirements related to the noise levels; however, Invenergy needed specific design details from the bidders and the selected PI supplier in order to fully determine expected noise for this mode of operation. It was always our intent to provide this information when it was available.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-10 Does Invenergy, or its parent or related company, operate another combined cycle plant that uses an air cooled condenser (ACC)? If so, please identify the plant and the noise mitigation installations in each such plant.

RESPONSE: Invenergy does not have any other combined cycle plants that use ACCs in operation. ACCs use a series of fans that blow air over a heat exchanger, (much like an automobile's radiator) and the fans and heat exchangers are arranged in cells. The attenuation features that are utilized on ACCs are low noise fans, which are specially designed fan blades that operate at a lower speed and are used in conjunction with the ACC heat exchanger surface, which is increased to accommodate the lower fan speed and remove the required heat.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-11 Do you agree that the noise generated during the steam turbine bypass phase of startup—when high pressure steam is injected directly into the vacuum of the main duct of the ACC is going to be extremely loud if no mitigation efforts are made? Please provide details.

RESPONSE: Yes, bypass operation can produce loud noise if not properly designed. The bypass valves will be located indoors and will utilize low noise design features so as to achieve the predicted levels.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-12 Please detail all steps Invenergy plans to take, such as for example, with the bypass valve, hogging air injector and drain vent, to maintain the sound level below 43 dBA during normal startups.

RESPONSE: The bypass valves will be located indoors and will utilize low noise design features, including low-noise valves and steam discharge stack resisters, so as to comply with the proposed limits. The vents from the hogging air ejector vent will include a silencer. Invenergy has taken reasonable steps to control noise levels during start up and shut down, and Invenergy anticipates that it can achieve 46 dBA.

RESPONDENT: Mike Hankard, Senior Acoustical Consultant, Michael Theriault Acoustics, Inc. and John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

NOISE

1-13 Please provide details regarding the expected noise to be generated by traffic (truck and other vehicles) during construction and routine operations.

RESPONSE: As indicated in Section 6.9 of our EFSB application and on page 31 of Appendix E, in general, it is anticipated that construction noise levels will be near or below current daytime ambient noise levels (L_{AEQ}) at residences. While construction noise is likely to be occasionally discernible, it is not expected to increase ambient noise levels significantly. The average individual is likely to tolerate construction noise given its temporary nature and that the majority of construction will take place during daytime hours (i.e., when the risk of sleep disturbance and interference with relaxation activities is low). Any nighttime or weekend construction activities will likely be similar to the ‘finishing’ phase of construction, which is typically 10 decibels lower than other phases. Also, the size of a nighttime/weekend work force would be significantly smaller than during typical daytime weekday hours, thereby further reducing noise levels. As such, construction of the CREC is not expected to result in any significant community noise impact. The noise levels from traffic during normal operations will be significantly less due to the much lower amount of traffic on the site.

RESPONDENT: John Niland, Director, Business Development, Invenergy and
Maureen Chlebek, P.E., PTOE, Senior Project Manager, McMahon
Associates

DATE: March 31, 2016

NOISE

1-14 Please identify the details of the expected noise to be generated during construction operations.

RESPONSE:

As indicated in Section 6.9 of our EFSB application and on page 30 of Appendix E, as summarized in Table 11 and Appendix N6, (*Construction Noise Modeling Results*) construction noise levels (L_{AEQ}) are predicted to range from a low of 27 dBA to a high of 53 dBA at residential receivers. These levels represent those observed outdoors, and a home or building would provide significant reduction. Specifically, noise levels within a home would be up to 27 dBA lower assuming closed windows. Even with open windows, indoor levels would be up to 15 dBA lower than levels observed outside.⁸

Table 11: Projected CREC Construction Noise Levels (L_{AEQ})*						
	Construction Phase					
Location	Grading & Excavation	Concrete Pouring	Steel Erection	Equipment Installation	Finishing	Existing Daytime Ambient Range (L_{AEQ})
M1	49	45	49	44	39	52 to 53
M2	53	49	53	48	43	50 to 52
M3	41	37	41	36	31	36 to 44
M4	47	43	47	42	37	50 to 51
M5	37	33	37	32	27	45 to 52
*Rounded to the nearest whole decibel						

As such, construction of the CREC is not expected to result in any significant community noise impact.

RESPONDENT:

John Niland, Director, Business Development,
Invenergy and
Maureen Chlebek, P.E., PTOE, Senior Project
Manager, McMahon Associates

DATE:

March 31, 2016

8 - Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, United States Environmental Protection Agency, Office of Noise Abatement and Control, USEPA Report 550/9-74-004 (March 1974).

NOISE

2-1 Table 1 on Page 7 of Appendix A (“Transient Operation Noise Level Evaluation for the Clear River Energy Center”, Michael Theriault Acoustics, Inc., March 2016) contains the expected near field sound pressure levels at various points along the air cooled condenser (ACC) duct during steam turbine bypass. Could you please explain the source or derivation of the values specifically associated with the following sources:

- a. ACC Main Horizontal Ducts
- b. ACC Riser Ducts
- c. ACC Finger Ducts
- d. HRH Steam Bypass Ducts
- e. LP Steam Bypass Ducts

Invenergy Resp. 2-1: The source of values for the various ducts listed in Table 1 on Page 7 of Appendix A (“Transient Operation Noise Level Evaluation for the Clear River Energy Center”, Michael Theriault Acoustics, Inc., March 2016) was based on a combination of:

1. Field measurements of ACC ducts at a similarly designed, combined-cycle combustion turbine energy center while in steam turbine bypass mode during startup operations; and
2. Manufacturer’s noise level data for ACC duct radiated noise using low-noise bypass valve systems under specific start-up flow conditions for the equipment proposed at the site.

Respondent: Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

2-2 Will the facility use a steam jet air ejector or vacuum pumps for condenser vacuum hogging during start-up?

Invenergy Resp. 2-2: The facility will utilize both vacuum pumps and steam jet air ejector (SJAE) technologies. Vacuum pumps, located inside a building, will operate during start up to create the initial vacuum and once the plant is operating the SJAE's will maintain condenser vacuum for normal operations. The vent flow from the SJAE's is directed to the SJAE condenser, (a shell and tube heat exchanger located inside the building) which collects and condenses the steam and which allows any air to be exhausted to the outside. The flow of vented air will be relatively small since this is primarily non-condensable gases (i.e., air) removed from the steam cycle during unit operation. The flow will vent to atmosphere through a silencer mitigated to a level sufficiently low so as to achieve design objectives.

Respondent: John Niland, Director, Business Development, Invenergy LLC
Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

2-3 Will the steam turbine drains tank discharge directly into the vacuum of the ACC duct to preserve demineralized water or will it vent to atmosphere?

Invenergy Resp. 2-3: The steam turbine drains tank will be vented to atmosphere, so as to avoid introduction of additional air into the ACC duct. There will be a small loss of steam from the tanks, which was accounted for in the plant's water balance. This atmospheric vent was included in the noise modelling and mitigated to a sufficiently low level as to comply with design objectives. Condensate that collects in this tank will be pumped to the condensate collection system.

Respondent: John Niland, Director, Business Development, Invenergy LLC
Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

2-4 Will either or both of the hot reheat (HRH) and low pressure (LP) bypasses join the ACC duct inside the turbine building or outside?

Invenergy Resp. 2-4: The HRH and LP bypass valves will be housed within the steam turbine building or in separate enclosures in order to minimize their off-site noise emissions. The interface between the HRH/LP bypass ducts and the ACC inlet duct is expected to be outside the steam turbine building, which is the configuration assumed in the noise model.

Respondent: John Niland, Director, Business Development, Invenergy LLC
Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

2-5 What is the anticipated sound power level of each ACC fan? Is the make and model known at this point? If so, please identify the make and model.

Invenergy Resp. 2-5: ACC noise levels used in the model translate to a total sound power level of 112 dBA or to 50 dBA at 400 feet, (after accounting for wind wall shielding and fan directivity). Assuming an 18-cell arrangement, the PWL per fan is 99 dBA (0 degrees from vertical). The ACC is modeled as two separate area sources located at the expected height of the of the fan deck , (rather than modeled as individual fans). The EPC contractor will be responsible for procuring the ACC, which has not yet been purchased at this stage of project development. Thus, individual fan model information is not available.

Respondent: Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

2-6 The noise modeling analysis suggests that the best sound level that can be realized at Receptor M1 during a normal start-up is 46 dBA. Does that mean that Invenergy believes that compliance with the overall 43 dBA Town Ordinance (neglecting the octave band component) cannot be achieved?

Invenergy Resp. 2-6: The original noise analysis considered start up a transient event not subject to the 43 dBA limit. As detailed in our March 2016 report, significant efforts were expended to achieve 46 dBA or less at nearby residences during start-up. We further confirm that 43 dBA at nearby residences can also be achieved during startup operations.

Respondent: John Niland, Director, Business Development, Invenergy LLC
Michael Theriault, Michael Theriault Acoustics, Inc.

Date: April 20, 2016

NOISE

4-30 Is there available sound generating equipment or a machine that can demonstrate the 45 decibel sound level?

4-30 Section 7.1 and the Wetlands Addendum make numerous additional references to mitigation, but all of the measures discussed other than the hypothetical land conservation or wetland creation ratios are, in fact, avoidance or minimization measures. Does the Applicant anticipate that a true mitigation proposal will be submitted prior to DEM's deadline for submitting a revised Advisory Opinion to the EFSB? If so, what is the Applicant's anticipated timeline for submitting this proposal?

ORIGINAL

RESPONSE 4-30: As noted in Section 7.1 of the Application to Alter Freshwater Wetlands, the Applicant will develop a Compensatory Wetland Mitigation Plan following the NED Compensatory Mitigation Guidance in cooperation with resource agencies. Based on an inventory of parcels of conservation interest developed by RIDEM and provided to the IRP proponents as well as a GIS overlay of elements in the Rhode Island Conservation Opportunities and local Assessors Maps, the Applicant has generated a confidential comprehensive list of parcel potentially suitable for preservation. The Applicant is currently investigating the willingness of current land owners to sell their property. Once completed, the Applicant intends to work with RIDEM and the USACE to determine which parcel(s) appear best suited to offset Project related wetland impacts.

It is anticipated the Compensatory Wetland Mitigation Plan will include a description of Project impacts, objectives, mitigation site selection procedures, site protection information, and monitoring standards in addition to all required graphics and information. At this time, it is anticipated that the final mitigation package will primarily consist of land preservation and possibly some restoration should a viable Project be identified. CRE is working to supply the mitigation package prior to RIDEM's supplemental advisory opinion deadline, which is expected to be in the month of July.

SUPPLEMENTAL

RESPONSE: Attached as **Exhibit Supplement 4-30** is a "Draft Sweet Hill Farm Desktop Habitat Assessment", prepared by ESS Group, Inc., which has been provided to the USACE and RIDEM for review. The purpose of this assessment was to characterize the existing site conditions to evaluate its suitability to satisfy the compensatory wetland mitigation requirements for the CREC and BIP projects through land preservation.

This preliminary assessment, which was based on a desktop review of publicly available site information, concluded that the property appears to provide an excellent opportunity for habitat conservation in northwestern Rhode Island, and is likely well suited as a preservation parcel to offset the impacts from the CREC and BIP projects. ESS Group, Inc. has subsequently conducted field investigations at the site and is working to coordinate a joint site walk with the USACE and RIDEM to get their feedback on the suitability of the site for compensatory mitigation through land preservation.

ESS Group, Inc. will incorporate the results of the site field investigations conducted, along with any feedback received as a result of the agency site walk, into a Final Compensatory Wetland Mitigation Plan for the CREC and BIP projects to be filed with the USACE and RIDEM for approval.

RESPONDENT: Jason Ringler, ESS Group, Inc.

DATE: May 2, 2018

NOISE

6-8 Please explain in detail how the adjacent gas compression station noise levels will impact the noise levels of the power plant (what will the projected combined noise levels be)?

RESPONSE 6-8 Noise levels for the Burrillville Compressor Station (“BCS”) are estimated to range from 43 to about 51 dBA depending on load conditions at BCS. The maximum noise level produced by CREC will not exceed 43 dBA at this same location. As such, CREC’s maximum noise level (43 dBA) is 8 decibels lower than BCS’s maximum noise level (51 dBA). With Clear River Energy Center (“CREC”) operating at maximum load (43 dBA) and BCS operating at maximum load (51 dBA), the combined noise level will be 52 dBA or 1 decibel higher than without CREC operating. A one decibel increase is barely perceptible under laboratory conditions. With CREC operating at maximum load (43 dBA) and BCS operating at low loads (43 dBA), the combined noise level will be 46 dBA or 3 decibels higher than without CREC. This evaluation is for the residences along the Wallum Lake Road.

RESPONDENT: Mike Theriault, Michael Theriault Acoustics, Inc.

DATE: May 11, 2016

NOISE

Request 27-33 **If there are any blow-offs of natural gas, what will be the maximum dBA of such an event? Please include the maximum dBA levels at the closest residents' property lines as well as the maximum dBA level at Invenergy/CREC property lines.**

RESPONSE 27-33 If this event occurred, it would last for a short while (a few seconds to at most a minute or two), and the noise levels for this emergency condition would be 50 dBA at most at the nearest residence. Please refer to the March 2016 Transient Noise Level Evaluation that shows the noise contours during an emergency steam release condition. Gas vents will be silenced similar to steam vents, so noise emissions will be similar.

RESPONDENT: Michael Hankard, Hankard Environmental, Inc.

DATE: July 18, 2017

NOISE

Request 27-41

What is the noise (dBA) difference between:

- (a) “normal operations” of 1 Turbine firing ULSD/1 turbine firing natural gas and 2 turbines firing ULSD?
- (b) “normal operations” of 2 turbines firing natural gas and “emergency shutdown” of 2 turbines firing natural gas?
- (c) “normal operations” of 2 turbines firing natural gas and “normal shutdown” of 2 turbines firing natural gas?
- (d) normal operations” of 2 turbines firing natural gas and “startup” of 2 turbines firing natural gas?
- (e) “normal operations” of 1 turbine firing natural gas/1 turbine firing ULSD AND “emergency shutdown” of 1 turbine firing natural gas/1 turbine firing ULSD?
- (f) “normal operations” of 1 turbine firing natural gas/1 turbine firing ULSD and “normal shutdown” of 1 turbine firing natural gas/1 turbine firing ULSD?
- (g) “normal operations” of 1 turbine firing natural gas/1 turbine firing ULSD and “startup” of 1 turbine firing natural gas/1 turbine firing ULSD?

RESPONSE 27-41

- (a) As part of the analysis of transient operations, noise levels from the CREC operating on fuel oil were found to be identical to those produced when the facility is being gas-fired. There is some oil related equipment that comes on line, such as pumps, but some of the gas related equipment goes off line. None of this equipment produces as much noise as the larger components of the CREC that operate identically under both gas and oil operation. Thus, there is no acoustical difference between oil and gas operations. Therefore, there is no change in noise level between normal operations of 1 turbine firing ULSD and 1 turbine firing natural gas, and 2 turbines firing ULSD.
- (b) Noise levels from the CREC during emergency operations were described in the March 2016 Transient Noise Level Evaluation. As described therein, two “emergency” situations might occur on the order of once per year. First, an “emergency shutdown” could occur, and during this event additional noise is expected from the discharge of energy into the air-cooled condenser (“ACC”) duct, as well as the opening of one emergency steam release vent. In the design of the

CREC, noise from the ACC duct has been significantly mitigated, and all emergency steam release vents have silencers. The dBA difference between this emergency shut-down and normal operations is about 7 dBA, with the shut-down being louder. Second, noise levels from just one emergency steam release vent being opened were modeled, but in this case assuming the facility does not shut down. The dBA difference between this emergency steam release and normal operations is about 6 dBA, with the steam release being louder.

Note that the noise levels for typical (non-emergency) start-up and shut-down published in the March 2016 Transient Noise Level Evaluation report have been revised downward due to additional noise controls being added to the design of the CREC. As testified to the Town Board in June 2016, noise levels during typical start-up and shut-down conditions will be 43 dBA or less at all nearby residences.

- (c) As described in the Transient Noise Level Evaluation report, noise levels during typical shut-down operations are expected to be less than start-up levels. Current modeling indicates that start-up levels will be 43 dBA or less, and typical baseload operations will be 2 dBA lower than that. Therefore, shut-down levels will be about 42 dBA or less, which is 1 dBA higher than normal baseload operations.
- (d) Start-up noise levels are expected to be approximately 2 dBA higher than normal baseload operations.
- (e) Same as (b), above, as oil and gas operations are acoustically equivalent.
- (f) Same as (c), above.
- (g) Noise levels during start-up are expected to be about 2 dBA louder than normal operations under any configuration of oil and gas fired units.

RESPONDENT: Mike Hankard, Hankard Environmental, Inc.

DATE: July 18, 2017

NOISE

Request 27-42 **Please provide data on the noise levels of diesel tankers/trucks along Wallum Lake Road in respect to the residents living along this portion of the route. Please give details (i.e., actual noise values at offset intervals).**

RESPONSE 27-42 Section 16-43 of the Town of Burrillville Code of Ordinances limits noise from trucks to 86 dBA when traveling 35 miles per hour (mph) or less, and 90 dBA when traveling faster than 35 mph. These levels are measured at a distance of 50 feet from the center of the travel lane. A typical level used in acoustical modeling is 85 dBA at 50 feet. This is the level expected at the homes that are 50 feet from the road. The level would drop to about 80 dBA at a distance of 100 feet, and 70 dBA at 200 feet.

RESPONDENT: Mike Hankard, Hankard Environmental, Inc.

DATE: July 18, 2017

NOISE

Request 27-45 **What steps will Invenergy/CREC take (e.g., add technology) to reduce the low-octave band/low frequency noise at the Facility? Please explain.**

RESPONSE 27-45 A significant number of steps have been taken to reduce CREC noise levels in the low octave bands. Almost all of the noise mitigation measures included in the design of the CREC reduce noise across the frequency spectrum, including the lower octave bands. The measures that have a significant impact on low frequency noise include a low-noise air cooled condenser, placing the auxiliary boiler in a building, enclosing all turbines and associated equipment inside an acoustically designed building, high performance exhaust stack silencers and acoustical treatment of the HRSG panels.

RESPONDENT: Mike Hankard, Hankard Environmental, Inc.

DATE: July 18, 2017

NOISE

Request 39-6 **If potential noise violations occur on site, how will CREC address those concerns? Specifically, what process and procedure(s) will be used to address a potential violation? Will monitoring be used and, if yes, where and what measures will be employed?**

Response 39-6 If, after commencing commercial operation, a noise complaint is received from the community, an initial investigation will take place to determine the credibility of the complaint. For example, is the noise coming from somewhere that, based on distance, the Facility is expected to be audible? Was the Facility running at the time of the complaint? Are other sources the cause of some or all of the noise? Assuming the complaint is legitimate, an acoustical consultant would be hired by the Facility to conduct measurements at the site of the complaint(s). This typically involves a combination of attended measurements over the course of a few nights and/or leaving a monitor to collect longer-term noise levels (e.g. weeks). Measurements may also be conducted concurrently closer to the Facility, or at the Facility, to identify specific noise sources.

If Facility-only noise levels are determined to be greater than 43 dBA, the investigation would continue to determine what mitigation measure(s) are necessary to bring the facility into compliance. Noise testing would be repeated after installation of mitigation to demonstrate that compliance is achieved.

Note, as further explained in my September 1, 2017 Rebuttal Testimony (Pages 2-3), noise level compliance testing will be conducted during commissioning of the Facility to demonstrate compliance. Accordingly, if exceedances are found, modifications will be made to install the proper noise mitigation measures and compliance will be re-demonstrated prior to commercial operation. This, in addition to designing a quiet Facility in the first place, is in an effort to minimize the potential for complaints.

RESPONDENT: Michael Hankard, Hankard Environmental, Inc.

DATE: October 13, 2017

NOISE

Request 39-7 **Will noise from the facility potentially be affected by weather or atmospheric conditions? Does noise from the facility have the potential to “travel” beyond the perimeter of the facility and impact areas of the community some distance from the perimeter of the facility? If yes, please elaborate.**

Response 39-7 Yes, noise propagating away from the Facility through the atmosphere will always be affected by weather and atmospheric conditions. And yes, noise will travel across the perimeter of the Facility. The degree of impact is judged by meeting the Town’s low noise limit. Given that the Facility has been designed to meet the limit, and that it will demonstrate the same, no significant impact is expected in the community due to noise from the Facility.

As described in more detail in the October 2015 Noise Level Evaluation Report, filed with the Board as an attachment to Invenergy’s Application, the acoustical model used to design the noise mitigation features of the Facility is based on atmospheric conditions very conducive to sound propagation. (Section 3.4, Pages 29-30) Specifically, all receivers are assumed to be downwind of the Facility, absorption of sound by the atmosphere is assumed to be at its lowest, no attenuation due to propagation through trees is assumed and a moderate temperature inversion is assumed to be present. During a temperature inversion, sound waves are bent back toward the ground thus increasing noise levels over what would have been experienced otherwise. Thus, the model represents “worst case” atmospheric conditions. Noise levels are expected to be lower than those reported a majority of the time.

RESPONDENT: Michael Hankard, Hankard Environmental, Inc.

DATE: October 13, 2017

TRAFFIC

1-13 Please provide details regarding the expected noise to be generated by traffic (truck and other vehicles) during construction and routine operations.

RESPONSE: As indicated in Section 6.9 of our EFSB application and on page 31 of Appendix E, in general, it is anticipated that construction noise levels will be near or below current daytime ambient noise levels (L_{AEQ}) at residences. While construction noise is likely to be occasionally discernible, it is not expected to increase ambient noise levels significantly. The average individual is likely to tolerate construction noise given its temporary nature and that the majority of construction will take place during daytime hours (i.e., when the risk of sleep disturbance and interference with relaxation activities is low). Any nighttime or weekend construction activities will likely be similar to the ‘finishing’ phase of construction, which is typically 10 decibels lower than other phases. Also, the size of a nighttime/weekend work force would be significantly smaller than during typical daytime weekday hours, thereby further reducing noise levels. As such, construction of the CREC is not expected to result in any significant community noise impact. The noise levels from traffic during normal operations will be significantly less due to the much lower amount of traffic on the site.

RESPONDENT: John Niland, Director, Business Development, Invenergy and
Maureen Chlebek, P.E., PTOE, Senior Project Manager, McMahon
Associates

DATE: March 31, 2016

TRAFFIC

- 1-15 Please provide any study or other information in Invenergy's possession regarding traffic issues that may arise during and after construction, including identifying the access road that will be used during and after construction, the location and details of the proposed road(s), and the impact of traffic on the neighborhood during and after construction.**

RESPONSE:

As stated in Section 3.9.1 of our EFSB application, the Project will convert an existing dirt road/path to a new site access road that will connect the Facility to the Wallum Lake Road (Route 100). This road is designed as a Class A road to handle equipment loads during and after plant construction. The access road is shown on Figure 3.4-3 of the EFSB application. Traffic issues that may arise during and after construction are discussed in Section 6.8 of our EFSB application. The Project will commence construction in the first quarter of 2017, and the expected construction duration is 30 months with commercial operation in June of 2019. Construction personnel will consist of construction craft (laborers, welders, etc.) and staff (professional staff, engineers administrative, etc.). Figure 6.8-1 shows the Heavy Haul and Main Road, Wallum Lake Road, the New Entrance Road, proposed parking and the equipment laydown area. Most staff traffic will occur between 6:00am-7:00 am with change of shift at 5:00pm-6:00pm. Staff will peak at approximately 150 people in the second quarter of 2018. Craft will also peak at 440 people the second quarter of 2018.

The operation of the Facility will have minimal, if any, impact on traffic. Employees will commute to and from the Facility on a daily basis but these vehicle trips will be spread out over multiple work shifts. There will daily deliveries of supplies and equipment but such deliveries will be intermittent. There will be delivery of ULSD by truck to the Facility when ULSD is fired; however as described previously this will likely occur no more than a few days per year so any impact on traffic resulting from such deliveries would be temporary. Invenergy is committed to identifying and mitigating potential traffic related issues associated with the construction and operation of the Facility. Invenergy and its contractors will coordinate closely with the Rhode Island Department of Transportation ("RIDOT") and the Town of Burrillville to develop and implement a pragmatic Traffic Management Plan ("TMP"). The TMP will alleviate the impacts of an increase in traffic volume in a predominantly rural community. Invenergy is devoted to working with the Town of Burrillville to maintain the safety and wellbeing of its citizens and the integrity of its infrastructure throughout the construction and operation

of this Project. Invenergy has engaged the services of a Expert Traffic consultant who will supplement this response when the report he is preparing is finished.

RESPONDENT: John Niland, Director, Business Development, Invenergy and
Maureen Chlebek, P.E., PTOE, Senior Project Manager, McMahon
Associates

DATE: March 31, 2016

TRAFFIC

4-3 How many trucks will be traveling Town roads during construction of this project?

RESPONSE 4-3: Truck traffic during construction will vary depending on the phase of the project. The estimated number of trucks that will access the site for various phases of construction are listed below:

- A. Mobilization Phase: an average of 12 trucks per day.
- B. Underground Work Phase: an average of 15 trucks per day.
- C. Aboveground Work and Equipment Delivery Phase: an average of 15 trucks per day.
- D. Demobilization Phase: an average of 12 trucks per day.

Further details on the anticipated truck traffic are included in Section 6.8 of the EFSB Application. Invenergy Thermal Development LLC (“Invenergy”) is having a traffic study prepared that will be provided to the Town of Burrillville when it is completed.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Maureen Chlebek, McMahon and Associates

DATE: April 27, 2016

TRAFFIC

5-5 Please provide a complete traffic study, including all traffic impacts, potential truck routes, and restrictions.

RESPONSE 5-5: Section 6.8 of the EFSB Application detailed the expected traffic impacts from the CREC during construction and operation. A supplemental traffic study for the project is currently being completed with input from the Town of Burrillville. Invenergy will work with the Town to develop and implement a pragmatic Traffic Management Plan to minimize project traffic impacts.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Maureen Chlebek, McMahon Associates

DATE: April 28, 2016

TRAFFIC

6-1 With the increase in traffic through densely settled areas, what is the increased risk statistically of accidents and risk of a hazmat spill?

RESPONSE 6-1 As part of the traffic study, traffic increases due to the proposed Clear River Energy Center (“CREC”) were estimated for both the construction phase (for which we used the construction phase that generates the most trips) and for the post-construction operational phase when the plant is fully constructed.

Crash data was provided by the Town of Burrillville for the following locations on Route 100:

- Pascoag Main Street
- South Main Street
- Church Street

Crash rates were calculated for Route 100 in Burrillville. The accident rate for a roadway segment represents the number of accidents that occur per million vehicle miles traveled. The accident rates were then applied to the projected traffic conditions for the construction phase and the operational phase of CREC. Assuming that the roadway and adjacent conditions do not change, and that only the traffic volumes are increased, the accident rate would remain consistent in these phases and the increased traffic is likely to result in approximately one additional accident during the construction phase with the highest level of trip generation and approximately one additional accident per three-year period during the operational phase.

To estimate the increased risk of a traffic-related hazmat spill as a consequence of the added traffic from the CREC, methodology based upon research conducted at the New Jersey Institute of Technology was utilized. The formula utilizes the following components:

- SS-The serious spillage rate, which was calculated based upon crash and traffic data to be 0.0017
- RL-The length of roadway
- AADT-The annual average daily traffic volume
- %HV-The percentage of heavy goods vehicles

Applying the formula to the existing conditions on Route 100 between the Gloucester/Burrillville Town line and the intersection of Church Street at Wallum Lake Road, the current probability of a serious spill is 0.22%. When the CREC is complete and operational, the added truck traffic will consist of a low volume of ammonia (approximately one delivery every two weeks) and oil trucks, which are only expected to be needed for a couple of days of the year when temperatures necessitate. With the increased truck traffic from the operational condition of the CREC, the probability of a serious spill does not increase and continues to be 0.22%.

During the construction phase with the heaviest volume of traffic, the probability of a serious spill increases to 0.23% with an estimated additional 69 vehicles per day of truck traffic. The increase of risk for a serious spill is 0.01% which is very low.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

6-2 What is the emergency response plan should a large tanker truck or other tractor trailer be involved in an accident and lose their cargo?

RESPONSE 6-2: In addition to notifying the local and state police, the Rhode Island Department of Environmental Management (“RIDEM”) Office of Emergency Response is contacted in the event of an environmental emergency. The RIDEM Hot-line can be contacted any time for any emergency. The delivery companies and CREC will work cooperatively with RIDEM in these events.

Furthermore, there are federal and state regulations that must be followed in order to transport hazardous materials. The US Department of Transportation Federal Motor Carrier Safety Administration mandates that the following information must be carried when transporting hazardous materials:

- The emergency response telephone number
- The emergency response information on the shipping paper that includes the description of material, immediate hazards to health, immediate methods for handling small or large fires and spills or leaks, preliminary first aid measures.
- All hazardous material transporters must have an appropriate placard on the outside of the vehicle.

Furthermore, the transport of materials to the proposed site is achieved along routes that allow hazardous material transport. Route 100 has good horizontal and vertical geometry and has wide shoulders. There are designated routes in Rhode Island that restrict the transport of hazardous materials and these routes are not in the project vicinity and not along the logical route to the site.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

6-3 Has any consideration been given to improving Jackson School House Road or Buck Hill Road and to use one as a bypass of the villages of Chepachet and Pascoag?

RESPONSE 6-3: In evaluating the surrounding street system, anticipated routes were identified for truck traffic and employee traffic. The truck traffic is expected to utilize the higher functional classification of roadways that are designed to handle higher levels of traffic. Jackson Schoolhouse Road is a winding, narrow roadway, often less than 24 feet in width, includes a portion of unpaved roadway, and generally abuts residential land use. Buck Hill Road is also winding and narrow (generally less than 26 feet wide) with adjacent residential land use. These two roadways are not preferred routes for truck traffic due to the narrow widths and curvature of the roadways.

There is potential that employees of the CREC may use these roadways if they originate from points west of the area. Using journey to work data, only 10% of the employment base is likely to be located in an area with a potential to use these roadways and this corresponds to approximately three additional vehicles in the peak periods when the development is fully built and occupied, most of which is likely to be passenger vehicles. During construction approximately 30 vehicles could potentially utilize Jackson Schoolhouse Road during both peak hours. It should be noted that the construction period is for a short duration. Given the small increase in traffic, these routes were not identified as candidates for roadway improvements.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

6-4 If Route 44 and 100 are the primary trucking routes for construction, what are the contingencies for compensation should homes be damaged by the impact of the truck traffic?

RESPONSE 6-4: A roadway assessment has been conducted to assess the current conditions of the construction trucking routes. The assessment focuses on Route 100 in Burrillville and Glocester. An assessment of Route 44 was not conducted due to its increased distance to the site and since the volume of trucks accessing the site will be less significant compared to the overall truck volumes experienced daily on Route 44.

The assessment will serve as a baseline for comparison of Route 100 roadway conditions after construction is completed. Roadway conditions will be monitored before, during and after construction in order to ensure that pavement conditions do not exist that could lead to damage to adjacent homes. The assessment is being coordinated with the Rhode Island Department of Transportation and coordination will continue during the construction cycle.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

6-5 Is there a plan to repair roads damaged by traffic from construction?

RESPONSE 6-5: A baseline inventory of pre-construction roadway conditions is already underway, and is focused on Route 100 in Burrillville and Glocester. Coordination has been initiated with the Rhode Island Department of Transportation (“RIDOT”) regarding the assessment. Upon completion of construction, any further deterioration or damage beyond what would normally be expected will be assessed in coordination with RIDOT.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

6-6 Where is the proposed laydown area? Has this location and its potential impact been included in the traffic studies?

RESPONSE 6-6: A laydown area is proposed within the Clear River site. The traffic study will include an evaluation of sight distance at the site driveway. There is potential to use an off-site laydown area during construction. A number of sites have been investigated. At this point, the off-site laydown area is likely to be at either the Port of Providence (35 Terminal Road, Providence, RI) or Quonset Development Corporation (QDC 95 Cripe Street, North Kingstown, RI).

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: May 11, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-1 Page 3: By what criteria were only the driveway and two unsignalized intersections identified for the study? Were no other intersections along the Route 100/Route 44 corridor affected by a 400 vph site traffic increase?

RESPONSE 13-1 The study area was chosen to focus on the major unsignalized stop-controlled intersections within the Town of Burrillville that will be most likely impacted by the proposed project due to their close proximity to the site and potential increased delays. The remaining major intersections to the south are under traffic signal control and along major arterial state numbered routes such as Route 44 where traffic volumes were found to be higher (15,590 vpd on Main Street (Route 44) vs. 6,500 vpd on Pascoag Main Street) and can handle additional volumes. In addition, the Route 102/Route 44 signalized intersection in Chepachet has been recently studied by the Rhode Island Department of Transportation (“RIDOT”) and is slated for a major intersection improvement project that will convert this intersection into a modern roundabout. Construction of this roundabout is expected to be completed by the end of 2017.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2017

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-2 Page 5: Is Main Street really 62 feet wide?

RESPONSE 13-2: On page 5 of the Traffic Impact Study, Main Street in Chepachet was inadvertently described as 62 feet wide. The correct dimension should be listed as 32 feet for a typical cross section including a 12 foot-wide travel lane in each direction and an eight foot-wide parking lane along the eastern side of the roadway.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-3 Page 7: The statement that the weekday afternoon peak hour of adjacent streets occurred between 5 p.m. and 6 p.m. (3rd paragraph) does not appear to be supported in the appendices. Please explain.

RESPONSE 13-3: The weekday afternoon peak hour was listed incorrectly as 5:00 PM to 6:00 PM on page 7 of the Traffic Impact Study. The statement should be revised to read: “The weekday afternoon peak hour of adjacent street traffic is shown to occur between 3:15 PM to 4:15 PM.” All of the traffic analysis included in the report was based on the correct peak hour of 3:15 PM to 4:15 PM and our conclusions remain valid.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-4 Page 8: How was the period (3:15 – 4:15) in the heading of the far right column determined? See 13-3 above.

RESPONSE 13-4: On page 8 of the Traffic Impact Study, the weekday afternoon peak hour of 3:15 PM to 4:15 PM was listed in the Automatic Traffic Recorder (“ATR”) Summary as this is the identified network peak hour that was analyzed in our traffic analysis. The network peak hour was identified by comparing the peak turning movement traffic volumes at the two adjacent intersections of Pascoag Main Street/Church Street and Pascoag Main Street/Sayles Avenue to see when the combination of traffic volumes at the two key study area intersections is the highest. In addition, it was also determined to be the network peak hour when comparing the weekday afternoon peak hour volumes from the seven ATRs that were collected on the various truck route roadways. It is standard practice to analyze a network peak hour of when the combination of adjacent roadway volumes and potential traffic increases with the project would coincide to assess potential traffic impacts during the worst peak hours of the day.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-5 Page 11: Route 100 / Route 44 roundabout: While no detours are anticipated, couldn't other traffic control strategies such as temporary lane blockage or temporary alternating traffic flow introduce traffic disruption and delays?

RESPONSE 13-5: While there is potential for alterations in traffic flow and other traffic control strategies during the construction of the Route 100/Route 44 roundabout, information on traffic control has not yet been released. It is our understanding that RIDOT will maintain traffic flow in both directions during construction. Vehicles traveling through the Route 100/Route 44 construction work zone in route to the project site will follow the traffic control measures set forth by RIDOT.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-6 Page 25: 3rd paragraph – Please clarify the PM Peak Hour (See 13-4 above).

RESPONSE 13-6: On page 8 of the Traffic Impact Study, the weekday afternoon peak hour of 3:15 PM to 4:15 PM was listed in the ATR Summary as this is the identified network peak hour that was analyzed in our traffic analysis. The network peak hour was identified by comparing the peak turning movement traffic volumes at the two adjacent intersections of Pascoag Main Street/Church Street and Pascoag Main Street/Sayles Avenue to see when the combination of traffic volumes at the two key study area intersections is the highest. In addition, it was also determined to be the network peak hour when comparing the weekday afternoon peak hour volumes from the seven ATRs that were collected on the various truck route roadways. It is standard practice to analyze a network peak hour of when the combination of adjacent roadway volumes and potential traffic increases with the project would coincide to assess potential traffic impacts during the worst peak hours of the day.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-7 Page 28: 2021 Construction Build, Pascoag Main / South Main – Please define the “short duration” of the degraded turning movement operation.

RESPONSE 13-7 We have described the degraded operation as “short duration,” meaning less than one hour. The site generated traffic includes a staff shift change, which generally surges and occurs in less than an hour, as opposed to occurring consistently throughout the peak hour.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-8 Page 28: 2021 Construction Build, Pascoag Main / South Main – How much of a decline in level of service would have been experienced had it NOT been conservative?

RESPONSE 13-8 The construction truck trips are expected to occur between 8:00 AM and 3:00 PM and the employee shift change is expected to occur between 5:00 PM and 6:00 PM. Realistically, these two trip types will never occur together, and the majority of these trips will never occur during the weekday afternoon peak hour. For purposes of providing a conservative traffic study, however, we assumed that 25% of the daily truck trips and all of the employee shift change traffic will occur during the weekday afternoon peak hour.

If we were to analyze the weekday afternoon peak hour from 3:15 PM to 4:15 PM with what is projected to occur, we would have no additional trips during the above ground construction phase. However, during the underground construction phase when concrete deliveries are allowed until 4:00 PM, there would be a minimal number of concrete trucks delivering between 3:15 PM and 4:00 PM and a negligible impact on peak hour traffic.

Since the construction employee trips are the highest volume of traffic added to the network and shifts are expected to change between 5:00 and 6:00 PM, it is expected that this time period will be affected. If the employee trips were added to this time period, it is expected that the northbound left turn movement would operate at level-of-service (“LOS”) E and under capacity. All other movements at this intersection are expected to operate at LOS C or better. LOS is a grading scale that measures the average amount of delay expected at an intersection approach. LOS E or better describes delays of less than 50 seconds at an unsignalized intersection.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-9 Page 29: 2021 Construction Build, Pascoag Main / Church – Please define the “short duration” of the degraded turning movement operation.

RESPONSE 13-9 We have described the degraded operation as “short duration,” meaning less than one hour. The site generated traffic includes a staff shift change, which generally surges and occurs in less than an hour, as opposed to occurring consistently throughout the peak hour.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-10 Page 29: 2021 Construction Build, Pascoag Main / Church - How much of a decline in level of service would have been experienced had it NOT been conservative?

RESPONSE 13-10 The construction truck trips are expected to occur between 8:00 AM and 3:00 PM and the employee shift change is expected to occur between 5:00 PM and 6:00 PM. Realistically, these two trip types will never occur together, and the majority of these trips will never occur during the weekday afternoon peak hour. For purposes of providing a conservative traffic study, however, we assumed that 25% of the daily truck trips and all of the employee shift change traffic will occur during the weekday afternoon peak hour.

If we were to analyze the weekday afternoon peak hour from 3:15 PM to 4:15 PM with what is projected to occur, we would have no additional trips during the above ground construction phase. However, during the underground construction phase when concrete deliveries are allowed until 4:00 PM, there would be a minimal number of concrete trucks delivering between 3:15 PM and 4:00 PM and a negligible impact on peak hour traffic.

Since the construction employee trips are the highest volume of traffic added to the network and shifts are expected to change between 5:00 and 6:00 PM, it is expected that this time period will be affected. If the intersection of Pascoag Main Street at Church Street were analyzed with the employee site trips added between 5:00 PM and 6:00 PM, the southbound approach is expected to operate at LOS E and under capacity. All other movements are expected to operate at LOS B or better. LOS is a grading scale that measures the average amount of delay expected at an intersection approach. LOS E or better describes delays of less than 50 seconds at an unsignalized intersection.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

**13-11 Page 30: Table 6 – Is there sufficient Intersection sight distance in both directions?
The table and text are unclear on this.**

RESPONSE 13-11 As noted in Table 6, the required intersection sight distance (“ISD”) to the west for left turning traffic is 640 feet and to the east for right turning traffic is 725 feet, based on the 85th percentile speeds. Based on our field measurements, there is over 1,000 feet of available sight distance to the east which exceeds the stopping sight distance (“SSD”) and ISD requirements. To the west, we measured approximately 580 feet of available sight distance which exceeds the requirements for SSD but is 160 feet short of the requirements for ISD.

Although it is desirable to meet both the SSD and ISD, meeting SSD is deemed acceptable by standard engineering practices since motorists approaching the site driveway have adequate time to react to a vehicle exiting the site driveway and safe conditions are maintained.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-12 Page 30: The last paragraph refers to adequate sight distance for heavy vehicle access, but the bottom of Page 29 states the design vehicle is a single unit truck. Are these the same vehicles?

RESPONSE 13-12 The sight distance evaluation conducted for this project was based upon the methodology published in “A Policy on Geometric Design of Highways and Streets” by the American Association of State Highway and Transportation Officials (“AASHTO”). According to these guidelines, heavy vehicle adjustments can be applied to the ISD criteria. There are not heavy vehicle adjustments for the SSD criteria in the AASHTO guidelines.

ISD can be adjusted for single unit trucks or for combination vehicles (trucks larger than single unit). For this project, the sight distance criteria was adjusted for a single unit truck since the majority of the truck traffic assessing the site is expected to consist of single unit trucks. Had we applied the ISD adjustment for combination trucks, the overall conclusions for ISD would remain the same. There are over 1,000 feet of available sight distance to the east, which will accommodate combination trucks, and 580 feet of sight distance to the west, which meets ISD for a passenger vehicle but does not meet ISD requirements for heavy vehicles. It should be noted that intersection sight distance is met for the passenger cars exiting the site, which is the majority of site traffic.

The driveway does meet safe SSD in both directions based on AASHTO guidelines. Stopping sight distance is a function of reaction time and braking distance and indicates that motorists have ample time to react to a vehicle exiting the site driveway.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: June 20, 2016

TRAFFIC

Regarding the “Traffic Impact Study for the Clear River Energy Center” dated May 2016 and prepared by McMahon Transportation Engineers and Planners:

13-13 The Traffic Impact Study notes Invenergy’s commitment to an appropriate level of restoration for roadway sections degraded by the construction-related traffic. Is Invenergy prepared to sign an agreement evidencing this commitment? If so, will Invenergy prepare such a proposed agreement and forward it to the Town’s attorneys?

RESPONSE 13-13 The truck route identified for this project involves roadways that fall under RIDOT jurisdiction. The proponent has proactively assessed the roadway conditions along the truck routes (Route 100) in Burrillville and Glocester, RI and has initiated coordination with RIDOT regarding the roadway conditions. RIDOT is in agreement with the approach to measure baseline roadway conditions, to monitor these roadways during construction, and to continue coordinate with RIDOT. To date, RIDOT has not required a formal agreement with the proponent. The proponent is required to obtain a Physical Alteration Permit (“PAPA”) from RIDOT for the curb opening on Route 100 at the site entrance, and such issues can be resolved during the permitting process.

RESPONDENT: Robert Smith, McMahon Associates

DATE: June 20, 2016

TRAFFIC

15-3 Do you have any specific traffic information available for accidents involving trucks, as opposed to automobiles, and what is your projection regarding the probability of increased truck accidents with the proposed facility?

RESPONSE 15-3: The vehicle type was obtained from the crash reports provided for the study horizon analyzed (2013-2015). From this data, it has been determined that within the truck route corridor from South Main Street at the Gloucester town line to Wallum Lake Road at the proposed site entrance, there were a total of 18 truck related crashes that occurred over this three year period.

The operation of the power plant proposes a small number of ammonia and oil deliveries over the course of the year. Oil is expected to be delivered by truck 3-4 times per hour over the course of several days on rare occurrences to the facility, and ammonia deliveries are expected by truck approximately twice per month (every 15 days).

Based on the existing daily number of trucks traveling on the truck route and the expected number of trucks expected to access the proposed site, there would be an increase of approximately 1% of truck traffic along the truck route to the proposed site. Based on this, it is expected that there would be a negligible increase (a small fraction of a vehicle) of truck crashes per year along this corridor.

RESPONDENT: Maureen McMahon, McMahon Associates
Robert Smith, McMahon Associates

DATE: August 19, 2016

TRAFFIC

22-5 Under the water plan, is it correct that water replenish rate after an oil fired operation event is 11 trucks per day, or 22 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-5 Yes, the traffic impact analysis, Appendix E of the Water Supply Plan assumes that approximately 11 trucks per day will access CREC to replenish the water tanks. This is not a guarantee, but it is a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-6 Under the water plan, is it correct that oil replenish rate after an oil fired operation event is 7 trucks per day, or 14 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-6 Yes, the traffic impact analysis, Appendix E of the water supply plan assumes that “approximately 7 trucks per day will access the CREC facility to replenish the oil tank.” This is not a guarantee, but it is a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-7 **Under the water plan, is it correct that you have assumed an oil run event duration for 3 days? What if there is an extended run of this power plant for more than 3 days while running on oil? Do you agree that this would increase the number of truck trips to and from the site during a week's time or longer? Please explain.**

RESPONSE 22-7 The quantity of water and oil stored on site would only allow for 3 days of continuous oil fired operations. It is not possible to replenish the tanks at a rate to support continuous oil operations beyond 3 days. Therefore, an extended run for more than 3 days on oil is not possible and the number of truck trips required for replenishment has been correctly addressed in the traffic study.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-9 **Under the water plan, is it correct that the average truck rate after an oil operation event will be 22 trucks per day new traffic or 44 trips to and from the site? Could this be exceeded? Please explain.**

RESPONSE 22-9 As discussed above in Invenergy Response No. 22-8, 22 trucks per day is expected but cannot be guaranteed.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-10 Under the water plan, is it correct that the traffic engineer assumes each truck carries 8,000 gallons per truck but the water host agreement indicates a truck is 7,200 gallons per truck? Do you agree that a recalculation of the traffic engineer's figures are needed, which will increase the truck figures identified above in items 1 through 9? Please explain and provide the recalculation.

RESPONSE 22-10 CREC expects to utilize trucks with an 8,000 gallon volume and the traffic engineer correctly assumed that volume in their traffic analysis. The truck capacity of 7,200 gallons referenced in the water supply agreement with the Town of Johnston was approximate and used for the purpose of generally describing typical operating conditions. It does not represent an obligation on either party. No recalculations are required.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-11 Under the water plan, do you agree that Table 2 of McMahon's traffic report is now underestimated due to estimated tanker truck size, and assumes only a 3-day operation event running on oil, so it technically is not the "worst case scenario"? Please explain.

RESPONSE 22-11 No, the truck count in Table 2 is not underestimated for the reasons explained in responses 22-7 and 22-10. The reference to worst-case scenario is a reference to a scenario where the tanks were depleted. The combination of water, oil and other trucks will be approximately 22 trucks per day to recover from such an event.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-13 Under the water plan, is it correct that Invenergy stated to the EFSB that 2 trucks per day on average will be needed to deliver water? However, Johnston's agreement indicates 3 trucks per day and up to 5 trucks per day will be needed on average to deliver water to the site. Do you agree that information to the EFSB needs to be amended accurately reflect which figure is correct? Please explain and amend as needed.

RESPONSE 22-13 Under the Water Supply Plan, Invenergy stated that: "The range in the number of truck deliveries for normal operations is typically 2 to 3 trucks per day." (Page 14).

The water supply agreement with the Town of Johnston, Section 2(a), entitled "Flow Rate," provides an estimate that contemplates that there will be times when truck deliveries cannot be made due to events such as adverse weather or holidays, so the agreement included language to account for these circumstances. The Agreement specifies that "CREC estimates that up to 3 truck deliveries per day will be required to satisfy expected water use needs of the Project. However, up to five (5) trucks a day may be necessary for certain operational occurrences and weather related impacts. This is the Average Demand Flow Rate." (Section 2(a)(i)). The 3 to 5 trucks per day is a reflection that there are varying plant operations and varying conditions in which trucks can be delivered. The information provided to the EFSB does not need to be amended.

RESPONDENT: Daniel Ewan, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-40 **The Trip Generation in the original report (May 2016) does not specifically reference an oil-fired event. Please explain in detail the assertion that the generated traffic from such an event has been reduced.**

RESPONSE 22-40 Page 16 of the Traffic Impact Study, dated May 2016, indicates the frequency of the oil trucks at 3 - 4 per hour. This would lead to 24 - 32 trucks in an 8 hour period.

The revised Plan states that there will be a total of 22 trucks (water, oil, ammonia, demineralized water, wastewater) per day over the replenishment period.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

22-42 What truck percentages were used in the previous signalized intersection analyses and in the updated analysis? Please explain.

RESPONSE 22-42 Both analyses report the worst-case-scenario conditions during the peak hours when the proposed site experiences a response to an oil fire event, which would require additional water and oil trucks to access the site. The Traffic Impact Study reports that following an oil fired event, trucks will access the site to a total of four trucks per hour during peak hours.

The supplemental analysis reported in the January 11, 2017 memorandum (Appendix E of the Water Supply Plan) reports that in an effort to reduce traffic impacts of the oil fired response trucks, oil replenishment will be extended over a longer duration, reducing the number of daily trucks and trucks that are expected to access the site during the peak hours. With the proposed water trucks as well as the oil fired response, it is expected that no more than three trucks would access the site during the peak hours. This decrease in daily and peak hour trucks was a result of the change in response duration for replenishing oil after an oil fired event.

The analysis was revised to reflect this change as were the truck percentages for the final build condition. Synchro analysis reports showing the difference in traffic volumes and truck percentages are attached as **Exhibit 3**.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-43 **Please provide the Synchro © (computer analysis) files for the signalized intersection analyses for both the current projections and the original projections.**

RESPONSE 22-43 Synchro report sheets for the final build condition from both the traffic impact study and January 2017 memorandum are attached as **Exhibit 3**. The reports show the input data used.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-49

CREC's traffic Consultant McMahon Transportation. Engineers and Planners has analyzed the intersection of Pascoag Main and South Main Street Intersection's Level of Service (LOS) and reported that it degrades to "E" during construction for "short periods." Please have the consultant re-evaluate this intersection for the water refill truck traffic both during construction and post-construction and during water and oil refilling operations and provide a copy.

RESPONSE 22-49

The peak construction period (FNTF - Underground) was analyzed as it is the busiest phase for construction vehicles. This third construction phase is expected to generate approximately 70 construction delivery trucks per day for the nine month duration, as described in the traffic impact study. The next phase of construction (FNTF - Above Ground), is expected to be the first phase where the water trucks will be needed at the proposed site. This fourth construction phase, however, is expected to generate approximately 25 construction vehicles per day, significantly lower than the expected 70 construction delivery trucks per day in the previous construction phase. Despite the addition of the water trucks to the fourth construction phase, the total number of trucks is still much less than the third construction phase.

The number of vehicles expected through the referenced intersection post-construction and during water fill and oil fill operations is less than during the peak construction period, and therefore, it is not necessary to evaluate that scenario.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-50 **Please have the CREC Traffic Consultant review and analyze tanker truck movements through the Pascoag Main/South Main Street and the Route 100 (Church Street) and High Street intersection because these movements require water tanker trucks to cross the centerline in order to make the turns and provide a copy. Please explain whether this movement will likely affect the LOS.**

RESPONSE 22-50 While a previous analysis of the truck movements through Pascoag Main Street intersections along the truck route show that a WB-50 truck would need to encroach over the centerline to traverse this route, there are only three trucks anticipated during the weekday morning and weekday afternoon peak hours during worst case conditions (during oil fired event response). For truck size, the analysis has been based on a WB-50, which also depicts a worst-case scenario. However, 8,000 gallon water delivery trucks can be of different sizes and axle configurations, and may be smaller than a WB-50 design vehicle. Typical conditions for the site result in only one truck per hour for the majority of site operations. Despite the WB-50 truck encroachment, there is not a significant impact on operations expected and the condition would last for a short duration. Additionally, if the trucks delivering to the site are smaller than the design vehicle (WB-50), a lesser encroachment would actually occur. Therefore, the LOS is not negatively changed from the prior report.

RESPONDENT: Robert Smith, McMahon Associates
 Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-51 **Please have the CREC Traffic Consultant review and report on the truck turning radii versus the road geometry. This needs to be revisited. Do you agree that Invenenergy/RIDOT will need easements to widen the radii at the Route 100 (Church Street) and High Street intersection, and that road geometry versus tanker truck turning radii will slow traffic and create roadway centerline conflicts at a confusing intersection? Please explain your answer.**

RESPONSE 22-51 This issue was discussed in detail in the previously conducted Intersection Review prepared for Church Street and Main Street in Pascoag, which was filed with the Town of Burrillville's Planning and Zoning Boards, and is attached as **Exhibit 5**.

It is unclear as to what additional analysis is being requested here.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-52 Please have the CREC Traffic Consultant review and report on the corner geometry versus turn radii at the Church Street corner adjacent to the Community Baptist Church and School. This intersection is 1,000 feet north of Route 100/High Street intersection.

RESPONSE 22-52 The roadway curve radius at this location measured graphically (without survey) along the existing Church Street centerline is approximately 160 feet. This is just above the 154 feet required for a curve with a design speed of 25mph (posted). RIDOT has installed a series of “chevron” type warning signs along the curve to alert drivers.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-53 **Please have the CREC Traffic Consultant review and report on the sight distances at the Route 100 corner at Serio's Pizzeria. There is an abandoned building that limits sight distances at this corner located 200 feet south of Lauren Hill/Route 100 Intersection.**

RESPONSE 22-53 While there may be an obstruction of sight lines from the driveway of the abandoned building, the condition is an existing condition that is not changed by the addition of the CREC. Sight distance from this driveway is controlled by the location of the building proximate to the road.

The roadway curve radius at this location measured graphically (without survey) along the existing Church Street centerline is approximately 140 feet. This is slightly below the 154 feet required for a design speed of 25mph, which is the posted speed at this location. RIDOT has installed a series of "chevron" type warning signs along the curve to alert drivers. We would recommend that RIDOT also consider adding advisory (20mph) speed plates to curve warning signs approaching the curve, as well as selectively trimming back vegetation along the southbound side.

RESPONDENT: Maureen Chlebek, McMahon Associates
Robert Smith, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-54 **Does the new cooling method increase the amounts of hazardous/contaminated materials such as ammonia, fuel, sewage, etc. to be transported over roadways through the Town and State? Please explain.**

RESPONSE 22-54 The cooling method has not changed. The air cooled condenser (ACC) has been a part of the original plan presented to the EFSB.

If this question pertains to the Water Supply Plan and the use of demineralized trailers, the use of demineralizer trailers will not result in the production of any hazardous/contaminated materials. There will be no increase in the use of ammonia, sewage or fuel that will need to be transported over roadways through the Town and State. The demineralizer trailers contain only ion exchange resins fully contained in their treatment vessels that will be transported from the Facility to the trailer demineralizer service vendor's facility for regeneration or renewal. Non-hazardous Facility wastewater will be transported by truck from the Facility to licensed treatment facilities where this wastewater will be treated for disposal. Transport of this non-hazardous wastewater by truck avoids use of the Town's local sewer system.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: February 14, 2017

TRAFFIC

22-55 What is the increased projection of accidents and spills which could occur by the increase in truck traffic at the four intersections/corners described above? Please explain.

RESPONSE 22-55 As previously described in comment responses to the Town dated May 11, 2016, traffic increases due to the proposed CREC were estimated for both the construction phase (for which we used the construction phase that generates the most trips) and for the post-construction operational phase when the plant is fully constructed.

Crash data was provided by the Town of Burrillville along Route 100, including the Pascoag Main Street, South Main Street and Church Street corridors. These roadways are inclusive of the two intersections on Pascoag Main Street and two horizontal curves previously described.

Crash rates were calculated for Route 100 in Burrillville. The crash rate for a roadway segment represents the number of crashes that occur per million vehicle miles traveled. The crash rates were then applied to the projected traffic conditions for the construction phase and the operational phase of CREC. Assuming that the roadway and adjacent conditions do not change, and that only the traffic volumes are increased, the crash rate would remain consistent in these phases and the increased traffic is likely to result in approximately one additional crash during the construction phase with the highest level of trip generation and approximately one additional crash per three-year period during the operational phase.

To estimate the increased risk of a traffic-related hazmat spill as a consequence of the added traffic from the CREC, methodology based upon research conducted at the New Jersey Institute of Technology was utilized. The formula utilizes the following components:

- SS-The serious spillage rate, which was calculated based upon crash and traffic data to be 0.0017 (number of crashes per million truck miles traveled)
- RL-The length of roadway
- AADT-The annual average daily traffic volume
- %HV-The percentage of heavy goods vehicles

Applying the formula to the existing conditions on Route 100 between the Glocester/Burrillville Town line and the intersection of Church Street at Wallum Lake Road, the current probability of a serious spill is 0.22%. When the CREC is complete and operational, the added truck traffic will consist of the ammonia, water, and oil trucks described in the January

2017 memorandum. With the increased truck traffic from the operational condition of the CREC, the probability of a serious spill does not increase and continues to be 0.22%.

During the construction phase with the heaviest volume of traffic, the probability of a serious spill increases to 0.23% with an estimated additional 70 vehicles per day of truck traffic. The increase of risk for a serious spill is 0.01% which is very low.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

TRAFFIC

22-56 **What size are ammonia containing delivery trucks? If the amount is increased, can ammonia containing trucks use an alternate route to the plant through a less populated area? The area along Route 100 from Steere Farm Road to Serio's Pizzeria is our most populated area in town, with two nursing homes (Bayberry Commons and Overlook Nursing Home) and two schools (Steere Farm Elementary and Baptist Community Church/School) within 1,500 feet of roadway. Please answer and explain.**

RESPONSE 22-56 Based on Invenergy's experience at other plants, a 6,200 gallon truck was used in the traffic analysis that was attached to the Water Supply Plan as Appendix E.

The options for delivery to the site are limited and depend upon the location of the supply. When an ammonia supplier is selected, the truck route for those particular deliveries can be finalized and if other options are viable, consideration will be made to take the route that is least invasive.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

TRAFFIC

25-1 **Please state whether Invenergy is planning to implement a reporting procedure to track the number of trucks to and from the facility that includes the daily/weekly/monthly maximum number of trucks. If not, please explain.**

RESPONSE 25-1 Standard plant operating procedures include maintaining a log of all the deliveries to the Clear River Energy Center (“CREC” or “Project” or “Facility”) once it is operational. This log could be used to report on the number of deliveries, if the Project is required to do so.

RESPONDENT: John Niland, Invenergy Thermal Development
 Amit Nadkarni, Invenergy Thermal Development

DATE: March 20, 2017

TRAFFIC

Request 27-7 **What are the possible routes of the following:**

- (a) ULSD tankers will take?**
- (b) Ammonia tankers will take?**
- (c) Hydrogen Tube Trailers will take?**
- (d) Demineralization trailers will take?**

RESPONSE 27-7 **Exhibit 27-7** details the routes from potential suppliers for ULSD, Ammonia, and Demineralizer Trailers. Currently, Invenergy has not contacted any local suppliers for hydrogen supply and the potential routes are not available for the supply of hydrogen.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2017

TRAFFIC

31-1 Chlebek's Testimony acknowledges that "larger trucks will encroach into the opposing travel lane to complete the maneuver." Provide support for Invenergy's contention that it is legal for a vehicle to cross into the opposing travel lane in this manner in Rhode Island, including all relevant statutes, regulations, and ordinances.

Response 31-1 To the extent the question seeks a legal opinion, I am not an attorney. However, in response to the Town's Data Request No. 31-1, it should be noted that at this intersection, the existing roadway is not of sufficient width for it to be practicable for larger vehicles to negotiate a left or right turn entirely while remaining to the right of the centerline. Nevertheless, minor encroachment into the opposing lane is sometimes necessary and appropriate. I am referring to guidance in R.I. Gen. Laws § 31-15-1 (stating the "roadways of *sufficient width* shall be driven upon the right half of the roadway") (emphasis added) and R.I. Gen. Laws § 31-16-2 (stating "(1) Right Turns. (i) Both the approach for a right turn and a right turn shall be made *as close as practicable* to the right-hand curb or edge of roadway" and "[w]hen *ever practicable* the left turn shall be made in that portion of the intersection to the left of the center of the intersection") (emphasis added).

It should be further noted that this is not a condition being created by Invenergy Thermal Development LLC ("Invenergy"); large trucks and school busses utilizing the roadway often are required to encroach on the southbound lane. It is also not an uncommon condition at intersections in the urbanized northeast.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: July 28, 2017

TRAFFIC

31-2 Chlebek's Testimony states that throughout New England "there are numerous examples of low volume, low speed intersections with a layout that requires large sized trucks to cross into the opposing travel lane during turn maneuvers." Provide support for Invenergy's contention that it is legal for a vehicle to cross into the opposing travel lane in this manner in other New England states, including all relevant statutes, regulations, and ordinances.

Response 31-2

To the extent the question seeks a legal opinion, I want to again emphasize that I am not an attorney. However, in response to the Town's Data Request No. 31-2, it is my opinion that the laws of the New England states generally provide guidance for left and right turn maneuvers which state that that the left turn should be made in the portion of the right half of the roadway nearest the centerline and passing to the right of such centerline where it enters the intersection and that a right should be made as close as practicable to the right-hand curb or edge of the way. The laws do not state that the centerline cannot be crossed during the turn maneuver but instead speak to the position of the vehicle at the start and end of the turn maneuver, and use terms such as nearest and whenever practicable. Examples of New England turn laws are listed below for Maine, New Hampshire and Vermont.

Maine

- "Right turns. The operator shall make both the approach and a right turn *as close as practicable* to the right-hand curb or edge of the way." Me. Rev. Stat. tit. 29-A, § 2060 (emphasis added).
- "Left turns on 2-way roadways. At an intersection where traffic is permitted to move in both directions on each way entering the intersection, an approach for a left turn must be made in that portion of the right half of the way nearest the center line and by passing to the right of the center line where it enters the intersection. After entering the intersection, an operator must make the left turn so as to leave the intersection to the right of the center line of the roadway being entered.

When practicable, the left turn must be made in that portion of the intersection to the left of the center of the intersection.

An operator intending to turn to the left must yield the right-of-way to traffic approaching from the opposite direction that is so close as to constitute an immediate hazard." Me. Rev. Stat. tit. 29-A, § 2060 (emphasis added).

New Hampshire

- "Right Turns. Both the approach for a right turn and a right turn shall be made *as close as practicable* to the right-hand curb or edge of the

roadway.” N.H. Rev. Stat. Ann. § 265:42 (emphasis added).

- “The driver of a vehicle intending to turn to the left within an intersection or into an alley, private road, or driveway shall yield the right of way to any vehicle approaching from the opposite direction which is within the intersection or so close thereto as to constitute an immediate hazard.” N.H. Rev. Stat. Ann. § 265:29.
- “The driver of a vehicle intending to turn left shall approach the turn in the extreme left-hand lane lawfully available to traffic moving in the direction of travel of such vehicle. *Whenever practicable*, a left turn shall be made to the left of the center of the intersection and so as to leave the intersection or other location in the extreme left-hand lane lawfully available to traffic moving in the same direction as such vehicle on the roadway being entered.” N.H. Rev. Stat. Ann. § 265:42 (emphasis added).

Vermont

- “Right turn. Both the approach for a right turn and a right turn shall be made *as close as practicable* to the right-hand curb or edge of the roadway.” Vt. Stat. Ann. tit. 23, § 1061 (West) (emphasis added).
- “The driver of a vehicle intending to turn to the left within an intersection or into an alley, private road, or driveway shall yield the right of way to any vehicle approaching from the opposite direction which is either within the intersection or so close as to constitute an immediate hazard.” Vt. Stat. Ann. tit. 23, § 1047 (West).
- “Left turns on two-way roadways. At any intersection where traffic is permitted to move in both directions on each roadway entering the intersection, an approach for a left turn shall be made in that portion of the right half of the roadway nearest the centerline thereof and by passing to the right of such centerline where it enters the intersection and after entering the intersection the left turn shall be made so as to leave the intersection to the right of the centerline of the roadway being entered. *Whenever practicable* the left turn shall be made in that portion of the intersection to the left of the center of the intersection.” Vt. Stat. Ann. tit. 23, § 1061 (West) (emphasis added).

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: July 28, 2017

SECURITY

1-16 Please identify in detail the company's security plans during and after construction.

RESPONSE: The Project will have a security gate and will have 24/7 security during both construction and operations. During construction, the property will be fenced in with 24-hour security at a guard shack located at the entrance.

Post construction, a permeant security fence that will be eight feet tall, topped with barbed wire, card readers will be installed at critical points along with CCTV, with monitoring from the control room.

RESPONDENT: John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

WATER

1-17 Please identify in detail the company's plans regarding water quality, water use, storm water run off, and waste water.

RESPONSE:

The Project's impact to water quality is detailed in Section 6.2 of the EFSB application. We also are employing the use of ACC's to minimize water consumption for the project. Table 6.2-3 summarizes the Project's projected water use and wastewater discharge during a typical summer day firing natural gas, during an annual average day firing natural gas, and during a winter day with one combustion turbine firing natural gas and one combustion turbine firing ultra-low sulfur diesel ("ULSD") fuel. The Facility will only fire ULSD when the regional natural gas supply is curtailed during very limited periods in the winter months. Invenergy has met with RIDEM to discuss the Project's water use and wastewater discharge, and is working with RIDEM to identify measures to reduce Facility water use, particularly during the summer months when stream depletion can be a concern.

The Project's preliminary Stormwater Management Plan ("SMP") is detailed in Section 6.4 of the EFSB application. The Project SMP will meet the requirements of the RI Stormwater Design and Installation Standards Manual. Invenergy is working with RIDEM to ensure that the final SMP developed for the Project meets all applicable standards and is fully protective of the water quality of nearby surface waters.

Invenergy will apply for a Wetlands Alteration Permit, a Water Quality Certification, a RIPDES Construction General Permit, and a Multi-Sector General Permit from RIDEM and an Individual Permit from the ACOE to ensure that Project impacts to wetlands, surface water, and groundwater during both construction and operation will be minimized. Invenergy will also apply for a Wastewater Pre-Treatment Permit and an Order of Approval from RIDEM, and an Industrial Wastewater Permit from the Town of Burrillville to ensure that the wastewater discharge from the Facility meets all applicable water quality standards.

As detailed in Section 6.2 of the EFSB Application, and through the completion of the required permitting processes with RIDEM, the ACOE, and the Town of Burrillville, the quality of wetlands, surface waters, and groundwater in the area surrounding the Facility will be protected and maintained, both during Project construction and operation. As detailed in Section 6.2 of the EFSB application, with the installation of the treatment system on PUD Well 3A, the

operation of the Facility will actually improve the quality of groundwater in the areas affected by the contamination event, which occurred previously.

RESPONDENT: John Niland, Director, Business Development, Invenergy
Michael Feinblatt, ESS Group, Inc. and
Craig Wood, ESS Group, Inc.

DATE: March 31, 2016

WATER

4-21 What is the method of replenishment of the aquifer?

RESPONSE 4-21: Infiltration from precipitation is the primary method of replenishment or recharge to the aquifer serving the existing PUD wellfield (Well #3A). Additional recharge may also be provided from groundwater discharges from Individual Sewage Disposal Systems (“ISDSs”) associated with residential, commercial and/or industrial land uses. Given the distance of the well from the Pascoag River and the Clear River, it is unlikely that any significant recharge is provided from these surface water bodies.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WATER

4-23 If the used water is clean and can be introduced back into the stream and local ponds, could Invenergy build a dam to provide adequate time for the water to percolate through to Pascoag aquifer and complete the circle allowing a flushing action to assist in the removal of the existing contaminates? If not, why not?

RESPONSE 4-23: As previously noted, this wastewater will be conveyed to the existing Town of Burrillville sanitary sewer system and through that system to the BWWTF. The proposed operation of PUD Well #3A will increase the flow of groundwater through the aquifer and continue to remove contaminants from the impacted aquifer. The CREC wastewater discharge is most properly handled by discharging to the BWWTF so that it can be assured that the water is properly treated.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WATER

5-2 Please identify the exact water pipe line route and plans for construction.

RESPONSE 5-2: The ground survey for the new pipeline route has begun and should take approximately 5 weeks to complete. Invenenergy will proceed with the development of the design plans at survey completion. The geotechnical borings are scheduled to begin on May 5, 2016 and should take approximately 7 days to complete. Exact water pipe line route and plans will take some time to develop.

Please see the proposed water pipe line route, attached as **Exhibit 1**.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: April 28, 2016

WATER

5-3 Please identify and describe the proposed water treatment system with activated carbon, including a description of the safety protocols that will be present for treatment of the contaminated water. Please include an evaluation of carbon breakthrough and provide a copy of the proposed treatment system operations and maintenance manual.

RESPONSE 5-3: Invenergy has engaged a local engineering firm (Pare Engineering) to develop the specific design details of the treatment facility that is proposed to be installed at the well head. The preliminary/conceptual design of the treatment system consists of two activated carbon vessels arranged in a lead/lag (series) configuration. The lead vessel will be used to treat for organic contaminants including MBTE. A sample location will be located between the 2 vessels to test for contaminants. When break-through occurs from the lead vessel, the lag vessel will be used for redundant treatment while the media in the lead vessel is replaced and becomes the new lag vessel. This will ensure that withdrawn water from the contaminated aquifer will be treated to levels below existing drinking water standards for organics associated with the contaminated groundwater. An operation and maintenance manual will be developed prior to start-up of the facility.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WATER

5-4 Have you made an evaluation of the presence of contaminants in the cooling water relative to evaporation, the potential increased concentrations, and to the waste stream going to the Burrillville water treatment facility?

RESPONSE 5-4: Please see Table 6.2-2 of Invenergy's Energy Facility Siting Board ("EFSB") Application. The only process that will concentrate dissolved items in the makeup water will be the evaporative coolers. The circulating water in the evaporative coolers will be controlled within the equipment supplier's water quality limits to avoid adverse impacts to the equipment.

The project makeup well water will be treated with granulated carbon filters to reduce organic contaminants. The treated well water will be blended with demineralized water as makeup for the evaporative coolers.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WATER

5-12 Can any emissions or pollution from the contamination build up in the activated carbon filtration system pollute the local air or water? Please explain.

RESPONSE 5-12: There will be no emissions associated with the operation of the carbon treatment system as it will be a closed system with no exhaust. The activated carbon treatment system will absorb the contamination onto the carbon. Once the carbon becomes exhausted, the activated carbon with the absorbed contaminants will be removed from the site. The spent or exhausted activated carbon will be sent by truck to a licensed facility for disposal or reactivation through a permitted and licensed process. A typical manufacturer and/or provider of this service is Calgon Carbon Corporation.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

WATER

5-13 Where does the spent activated carbon laden with MTBE go once it is used?

RESPONSE 5-13: The spent carbon is removed and taken off site for reactivation by a licensed entity. The specific vendor and handling protocol will be defined when a licensed entity is selected. A typical manufacturer and/or provider of this service is Calgon Carbon Corporation.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenenergy Thermal Development LLC

DATE: April 28, 2016

WATER

5-16 What is the output production rating of the defunct Pascoag Utility District water wells?

RESPONSE 5-16: 700 gallons per minute. Pascoag Utility District (“PUD”) Well #3A was originally tested at 700 gallons per minute (gpm) [1,000,800 gallons per day (gpd)].

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

WATER

5-17 Can these water wells meet the proposed type of long term water supply demand without significant constraints on the ground water resources adjacent to the wells?

RESPONSE 5-17: PUD Well #3A was originally permitted to provide water at the same capacity to drinking water users in the community. Its capability to meet long term water supply demand without constraints on the adjacent groundwater resources was previously vetted by RIDEM and the RI Water Resources Board for its original approval for use. Invenenergy will work with PUD, RIDEM and the Rhode Island Water Resources Board (“RIWRB”) to conduct any assessments required to confirm that Well #3A can still meet the CREC water demand long term without impacting adjacent ground water resources.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WATER

5-18 If Pascoag Utility District wells do not meet the demand for the power facility, where will the water come from?

RESPONSE 5-18: Invenergy fully expects that the PUD well will meet the needs for the power facility. The well's capacity has been demonstrated in the past. If the well or treatment system is unavailable due to maintenance or repair, these maintenance cycles will be scheduled to coincide with CREC's maintenance cycles. Should the well unexpectedly need maintenance, Invenergy would rely on the water stored at the CREC site. If the well outage is longer and causes the entire CREC stored water to be utilized, Invenergy would pursue an alternate supplier.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

WATER

5-19 Exactly where will the facility obtain potable water for human consumption?

RESPONSE 5-19: The CREC will obtain potable water for human consumption from an on-site well, which will require approval from the Rhode Island Department of Health.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WATER

- 6-9 Explain in detail the level and frequency of testing for adjacent water sources (to well 3A) for MTBE contaminants to ensure the extraction of water from well 3A does not cause the pollution to spread to other water sources.**

RESPONSE 6-9 RIDEM and others have performed extensive sampling of groundwater, monitoring wells to delineate the MTBE impacts to groundwater in the area of the Main Street Mobil property and Pascoag Utility District's ("PUD") Well 3A. The areas impacted by the MTBE contamination have been well defined as a result of this extensive sampling. RIDEM has performed multiple pumping tests to assess the effect of the operation of Well 3A on the delineated areas of contamination. The results of the pumping tests demonstrated that the operation of Well 3A will remove contamination from the aquifer and will not spread the contamination to areas that are not currently impacted or to areas that were not historically impacted.

In pre-application meetings for the project, RIDEM has stated that it will require further pump testing to reconfirm Well 3A capabilities. RIDEM will also require that monitoring be conducted of the water levels and groundwater quality in the existing monitoring wells surrounding Well 3A prior to, during and after the pump test. Invenergy Thermal Development LLC ("Invenergy") and PUD will submit a test protocol to RIDEM for approval, outlining the level and frequency of groundwater monitoring which will be conducted prior to and during the pump test. The results of the pump test will be submitted to RIDEM for review. Based on the results of the pump test, it is anticipated that RIDEM will require PUD to continue monitoring the water levels and the groundwater quality in the surrounding wells on an ongoing basis to ensure that the extraction of water from Well 3A is not causing impacts to groundwater volume or quality in the surrounding area.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: May 11, 2016

WATER

6-10 Explain in detail your remediation plan should the contamination from well 3A spread to surrounding water sources/areas.

RESPONSE 6-10 Based on the work previously completed by RIDEM and others, it is not expected that any contamination from Well 3A will migrate or spread to areas that are not currently impacted. There are no other public supply wells located near the delineated groundwater impact areas associated with the Main Street Mobil property.

The extensive monitoring of the water levels and groundwater quality in the surrounding monitoring wells required prior to and during the Well 3A pump test by RIDEM will demonstrate that the contamination from Well 3A will not spread to surrounding areas during use of the well. RIDEM will only approve the use of the well if such a demonstration is made. RIDEM will require PUD to continue to monitor the water levels and the groundwater quality in the surrounding wells on an ongoing basis to ensure that the extraction of water from Well 3A is not causing impacts to groundwater volume or quality in the surrounding area.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: May 11, 2016

WATER

6-11 How does Invenergy intend to overcome the court order shutting down Pascoag well 3 and 3A?

RESPONSE 6-11 The January 15, 2002 Court Order (“Court Order”) states that Wells No. 3 and 3A may only be used for remediation of contamination as directed by the Director of Health, the Department of Environmental Management, Water Resources or other appropriate State Officials but in no event shall the wells be used for potable water supply. Invenergy is proposing to install a treatment system to remediate the contamination in Well 3A and then use the remediated water, which will be treated to drinking water standards. This water will not be used for drinking water. It will be used as process water within the facility via a dedicated water pipeline.

PUD will own and operate the proposed treatment system and believes that the proposed use of Well 3A is consistent with the Court Order. Invenergy and PUD have attended several pre-application meetings with various representatives of RIDEM in both the Water Resources and Site Remediation divisions, as well as with the Chief of the Office of Drinking Water Quality at the Rhode Island Department of Health (“RIDOH”). Both RIDEM and the RIDOH have endorsed PUD’s and Invenergy’s proposal to remediate the contamination in Well 3A provided that the proper assessments are conducted to ensure that its use will not cause any further impacts to water availability or groundwater quality in the surrounding area. Invenergy and PUD will work with RIDEM and the RIDOH to ensure that the proper assessments are conducted with the understanding that approval of the use of Well 3A for CREC by RIDEM and the RIDOH will not be issued without such assurances.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: May 11, 2016

WATER

8-1 GAC Treatment following Extraction at the Pascoag Well – The proposed granular activated carbon (GAC) treatment system needs to be evaluated. In Table 6.2-2 of the October 2015 application, the proposed MTBE concentration going to the proposed plant is 55 µg/L, and following use at the plant as cooling water, the compositional projection of MTBE going to the Burrillville WWTP is 200 µg/L. Please provide a process and instrumentation diagram for the proposed GAC treatment system.

RESPONSE: 8-1 The design of the granular activated carbon (“GAC”) will be such that water supply to the plant will be below drinking water standards and we will control to reduce MTBE to 40 ppb after the first vessel and the second vessel will remove the remaining MTBE to a non-detect level, but we conservatively assumed that a max limit of 40ppb could get past the second vessel and this was the basis for the 200 ppb in the waste stream. The normal operating flow to the waste water treatment plant will not contain any MTBE.

Engineering for the water treatment system is in the early stages of design; therefore, no piping and instrument diagrams are available at this time. Attached as Exhibit 1 is a pictorial flow diagram that shows the basic process steps for the system.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: May 16, 2016

WATER

10-1 Should breakthrough occur during use of the Town's granular activated carbon treatment system, and the well water supplied to the facility contains MTBE at levels currently present in the groundwater, what fraction of the MTBE present in the untreated well water would be expected to volatilize and be released as an air emission and what fraction of the MTBE would be expected to be discharged to the Burrillville Sewer?

RESPONSE: 10-1 Any untreated water supply to the Clear River Energy Center ("CREC") that contains MTBE will be mixed and diluted in CREC's raw water storage tank. None of this untreated water would be volatilized and be released as an air emission through the combustion turbine as any MTBE would be thermally destroyed in the high temperature combustion processes of the combustion turbines. Any waste water that would come from the demineralized water treatment system that contained the diluted untreated raw water would be discharged with the wastewater from the CREC facility to the Burrillville Wastewater Treatment facility.

The activated carbon treatment system being designed to treat PUD's Well #3A will have two carbon vessels that work in series to prevent breakthrough of MTBE from occurring. The majority of the water supplied to the CREC facility will be used for makeup to the evaporative coolers that will cool the inlet air to the combustion turbines during natural gas firing in the summer or will be used for direct injection into the combustion turbines to control NOx emissions when firing distillate oil. Any MTBE volatilized into the inlet air to the combustion turbines or injected into the combustion turbines when firing distillate oil will be carried into the combustion zone of the combustion turbine where it will mix with either natural gas or distillate oil, depending on which fuel is being used, with the MTBE being thermally oxidized in the high temperature combustion process.

The temperature in the combustion zone of the combustion turbines will be greater than 2,000 degrees Fahrenheit (F). As a result, any MTBE carried into the combustion processes will be oxidized and destroyed by the high temperature present in the combustion process. MTBE is a gasoline additive originally intended to reduce automobile emissions and as a result MTBE was formulated to be destroyed by the combustion processes within automobile engines.

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

WATER

10-2 Regarding the “3.865 Kilometer, significant impact zone” referenced in the EFSB application, please explain in detail what it means and provide all information on any potential impacts to anyone residing within the radius.

RESPONSE 10-2: The significant impact zone is an area that the emissions levels are above a threshold called the Significant Impact Levels (“SILs”) that if exceeded a more detailed analysis must be performed that includes emissions from other nearby sources. The SILs are much lower than the National Ambient Air Quality Standards (“NAAQS”), and the air quality in an area where the modeled concentration is greater than the SIL is still considered safe with regard to human health and public welfare. Modeled impacts above the SILs are considered safe by the EPA and therefore there is no potential impact to anyone residing within the radius, the only issue is more detailed modeling is required.

As required by the Clean Air Act (“CAA”), the EPA has established NAAQS for six commonly found (criteria) pollutants: carbon monoxide (“CO”), lead (“Pb”), nitrogen dioxide (“NO₂”), ozone (“O₃”), particulate matter (less than 10 microns in diameter (“PM₁₀”) and less than 2.5 microns in diameter (“PM_{2.5}”) and sulfur dioxide (“SO₂”).

The United States Environmental Protection Agency (“EPA”) has established two types of NAAQS. The primary standards protect public health, including the health of sensitive populations such as asthmatics, children and the elderly. The secondary standards protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation and buildings.

Based on the most recent monitoring data, Rhode Island is an attainment area with regard to the NAAQS. Therefore, any new proposed source, such as the CREC, must demonstrate that the maximum air quality impacts resulting from its operation, when combined with existing background air quality concentrations and the maximum air quality impacts resulting from the operation of other nearby sources, will not cause an exceedance of the NAAQS.

Such a demonstration has been made for the CREC, as detailed in the Air Dispersion Modeling Report submitted to RIDEM on October 30, 2015. The results of the air dispersion modeling analysis have demonstrated that the maximum air quality impacts resulting from its operation, when combined with existing background air quality concentrations and the maximum air quality impacts resulting from the operation of other nearby sources, will result in criteria pollutant ambient air quality

concentrations which will remain at levels which are protective of human health and public welfare.

The EPA has also established Significant Impact Levels (“SILs”) for each of the criteria pollutants. The SILs are much lower than the NAAQS and represent the impact concentration levels at which the ambient air impacts from nearby sources must be considered. Because the SILs are lower than the NAAQS, the air quality in an area where the modeled concentration is greater than the SIL is still considered safe with regard to human health and public welfare; however, a more in-depth air quality analysis is required. Modeled impacts below the SILs are considered by the EPA to be insignificant, and therefore the ambient air impacts from nearby sources are not required to be considered in the modeling analysis.

The results of the CREC air dispersion modeling analysis, which included the modeled impacts from the Algonquin Compressor Station, Ocean State Power, and the Tennessee Gas Compressor Station, indicated maximum CO, annual NO₂, annual PM₁₀ and SO₂ impacts below their respective SILs, and therefore insignificant. The maximum modeled 1-hour NO₂ and 24-hour PM₁₀ impacts exceeded their respective SILs. The PM_{2.5} SILs have been vacated by the EPA as a result of a court order.

Figure 8 of the Major Source Permit Application (attached as **Exhibit 1**) graphically depicts the areas where the maximum modeled impacts exceeded their respective SILs. The concentrations are above the SIL threshold, however the resulting air quality concentrations will remain well below the NAAQS, and thus at levels still protective of human health and the public welfare. Any increases in criteria pollutant ambient air concentrations in all other areas resulting from the operation of the CREC will be insignificant, as defined by the EPA.

The air quality impact analysis completed for the CREC Project has demonstrated that the air quality both within the Significant Impact Area and as far away as 50 kilometers in every direction, will remain at levels deemed protective of human health and the public welfare by the EPA during CREC operation.

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

WATER

11-1 Does Invenergy intend to perform any pump tests and water sampling and testing at the PUD Well #3A? If so, please provide details on the pump test, including duration and flow rate and information on water sampling testing.

RESPONSE: 11-1 Invenergy Thermal Development LLC (“Invenergy”) plans to perform pump testing on PUD Well #3A to verify that it has sufficient capacity to supply the Clear River Energy Center (“CREC”) with its water supply and to assess the impact of reactivating the well on the aquifer. Water level monitoring and environmental sampling will be conducted from surrounding monitoring wells during the pump tests as required by Rhode Island Department of Environmental Management (“RIDEM”).

Invenergy is currently preparing a detailed protocol for the PUD Well #3A pump testing. The protocol outlines the objectives of the testing, the proposed pre-test monitoring and sampling, the wells that will be monitored during the test and the test duration and anticipated pumping rates. The pump test set up will include activated carbon filtration of all water pumped from the well. The pump test protocol has been discussed with RIDEM and is in the process of being submitted to RIDEM for their review and approval prior to commencing with any pump testing on the well. A draft copy of the test protocol is included as Exhibit 1.

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

WATER

11-2 Does Invenergy intend to perform any vapor intrusion assessments on the properties in the vicinity of PUD Well #3A? If so, please provide details on the testing.

RESPONSE 11-2: Invenergy does not intend to perform any vapor intrusion assessments on the properties in the vicinity of PUD Well #3A at this time. RIDEM performed a Soil Vapor Intrusion Study in 2006 for this area and found no significant VOC concentrations. Given the significant reductions in monitored groundwater concentrations following the performance of site cleanup activities by RIDEM and their subcontractors at the North Main Street Mobil site and considering the results of the 2006 RIDEM Study, additional vapor intrusion assessments are not warranted at this time.

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

WATER

16-1 Please provide details of the potential exposure to natural gas shortages that may require the proposed plant to utilize its onsite water supply and potentially have to use back up methods, such as trucking water.

16-1 Please provide details of the potential exposure to natural gas shortages that may require the proposed plant to utilize its onsite water supply and potentially have to use back up methods, such as trucking water.

RESPONSE It is very difficult to quantify the potential exposure to natural gas shortages for Clear River Energy Center (“CREC”). Historical precedent for shortages have shown them to be infrequent and of short duration. If Invenergy Thermal Development LLC (“Invenergy”) observes plants in the New England (“NE”) area that have dual fuel capabilities of similar size to CREC, their average maximum consecutive hours that they ran on fuel oil in 2014 and 2015 was 72 hours and 68 hours respectively. There are however several reasons why Invenergy believes these numbers are higher than we would expect for CREC:

1) CREC is located directly on the Algonquin main line and closer to the natural gas supply source than the plants included in this historical analysis.

2) The information to assess whether a gas shortage has occurred is not readily available. As such, in this analysis it was assumed that the use of fuel oil coincided with a natural gas shortage event. In reality, fuel oil can be used for other reasons such as for maintenance or for a plant located on a lateral or at the end of a lateral if gas capacity was not available. Therefore, it is our expectation that the maximum consecutive hours based on natural gas shortages would be lower for CREC.

3) Pipeline infrastructure projects such as Atlantic Bridge and Spectra’s AIM project will increase the availability of gas supply to NE gas power generators and reduce the severity of natural gas shortages.

Accordingly, Invenergy has designed our water systems to include an appropriate level of water storage capacity on site to allow for continued operation on fuel oil for these short duration natural gas shortages and do not anticipate a need for a backup water supply that would be trucked to the site.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 25, 2016

WATER

16-2 Please provide data showing what has actually happened with regard to natural gas shortages requiring power plants in the ISO-NE local zone to switch from natural gas to diesel fuel and provide details about each incident available within the last five years.

RESPONSE 16-2: As mentioned, it is very difficult to correlate historical fuel oil burn with natural gas shortages since this will be impacted by generators contracted capacity and where plants are located on the natural gas pipeline system.

One way to explore potential for dual fuel units to switch over to oil is to examine the data from ISO-NE who provided an analysis of historical events that would have been periods when supply shortages would have occurred and possibly triggered “Pay for Performance” penalties. The summary of this data is as follows:

There were 178 events in the 7 year, 4 month study period;

The average event was 29 minutes, the maximum event was 285 minutes;

The majority of events were less than one hour; and

There were only three events greater than two hours.

(www.iso-ne.com/static-assets/documents/markets/othrmkts_data/fcm/doc/opr_reserve_deficiency_info_hist_data_updated_5_21_2014.zip)

Note however, that the supply shortage in these instances were not necessarily due to gas supply shortages.

Based on our analysis, there were three recently observed natural gas shortages in the ISO-NE which resulted in dual fired plants using fuel oil:

- 1) The most severe example where natural gas supply was compromised was what is referred to as the polar vortex in Winter 2013/2014 where the area saw the coldest temperatures observed in two decades. In this instance, dual fuel fired plants of similar size ran for on average maximum 72 hours.
- 2) The second instance was also due to a cold front that happened in 2015. This resulted in plants of a similar size to CREC running on average a maximum of 68 consecutive hours on fuel oil.
- 3) This month, Algonquin had to curtail interruptible gas and

reduce firm transport to 80% of contracts because of the Oxford Compressor outage. While detailed information is not yet available, it is expected that this could have caused some units to switch from gas to fuel oil.

Invenergy also examined data associated with when plants that have dual fuel capability have fired oil. Invenergy identified all ISO-NE plants with dual fuel capability (“DFC”), and there are 7,052 MW DFC units out of 17,184 MW NG units. Invenergy identified all instances in 2014 and 2015 where the dual fuel units were operated on fuel oil and the duration of the fuel oil run events were:

- On average, Units are running 16 hours.
- When outliers (>100 hr runs) are removed from the data set, the average drops to 8 hours.

More Information is included in **Exhibit 1**, which includes some graphics around where the dual fuel fired power plants are located in NE, their operating capacity, average consecutive hours run in 2015, maximum consecutive hours run in 2015 and the natural gas pipeline infrastructure.

Some key points on the data included:

- 1) The plants with high fuel oil usage (based on hours) generally are on or at the end of natural gas lines or laterals off of the main line.
- 2) DFC plants on the main line have relatively lower number of hours on fuel oil suggesting they are less likely to switch to oil in a gas shortage events based on their superior access to gas.
- 3) The amount of DFC capable plants is only about 25% of the peak load.

In **Exhibit 1**, the maps shown of dual fuel units running on oil were built using the Velocity Suite Online application, created by ABB. Specifically, the ABB Database of Unit Generation & Emissions - Hourly (Standard), which provides unit-level hourly generation and emissions data for fossil-fuel generating units. The hourly data comes from the US EPA (CEMS reporting), the Nuclear Regulatory Commission, the Alberta Electric System Operator and the Ontario IESO.

The CEMS database can be accessed directly from this public website: <https://ampd.epa.gov/ampd/>.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 25, 2016

WATER

16-3 Please explain how the potential exposure to natural gas shortages, as described above, would change if Invenenergy opted to obtain fixed gas supply contracts for both of its turbines rather than for only one.

RESPONSE 16-3: Even with a firm supply, there could still be exposure to shortages if an event on the gas pipeline prevented delivery. Such an event occurred a few weeks ago where the Algonquin Pipeline had an outage and reduced flow on the system. On August 16, 2016, the pipeline restricted all nominations by shippers holding interruptible contracts and 18% of nominations by shippers holding firm contracts through the Oxford, CT compressor station. The pipeline also restricted out-of-path nominations, which shippers use to move gas through receipt and delivery points that are not part of their established contracts through the compressor station. It is not certain that this could have impacted CREC, but CREC would not be immune to such outages even with firm supply contracts. The expected frequency of such an event would be less with a full fixed gas supply contracts for both of its turbines rather than for only one; however, the cost for such a contract is most likely prohibitive.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: August 25, 2016

WATER

16-4 Please provide all information demonstrating whether there is a history or pattern of extended natural gas shortages for power plants in the ISO-NE local zone, how long those shortages typically last, the likelihood that fuel oil will be needed to run the plant, and how many instances where such shortage could last longer than 3.65 days.

RESPONSE 16-4: An analysis of all dual fuel units was done in the ISO-NE, and it was observed that in general gas shortages typically occurred during cold temperatures where residential and commercial heating demand peaked. In the last five years, only 2014 and 2015 saw impactful natural gas shortages where dual fuel units burned fuel oil. Based on 23 plants observed in this area:

- On average, the shortages typically lasted 0.71 days, with the largest consecutive outage lasting on average 2.03 days.
- The average plant saw 1 instance where a natural gas shortage lasted longer than 3.65 days. Sixteen plants never experienced a shortage that lasted longer than 3.65 days and seven plants observed a shortage that lasted longer than 3.65 days.
- The plants that saw these longer durations were not located on the main pipeline.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 25, 2016

WATER

16-5 Please identify in detail all water supplies for the proposed facility that you currently have under consideration and the development status of each one.

RESPONSE 16-5: Due to the confidential nature of the discussions we are involved with potential suppliers, we are not able to disclose the names of the counterparties. For each of the options we are examining, we are simultaneously performing the development work, permitting evaluation and engineering to determine viability. There are viable alternatives, and we anticipate making a selection in the very near term.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 25, 2016

WATER

18-2 The Invenergy October 2015 Application states:

During the infrequent periods when the Facility is requested to fire one of the gas turbines on oil, the daily water demand for the Facility will increase to approximately 925,000 gpd, or 0.925 MGD for each day of oil firing. Although the total water use of the Facility increases when firing ultra low sulfur diesel (ULSD) oil, the total number of days that the Facility will be required to fire oil will typically be determined by the grid operator (ISO-NE) based on the severity of winter conditions when there is a need to conserve natural gas for heating needs of the region. Generally, based on history, the number of days per year the Facility will be requested to use ULSD will be approximately five days. (October 2015 EFSB Application, Page 18).

To put the above in perspective, over the last five years with the current limited pipeline capacity into the region, there has been an average of only five days per year when gas fired electric generation was asked to switch to distillate oil. Five days per year means, if the Project had existed for the last five years, that the Project would have fired natural gas 98.6% of the time, and as a result, the Project's daily water use and wastewater discharge would have been in the range of 102,240 gpd and 69,000 gpd respectively 98.6% of the year. Projecting forward with the natural gas pipeline expansions underway, the total annual days of Project oil firing should lessen with the increasing supplies of natural gas helping to reduce winter shortage of this critical fuel to the region.

Provide a confirmation from ISO-NE that this information is accurate. We understand that the plant can operate in this condition for as long as 3.6 days based on information provided by John Niland of Invenergy. Would the expected days be consecutive or not? Please provide information for operating in this condition for the last five years.

RESPONSE:

Please see Invenergy's Responses to the Town's 16th data requests, particularly 16-2 and 16-4. Invenergy checked with multiple ISO-NE staff members in Operations and System Planning and was informed that ISO-NE does not provide confirmation as to when generators should be expected to switch to ULSD. What the ISO-NE could provide was data on when a Reserve Constraint Penalty Factor ("RCPF") Activation event had occurred over the past five years (and back to 2006). Please see the publically available spreadsheet which can be found at: https://www.iso-ne.com/static-assets/documents/2015/12/rcpf_event_data_from_may_2015.xlsx

The RCPF indicates when reserves (peakers) were called upon, which can be a good indicator of when dual fuel units may have had to switch to oil.

The availability of natural gas is monitored by ISO-NE, who may declare a “Cold Weather Event,” a “Cold Weather Watch” or a “Cold Weather Warning” according to its market rules. Natural gas will be deemed to be unavailable when the natural gas supplier informs the Clear River Energy Center (“CREC”) that the natural gas supply is being curtailed or if there is a Force Majeure event.

Invenergy examined the publically available data over the past five years from data of dual fuel units running on oil were built using the [Velocity Suite Online](#) application, created by ABB Group, Inc. (“ABB”). The ABB Database of Unit Generation & Emissions - Hourly (Standard) provides unit-level hourly generation and emissions data for fossil-fuel generating units. This data comes from the United States Environmental Protection Agency (CEMS reporting), ISO-NE and the Nuclear Regulatory Commission.

The CEMS database can be accessed directly from this public website:
<https://ampd.epa.gov/ampd/>.

Invenergy has included this data in the attached spreadsheet which includes the raw data and its source reference. Invenergy summarized the data to show the oil fired and dual fuel units run times (in hours) both annually and monthly for all units. This is the data used to create the maps that were included in Invenergy’s Response to the Town’s 16th Set of Data Requests. The summary data tab provides the number of hours each unit ran on oil by year and the maximum consecutive run time on oil.

The reason that Invenergy provided the map for these units in Invenergy’s Response to the Town’s 16th Set of Data Requests is that most of these units are not on the main pipeline (with the exception of Ocean State Power), and as can be seen from the maps that further away from the main pipeline a unit is located or if it is a highly constrained area like downtown Boston or Providence, the consecutive run times for these units increases as compared to other units that are closer to the main pipeline. Based on this data, Invenergy expects that the times when the unit would need to switch to oil would be short lived, i.e. less than a day, however the facility has been configured to allow for longer duration runs on oil should it be necessary.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 4, 2016

WATER

21-1 Our understanding is that approximately 20,000 gpd of water will be consumed during natural gas usage. Is this both units or per unit? If water is delivered to the site by truck:

- a. How will it be stored on-site?**
- b. How frequently will deliveries be made to the site (i.e., daily, weekly)?**
- c. How many deliveries will be made during a given day?**
- d. When will deliveries be made (morning, night, any time)?**
- e. What traffic route(s) will be used?**
- f. What type/size truck will be used?**

RESPONSE 21-1: Please see Invenergy Thermal Development LLC (“Invenergy”) revised Water Supply Plan, filed with the Energy Facility Siting Board (the “Board”) on January 11, 2017.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-2 What processes will be implemented to reduce water consumption during natural gas usage to 20,000 gpd? Will this be a combination of process cooling changes and wastewater recycling? Please explain in detail.

RESPONSE 21-2: Please see Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-3 How much water will be required when oil is used as the fuel for one unit? For both units?

RESPONSE 21-3: Please see Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-4 Is the amount of water required for oil, more or less than what is required for natural gas? Please explain in detail.

RESPONSE 21-4: Oil firing requires more water than natural gas firing. Please see Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017 for details.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-5 Do the water saving measures that apply for natural gas, also apply to oil?

RESPONSE 21-5: Please see Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017. The water saving measures apply to both oil and gas fired operations.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-6 If the 2M gallon water storage tank is used when oil is the fuel:

- a) How much water per day will be consumed?**
- b) How will the tank be refilled?**
- c) In what timeframe will the tank be refilled?**
- d) How many water deliveries per day will be needed?**

RESPONSE 21-6: Please see Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017; specifically, Section 2 and Appendix E, the McMahon Associates traffic analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

21-7 Please explain in detail how the deionization ion system would work. Please specify what chemicals are involved, and in what amounts, how they will be delivered/stored/used at the site, and what steps you propose to take to protect workers, residents, and the environment from these chemicals.

RESPONSE 21-7: Manufacturer's information was included in Invenergy's revised Water Supply Plan, filed with the Board on January 11, 2017.

The Clear River Energy Center ("CREC") will utilize mobile demineralizer trailer systems to produce the high quality demineralized water needed. Mobile demineralizer trailer systems have been used for many years in many industries because they produce a high quality demineralized water product, do not rely on facility personnel for their operation, do not require the storage or handling of chemicals on site for their regeneration and do not produce wastewater that must be treated or discharged on site.

Mobile demineralizer trailer systems utilize ion exchange resins that have the chemical capacity to remove dissolved minerals and salts present in the water supply, producing a high quality demineralized water product.

The mobile demineralizer trailers, once exhausted, will be removed from the site by trucks and returned to the suppliers' regeneration station where the units will be regenerated.

As a result, no chemicals will need to be delivered, stored or used at the CREC for the regeneration of the trailer mounted demineralizer systems since the trailers will be regenerated at the suppliers' facility and not at the CREC.

Section 2.2.1 (a) of the Water Supply Plan provides additional details on the mobile demineralizer trailer systems and Appendix B provides brochures from two service providers of these types of systems.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 25, 2017

WATER

22-1 **Under the water plan, is it correct that ammonia deliveries increased from 2 per month to 15 per month, or a 13 truckload per month delivery? That equals 26 new trips to and from the site. Please explain the reasons for the increase and the details.**

RESPONSE 22-1 The amount of ammonia anticipated to support the Clear River Energy Center (CREC or Project or Facility) did not change from the May 2016 Traffic Impact Study to the revised Water Supply Plan, filed with the Energy Facility Siting Board (EFSB or Board) on July 11, 2017 (Water Supply Plan or revised Water Supply Plan). However, during a comprehensive review of the trucking option for the Water Supply Plan, Invenergy Thermal Development LLC (“Invenergy”) noticed that the assumptions in the May 2016 Traffic Impact Study regarding the number of ammonia deliveries were not correct. The traffic analysis submitted as Appendix E of the revised Water Supply Plan corrected the number of ammonia trucks to approximately 15 per month and confirmed that “the traffic impacts are still minimal.”

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-2 Under the water plan, is it correct that Water Filter Bed media turnover introduces 2 new truck trailers on the roadway per month? That equals 4 trips to and from the site per month. Please explain.

RESPONSE 22-2 No, Water Filter Bed media turnover will not introduce 2 new truck trailers on the roadway per month. However, as indicated on page 5 of the Water Supply Plan, Invenergy intends to utilize mobile demineralizer trailers that will require off site regeneration and, “Based on the annual average cycle makeup water demand, this is equivalent to approximately one trailer needing to be regenerated every month.” That equals approximately 2 trips to and from the site per month.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-3 Under the water plan, is it correct that Onsite water storage tank increased from 1,000,000 gallons (1 MG) to 2.25 MG? That is a 125% size increase, which in all likelihood, increases the footprint of impervious at the site. Please explain.

RESPONSE 22-3 No, the original application consisted of an approximately 1,000,000 gallon tank for demineralized water and an approximately 800,000 gallon tank for service water/fire water.

The revised configuration consists of an approximately 1,850,000 gallon tank for demineralized water and an approximately 1,050,000 gallon tank for service water/fire water.

This revised volume does not increase the footprint or affect the impervious coverage at the site. The volume increase is achieved by increasing the height of the tank. The diameter of the demineralized water tank was previously stated as 110 feet in diameter and 30 feet tall and is now revised to approximately 85 feet in diameter and 55 feet tall. The height of the service water/fire water tank has been increased from 30 to 49 feet.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-4 Under the water plan, is it correct that you now propose an Onsite Wastewater Treatment System (“OWTS”) to treat wastewater from the office and domestic spaces? Do you agree that this will require an OWTS permit through RIDEM? Is there any potential for treated process wastewater to be introduced to this system? Please explain the details.

RESPONSE 22-4 Yes, Invenergy now proposes an Onsite Wastewater Treatment System (OWTS) to treat wastewater from the office and domestic spaces, and a new OWTS permit is required from the Rhode Island Department of Environmental Management (RIDEM). No process water will be sent to this system as all other plant systems are physically separated and not connected to the OWTS.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-5 Under the water plan, is it correct that water replenish rate after an oil fired operation event is 11 trucks per day, or 22 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-5 Yes, the traffic impact analysis, Appendix E of the Water Supply Plan assumes that approximately 11 trucks per day will access CREC to replenish the water tanks. This is not a guarantee, but it is a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-6 Under the water plan, is it correct that oil replenish rate after an oil fired operation event is 7 trucks per day, or 14 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-6 Yes, the traffic impact analysis, Appendix E of the water supply plan assumes that “approximately 7 trucks per day will access the CREC facility to replenish the oil tank.” This is not a guarantee, but it is a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-7 Under the water plan, is it correct that you have assumed an oil run event duration for 3 days? What if there is an extended run of this power plant for more than 3 days while running on oil? Do you agree that this would increase the number of truck trips to and from the site during a week's time or longer? Please explain.

RESPONSE 22-7 The quantity of water and oil stored on site would only allow for 3 days of continuous oil fired operations. It is not possible to replenish the tanks at a rate to support continuous oil operations beyond 3 days. Therefore, an extended run for more than 3 days on oil is not possible and the number of truck trips required for replenishment has been correctly addressed in the traffic study.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-8 Under the water plan, is it correct that the worst case scenario you present is that oil tank depletion (2 MG) will equal 19 trucks per day to replenish, or 38 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-8 The worst-case-scenario presented is a total of 22 trucks per day following an oil fired event as indicated in the traffic analysis, Appendix E to the Water Supply Plan. The analysis assumes approximately 13 water trucks (2 for normal operation and 11 for water replenishment), 7 oil trucks, and 2 additional trucks consisting of either 1 aqueous ammonia truck, 1 wastewater truck or 1 mobile demineralizer trailer.

No, this is not a guarantee but represents a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-9 **Under the water plan, is it correct that the average truck rate after an oil operation event will be 22 trucks per day new traffic or 44 trips to and from the site? Could this be exceeded? Please explain.**

RESPONSE 22-9 As discussed above in Invenergy Response No. 22-8, 22 trucks per day is expected but cannot be guaranteed.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-10 Under the water plan, is it correct that the traffic engineer assumes each truck carries 8,000 gallons per truck but the water host agreement indicates a truck is 7,200 gallons per truck? Do you agree that a recalculation of the traffic engineer's figures are needed, which will increase the truck figures identified above in items 1 through 9? Please explain and provide the recalculation.

RESPONSE 22-10 CREC expects to utilize trucks with an 8,000 gallon volume and the traffic engineer correctly assumed that volume in their traffic analysis. The truck capacity of 7,200 gallons referenced in the water supply agreement with the Town of Johnston was approximate and used for the purpose of generally describing typical operating conditions. It does not represent an obligation on either party. No recalculations are required.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-11 Under the water plan, do you agree that Table 2 of McMahon's traffic report is now underestimated due to estimated tanker truck size, and assumes only a 3-day operation event running on oil, so it technically is not the "worst case scenario"? Please explain.

RESPONSE 22-11 No, the truck count in Table 2 is not underestimated for the reasons explained in responses 22-7 and 22-10. The reference to worst-case scenario is a reference to a scenario where the tanks were depleted. The combination of water, oil and other trucks will be approximately 22 trucks per day to recover from such an event.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-12 Under the water plan, is it correct that Johnston's signed agreement is dated 1/6/17 by the Mayor, which is 4 days before the Johnston Town Council authorized the Mayor to enter such an agreement with Invenergy? Do you believe this agreement is valid? Please explain.

RESPONSE 22-12 Yes, the agreement is valid. The Town Council duly authorized the Mayor's signature on January 10, 2017. Please see the Resolution of the Town Council of Johnston, dated January 10, 2017, attached to the Water Supply Plan as Appendix F, Exhibit A, wherein it expressly states that "the members of the Johnston Town Council hereby **ratify** and authorize Mayor Joseph M. Polisena to enter into the attached Water Supply and Economic Development Agreement between the Town of Johnston and Clear River Energy LLC for the purchase of water from the Town of Johnston."(Emphasis added.)

RESPONDENT: Alan M. Shoer, Esq., Richard R. Beretta, Jr., Esq., Nicole M. Verdi, Esq.

DATE: February 14, 2017

WATER

22-13 Under the water plan, is it correct that Invenergy stated to the EFSB that 2 trucks per day on average will be needed to deliver water? However, Johnston's agreement indicates 3 trucks per day and up to 5 trucks per day will be needed on average to deliver water to the site. Do you agree that information to the EFSB needs to be amended accurately reflect which figure is correct? Please explain and amend as needed.

RESPONSE 22-13 Under the Water Supply Plan, Invenergy stated that: "The range in the number of truck deliveries for normal operations is typically 2 to 3 trucks per day." (Page 14).

The water supply agreement with the Town of Johnston, Section 2(a), entitled "Flow Rate," provides an estimate that contemplates that there will be times when truck deliveries cannot be made due to events such as adverse weather or holidays, so the agreement included language to account for these circumstances. The Agreement specifies that "CREC estimates that up to 3 truck deliveries per day will be required to satisfy expected water use needs of the Project. However, up to five (5) trucks a day may be necessary for certain operational occurrences and weather related impacts. This is the Average Demand Flow Rate." (Section 2(a)(i)). The 3 to 5 trucks per day is a reflection that there are varying plant operations and varying conditions in which trucks can be delivered. The information provided to the EFSB does not need to be amended.

RESPONDENT: Daniel Ewan, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-14 Under the water plan, is it correct that under the Johnston water agreement, CREC has allowed themselves a provision to alter its water consumption at any time? What if CREC decides to sell water 3r^d party to another vendor, outside of their sole use? Do you agree that there is no provision in the agreement that would prevent you from doing so? Please explain.

RESPONSE 22-14 Invenergy does not understand what provision of the Agreement (if any) you are referring to in this question. In Section 7(a)(ii) of the Agreement, CREC does represent that it has “the ability to adjust its Daily Water Demand through the use of on-site storage tanks and other operational adjustments between the Standard Demand Flow Rate and the Increased Demand Flow Rate when operating on natural gas. CREC also has the ability to adjust its daily demand for truck deliveries for any of the Demand Flow Rates by relying on such on-site tanks.”

The third and seventh whereas provisions of the Water Agreement with Johnston clearly lay out the intentions of the Parties (Invenergy and the Town of Johnston). We repeat those here for clarity:

- Whereas, in connection with the operation of the Project, CREC requires a reliable source of water in sufficient quantities to meet the Project’s demand;
- Whereas, Johnston has the available water supply capacity and has agreed to supply the Project with a reliable source of water in sufficient quantities to meet the Project’s demands on the terms and conditions set forth herein;

These provisions indicate that the intent of the Parties is to supply the Project’s water needs and not those of third Parties. Invenergy does not have any intention to sell water to a third party.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-15 What will happen if an oil operation event occurs more frequently, or lasts longer due to a gas shortage? All the events above indicate that in addition to the figures provided, a 3 truck a day rate is needed just to supply water in addition to the figures above. Do you agree? Please explain.

RESPONSE 22-15 It is difficult to predict the frequency or duration of oil operation events. Invenergy anticipates that they will not be frequent or long in duration. Generally speaking, Invenergy anticipates that it will replenish the tanks shortly following an oil operation event, at the rate specified in the Water Supply Plan. The rate of approximately 22 trucks a day as specified in the Water Supply Plan includes the water trucks needed for continued operation on gas following an oil operation event. The units can run only as long as there is an adequate supply oil and water onsite. Once the oil and water is depleted, the units cannot run, as set forth in 22-7 and 22-8.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-16 **Please provide Schedule 1 to the Benn Water Agreement.**

RESPONSE 22-16 Attached as **Exhibit 1** is a redacted version of Schedule 1. Please note that Schedule 1 contains confidential third-party proprietary pricing information of a private company that Invenergy is not in a position to disclose.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-17 Please specifically identify and explain the status of the “all necessary permits and/or local approvals” needed as described in the last paragraph of 2.0 of the Water Supply Plan.

RESPONSE 22-17 Once the site for the truck filling station, to be located in Johnston, has been selected, Invenergy will begin the permitting process as needed with the Town of Johnston with regard to any new real estate and the new Water Transport Facility, as referenced in the Agreement on Page 3. If Invenergy chooses to buy an existing facility, the permitting requirements, if any, will be determined and processed at that time.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-18 How exactly will Invenergy “limit winter distillate oil firing” as discussed in paragraph 2.2.1 (third paragraph)? Will the CREC be subject to pay for performance payments? If so, how much?

RESPONSE 22-18 Winter distillate oil firing is limited by the quantity of water and oil available onsite as well as the ability to re-fill the on-site storage. Invenergy will participate in the ISO-NE day ahead energy market and is subject to all of its associated rules. In the event that both natural gas and oil are not available for the unit(s) to operate and the unit(s) are called on to operate, it is possible that CREC would be subject to pay for performance penalties. It is not possible to determine the penalty amount as that is dependent on the specific market conditions at the time of the capacity shortfall.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-23

Provide the following annual data:

- a. Annual number of MWH the CREC is anticipated to produce operated on natural gas between 2019 and 2038 broken down by calendar year;**
- b. Annual number of MWH the CREC is anticipated to produce operated on ultra-low sulfur distillate (“ULSD”) between 2019 and 2038 broken down by calendar year;**
- c. Annual cost of water in \$/MWH added to the variable cost of the unit when firing ULSD.**

RESPONSE 22-23

- a. The MWhs provided below were based on the previously provided confidential PA Consulting, Inc. forecast. The forecasted MWhs listed below are **confidential**.

[TABLE REDACTED]

- b. Neither Invenergy nor PA has calculated the annual number of MWh CREC is anticipated to produce when operated on ultra-low sulfur distillate between 2018 and 2038 broken down by calendar year. In summary, absent discrete gas shortage events (which are random events which cannot be forecast), PA does not project CREC to utilize ULSD.
- c. Invenergy has not calculated the annual cost of water in \$/MWh added to the variable cost of the unit when firing ULSD.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Ryan Hardy, PA Consulting, Inc.

DATE: February 14, 2017

WATER

22-24 **Provide the estimated monthly number of mobile demineralization trailers that will be needed per calendar year between 2019 and 2038 to operate the CREC and the total cost.**

RESPONSE 22-24 CREC would need approximately 1 mobile demineralizer trailer every month.

During the summer months, the number of demineralized trailers would be slightly higher based on the number of hours the Facility would use evaporative cooling. As an example, if the Facility used the evaporative cooling for 6 hours throughout the summer, the additional usage would require approximately 1 additional trailer per month during that period.

The rental costs of these trailers are confidential and proprietary.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-24 **Provide the estimated monthly number of mobile demineralization trailers that will be needed per calendar year between 2019 and 2038 to operate the CREC and the total cost.**

RESPONSE 22-24 CREC would need approximately 1 mobile demineralizer trailer every month.

During the summer months, the number of demineralized trailers would be slightly higher based on the number of hours the Facility would use evaporative cooling. As an example, if the Facility used the evaporative cooling for 6 hours throughout the summer, the additional usage would require approximately 1 additional trailer per month during that period.

The rental costs of these trailers are confidential and proprietary.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-26 **Provide all water ranking analyses or other documents analyzing the costs, benefits and shortcomings Invenergy developed or considered prior to submission of the Water Supply Plan to the EFSB**

RESPONSE 22-26 Please see Invenergy's response to Data Request No. 22-25 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-29 **Does the change in plant processes associated with the reduction in water usage have any impact on site and neighborhood safety? Please explain.**

RESPONSE 22-29 The change in plant process associated with the reduction in water usage does not have an impact on site and neighborhood safety.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-30 Please provide the identity and location of all power plants Invenergy or its subsidiaries (or other operators) operate with the newly proposed water/sewer saving technology to be incorporated into the CREC plant.

RESPONSE 22-30 Invenergy utilizes the mobile demineralizer trailers at their Cannon Falls, MN, Spindle Hill, CO and Ector County, TX facilities and has used them on a temporary basis at other facilities, such as Invenergy's facilities in St. Clair Ontario, Nelson, Illinois and Grays Harbor, Washington State.

The water savings technologies identified under the Water Supply Plan are conventional water treatment technologies that have been employed at many power plants and industrial facilities in one form or another for many years. In this application, the water saving technologies are not unique nor are they new. The water saving technology that will provide the most significant benefit to the reduction in water use and wastewater reduction at CREC is the use of Ion Exchange Resins in the form of mobile demineralization trailers and some simple industrial filtration systems.

Ion Exchange Resins have been employed for many years at many electric utility generating facilities and at many industrial facilities to produce high purity demineralized water from local water supplies. The Ion Exchange Resins once depleted by the removal of dissolved salts in the water supply must be regenerated by use of acid and caustic solutions. Mobile Demineralizer Trailers are simply ion exchange resin vessels and piping mounted on mobile trailers so the regeneration of the ion exchange resins can be conducted at the mobile trailer vendor's facility where the ion exchange resins are regenerated avoiding a need to chemically regenerate the ion exchange resins at the user's facility.

The use of mobile demineralization trailers employing ion exchange resins significantly reduced water use and wastewater generation at the CREC facility over the previously proposed on-site water treatment system albeit at an increased cost for the trailer demineralizer service. The mobile demineralizer trailers contain only ion exchange resins stored in demineralizer vessels and do not transport any chemicals.

To reduce water use and recycle wastewater at CREC other industrial filtration systems will also be employed. These filtration systems are industrial size filters that in a smaller form are used by many homeowners as swimming pool filters. Cartridge, sand and pre-coat type filters are commonly used by many home owners to filter swimming pool water to remove suspended dirt, hair and oil from swimming pool water. These same filtration systems at an industrial size will be

employed at CREC to remove particulates, dirt and potentially low levels of oil from floor and equipment drains and from boiler blowdown within the facility. The filtered water will be recycled to the Service Water Storage Tank for processing by the mobile demineralizer trailers for the removal of dissolved salts.

GE Mobile Water Inc. is one of the vendors that supplies mobile demineralizer services and attached as **Exhibit 2** is a letter from GE Mobile Water that provides additional information on the breadth of their services.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-31

There is mention of summer time evaporative cooling usage at a rate of 4,600 gallons per hour (gph). There is limited mention of the duration for such an event (seldom during evenings, etc.), but no defined duration per event.

- a. How many hours per day would evaporative cooling usage occur?**
- b. How many days per year on average would evaporative cooling usage occur?**

RESPONSE 22-31

- a. The 4,600 gallon per hour was a conservative estimate based on the ambient conditions of 90F degrees with a 45% relative humidity. As temperature and humidity can change throughout the day, it is difficult to predict; however, typical consumption will be at a lower rate. On average, Invenergy expects the evaporative cooling usage would be 4-6 hours per day.
- b. As temperature and humidity can change throughout the day, it is difficult to predict. It is expected that evaporative cooling would only be used during the summer months (part of June through part of September).

RESPONDENT

Amit Nadkarni, Invenergy Thermal Development LLC

DATE:

February 14, 2017

WATER

22-32

There are four (4) water balance diagrams showing different typical scenarios, but none of the scenarios include evaporative cooling usage.

- a. How much of the water used during the evaporative cooling scenarios would be consumptive (i.e., result in losses that would require make-up water)?**
- b. What would be the source of this water?**
- c. How would it be supplied to the site?**

RESPONSE 22-32

- a. Sheet 2 of the water mass balance attached to the Water Supply Plan specifies 4,600 gallons per hour for 2 units which is approximately 39 gallons per minute for each unit at 90F degrees and 45% relative humidity. This is the consumptive loss during those conditions, assuming both units at full load output. As stated in Response 22-31, the typical consumption will be lower.
- b. The water needed for evaporative cooling is a 50/50 blend of service water and demineralized water. The water utilized for this purpose will be the same source as the water indicated in the Water Supply Plan and there is no special source for this water supply.
- c. All needed water will be trucked to the Facility as described in the Water Supply Plan.

Please refer to water mass balance diagram, Appendix C, furnished as a part of the Water Supply Plan, which depicts the source of water within the plant that feeds the evaporative coolers, to better understand the flow.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-33 Assuming a 3-day oil-fired event, as outlined in the report as a worst-case scenario, do you agree that approximately 2.2M gallons would be consumed? It is unclear in the water plan as to the capacity of the various storage tanks (service/fire water and demineralized water). What are all the proposed on site water storage capacities?

RESPONSE 22-33 If the Facility were required to operate on fuel oil for 3 consecutive days, the water consumption would be approximately 2,250,000 gallons. This capacity is accommodated between the service water and the demineralized water tank.

The storage capacities of these tanks is as follows:

Fire Water/Service Water – 1,050,000 gallons of which 650,000 gallons is dedicated to fire water.

Demineralized Water – 1,850,000 gallons.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-34

The plan outlines a lengthy refill strategy of up to 1 month where approximately 9 additional trucks per day (72,000 gpd) will be used.

- a. Is there a minimum water storage capacity required or planned at the site for fire protection?**
- b. Is there a plan to have some peak water truck delivery (for example, 30 to 60 trucks on Day 1 of the refill) in order to satisfy fire protection needs?**

RESPONSE 22-34

- a. Yes, the tank will be designed for approximately 650,000 gallons of dedicated fire water storage.
- b. No, the firewater tank will be filled up during the construction/commissioning phase, and the reserve water will be untouched unless a fire event has occurred at the plant. If there is a fire event, CREC would expect to replenish the tank in the same manner as following an oil fired event.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-35 **Is it possible that this revised process may impact the overall footprint of the facility and further impact wetlands? Please explain, and please submit a site plan for the revised facility.**

RESPONSE 22-35 The new water plan affected individual components within the plant but not the overall footprint of the Facility. Accordingly, there is no further impact to wetlands.

A revised site plan is being prepared and will be provided in the near future.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-36 **Is it true that with the reduced process water demand for the project, the local water suppliers may have adequate capacity to provide water to the CREC? Could a local water supply be piped to the site, eliminating the impacts of trucking water to the site?**

RESPONSE 22-36 Yes, if a local water supply were willing to commit to supplying water to the Project, Invenergy would of course be interested in working with a local water supply. If the Town has a particular local supplier in mind, please let us know. No local water supplier has approached Invenergy to supply water at this point, with the reductions as referenced in the Water Supply Plan.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-37 Could onsite subsurface conditions be evaluated to determine if the site could provide both process and potable water to the facility?

RESPONSE 22-37 As noted in the recently-submitted Water Supply Plan, an on-site well will be used for potable water. However, with regard to process water, in consideration of the many concerns expressed by the Town of Burrillville over the use of local water supplies and the possible use of water from a previously-contaminated Pascoag Utility District (PUD) groundwater well for process water for the CREC, an alternative water supply plan has been developed. Given the high level of uncertainty in the yield of bedrock water wells and the previously expressed concerns regarding the use of water within the Clear River watershed, Invenergy does not plan to evaluate the potential for use of an on-site water source(s) for process water for the CREC.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-39 **Please verify the water truck planned capacity, which has been reported as both 7,200 gallons and 8,000 gallons.**

RESPONSE 22-39 The water truck capacity is 8,000 gallons.

The McMahon Traffic Analysis (Appendix E to the Water Supply Plan) is based on 8,000 gallons.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-40 **The Trip Generation in the original report (May 2016) does not specifically reference an oil-fired event. Please explain in detail the assertion that the generated traffic from such an event has been reduced.**

RESPONSE 22-40 Page 16 of the Traffic Impact Study, dated May 2016, indicates the frequency of the oil trucks at 3 - 4 per hour. This would lead to 24 - 32 trucks in an 8 hour period.

The revised Plan states that there will be a total of 22 trucks (water, oil, ammonia, demineralized water, wastewater) per day over the replenishment period.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-41 **Is there a plan for monitoring and/or enforcing the voluntary extension of the oil-firing replenishment duration? Are the specifics of this duration extension documented somewhere? Wouldn't this be inefficient and costly for the operators? Please explain.**

RESPONSE 22-41 The durations that were based on the 22 trucks per day, were based on Invenergy's reasonable expectation and is Invenergy's commitment to balance the needs for replenishment with traffic impacts. The specifics are documented in Invenergy's Water Supply Plan, Section 2.2.1, Section 2.3.1 and Appendix E.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-42 What truck percentages were used in the previous signalized intersection analyses and in the updated analysis? Please explain.

RESPONSE 22-42 Both analyses report the worst-case-scenario conditions during the peak hours when the proposed site experiences a response to an oil fire event, which would require additional water and oil trucks to access the site. The Traffic Impact Study reports that following an oil fired event, trucks will access the site to a total of four trucks per hour during peak hours.

The supplemental analysis reported in the January 11, 2017 memorandum (Appendix E of the Water Supply Plan) reports that in an effort to reduce traffic impacts of the oil fired response trucks, oil replenishment will be extended over a longer duration, reducing the number of daily trucks and trucks that are expected to access the site during the peak hours. With the proposed water trucks as well as the oil fired response, it is expected that no more than three trucks would access the site during the peak hours. This decrease in daily and peak hour trucks was a result of the change in response duration for replenishing oil after an oil fired event.

The analysis was revised to reflect this change as were the truck percentages for the final build condition. Synchro analysis reports showing the difference in traffic volumes and truck percentages are attached as **Exhibit 3**.

RESPONDENT: Maureen Chlebek, McMahon Associates

DATE: February 14, 2017

WATER

22-44 **Please provide a copy of Johnston's wholesale water agreement with Providence Water.**

RESPONSE 22-44 Invenergy is not aware that any such agreement exists. Invenergy understands that Johnston purchases its water from Providence Water Supply pursuant to Providence's wholesale tariffs.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-48 **What effect, if any, will the change in operating processes as set forth in the water plan have on data previously provided in the application and data responses? Please explain.**

RESPONSE 22-48 CREC's new Water Supply Plan essentially replaces sections 6.2.3, 6.2.4 and 6.2.5 of the original EFSB Application and any water or wastewater related data requests. The effect of the change in operating processes on data previously provided in the application and data responses is detailed in the Water Supply Plan.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-57 **Is Johnston your one exclusive primary water source or are you still considering any other water sources?**

RESPONSE 22-57 Johnston is Invenergy's primary supplier. Invenergy has identified a contingent/redundant source, Benn Water & Heavy Transport Corp. Invenergy is still considering additional contingent/redundant sources.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

22-58 **What will you do if Providence refuses to allow Johnston to re-sell water to Invenergy?**

RESPONSE 22-58 If for some unknown reason, Johnston is unable to sell the water it obtains from the Providence Water Supply Board, Invenergy will utilize its contingent/redundant supply, as identified in its Water Supply Plan.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WATER

23-1 **Regarding the water plan, will the newly proposed water treatment system add any mechanical equipment to the site that could produce noise, such as might be associated with a zero liquid discharge system (crystallizer pumps, vapor compressors or brine recirculation pumps), for example? If so, what measures are planned to ensure that this additional noise is adequately mitigated so that the facility remains in full compliance with the Town of Burrillville's noise limits at all times?**

RESPONSE 23-1 There is no new equipment that will produce noise that changes the results of the noise model or report that was previously submitted.

Under the water plan that was previously submitted, and that which was modeled acoustically, all noise-producing water treatment equipment, such as pumps and the reverse osmosis system, were contained inside the Water Treatment Building. In the acoustic model of the Clear River Energy Center (CREC or Facility), a noise level of 85 dBA was assumed inside this building based on measurements at other sites. The building was modeled assuming standard steel construction with ventilation openings. Resulting noise levels at the nearest residences due to this source only were more than 20 dBA below the total and, therefore, not a contributing factor at all. The revised water supply plan (Water Supply Plan or Plan) involves a smaller Water Treatment Building, due primarily to the elimination of the reverse osmosis and electrodeionization system. The new Plan adds portable demineralization trailers, which house only tanks and pipes but not pumps. The only noise source inside the trailers is flowing water. If one assumes a conservatively high noise level of 80 dBA inside these trailers, as well as the sound transmission loss of a standard 'semi-trailer', the resulting noise levels at the nearest residences are again more than 20 dBA less than the total and, therefore, non-contributing. In summary, the revised water treatment system will produce less noise than the previous system and is not a contributing factor to overall noise levels at nearby residences.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

Mike Hankard, Hankard Environmental Acoustical Consultants

DATE: February 21, 2017

WATER

23-2 Have you ever constructed a natural gas/oil fired electric generating facility of the size and magnitude of the CREC, whose process water demands were addressed with drinking water from a public water supply, delivered by truck, in the manner you are now proposing? If not, are you aware of any similar existing facilities? Please explain in detail.

RESPONSE 23-2 Invenergy Thermal Development LLC (Invenergy) has not constructed a natural gas/oil fired electric generating facility with the same design features as proposed for CREC as posed by this question. Process water source and demand are unique features of nearly every electric generating facility.

Invenergy has constructed six natural gas fired electric generating facilities and has a seventh under construction. Some, but not all of them, also fire oil. Invenergy's St. Clair, Ontario, Grays Harbor, WA, Nelson, IL and Lackawanna, PA facilities all have larger water demands than CREC. The water supply for Invenergy's Cannon Falls, MN, Spindle Hill, CO and Lackawanna, PA facilities are all supplied with water from a public water supply. Invenergy's facilities in St. Clair, Ontario, Nelson, IL, Grays Harbor, WA and Ector County, TX source their water from either rivers or wells. All of these facilities use a pipeline to deliver water.

The water savings technologies identified under the Water Supply Plan were utilized to minimize consumption and, therefore, allow for the delivery of water by truck. It is Invenergy's understanding that Ocean State Power (OSP) utilizes trucked water for its wet cooled plant. It is also Invenergy's understanding that the water plan for the proposed Exelon West Medway LLC generation project in Massachusetts includes trucking water as a back-up source of supply, if needed.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 21, 2017

WATER

23-3

Have you ever constructed a natural gas/oil fired electric generating facility of the size and magnitude of the CREC whose water treatment process was designed to utilize mobile, trailer mounted demineralization systems as a permanent component of the process? If not, are you aware of any similar existing facilities? Please explain in detail.

ORIGINAL
RESPONSE 23-3

Invenergy has not constructed a natural gas/oil fired electric generating facility with the same exact design features as proposed for CREC as posed by this question. Water treatment processes are unique features of nearly every electric generating facility. Invenergy has constructed a number of facilities with similar design features for the treatment of process water.

As stated in Invenergy's Response to the Town's Data Request No. 22-30, Invenergy utilizes the mobile demineralizer trailers at our Cannon Falls, MN, St. Clair, Ontario, Spindle Hill, CO and Ector County, TX facilities and has used them on a temporary basis at other facilities, such as Invenergy's facilities in Nelson, Illinois and Grays Harbor, Washington State.

The water savings technologies identified under the Water Supply Plan are conventional water treatment technologies that have been employed at many power plants and industrial facilities in one form or another for many years. In this application, the water saving technologies are not unique nor are they new. The water saving technology that will provide the most significant benefit to the reduction in water use and wastewater reduction at CREC is the use of Ion Exchange Resins in the form of mobile demineralization trailers and some simple industrial filtration systems.

GE Mobile Water Inc. is one of the vendors that supplies mobile demineralizer services, and a letter from GE Mobile Water that provides additional information on the breadth of their services was submitted to the Energy Facility Siting Board on February 14, 2017 as an attachment to Invenergy's Responses to the Town's 22nd Set of Data Requests.

SUPPLEMENTAL
RESPONSE

Invenergy recently became aware of the following similar facilities that have been fully permitted/constructed and have been or soon will be placed into commercial operation. Both these electric generating facilities will utilize mobile, trailer mounted demineralization systems as their permanent method of production of demineralized water to support operation of these facilities.

The Carroll County Energy Center located in Carroll County, northeastern Ohio is a 700MW gas/oil fired combined cycle electric generation facility incorporating dry cooling for heat rejection. This facility was placed into commercial operation on January 10, 2018.

The CPV Towantic Energy Center located in Oxford, Connecticut which is a 785MW gas/oil fired combined cycle electric generating facility incorporating dry cooling for heat rejection has completed construction

and is planned to begin commercial operation in the spring of 2018.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: May 2, 2018

WATER

23-5 Have you ever constructed a natural gas/oil fired electric generating facility of the size and magnitude of the CREC whose onsite potable water from domestic use was supplied by an onsite drilled well, with sanitary waste supplied by a separate onsite wastewater treatment system constructed on the property? If not, are you aware of any similar existing facilities? Please explain in detail.

RESPONSE 23-5 The MW output or size of the Facility does not have a factor on the domestic water needs of the Facility as these needs are driven by the number of employees. Invenergy has not constructed a natural gas/oil fired electric generating facility with the same exact design features as proposed for CREC as posed by this question. Invenergy has constructed a number of facilities with similar design features for the design of the potable water supply and sanitary wastewater treatment.

Invenergy's Hardee, FL facility has onsite wells for domestic water supply. Invenergy's Ector County, TX facility is supplied with domestic water supply from a private well on the adjoining property. Invenergy's Hardee FL, Grays Harbor, WA, St. Clair, Ontario, Nelson, IL and Ector County, TX facilities all have septic systems for onsite wastewater treatment of sanitary waste.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 21, 2017

WATER

25-2 **In the Revised Water Supply Plan, (page 4) 2.2.1 paragraphs 5 and 6, please clarify where the general housekeeping, floor/equipment drains, and general maintenance water discharges. Please clarify the location of the discharge.**

RESPONSE 25-2 Please refer to the water balance provided in Appendix C of the revised Water Supply Plan, filed with the Energy Facility Siting Board (“the Board”) on January 11, 2017. The general housekeeping, floor/equipment drains and general maintenance water is depicted as Misc. Plant Services and discharges to the Oil Water Separator as shown on the water balance documents. After oil is extracted, water is sent to a Waste Water Collection Tank before being treated and recycled into the system or trucked offsite.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
 Amit Nadkarni, Invenergy Thermal Development LLC

DATE: March 20, 2017

WATER

25-3

Please clarify the following regarding the demineralization trailers:

- a. Is there redundancy in the demineralization trailers to handle an oil fired event? Appendix C, Sheet 4 appears to show an additional Mobile Ion-Exchange Demineralization Trailer in use during an oil burning event. Please clarify the number of demineralization trailers on site.**
- b. The equipment cut sheets shown in Appendix B, the demineralization trailer, require a minimum flow rate of 50 GPM. However, the flowrates in Appendix C Water Balance Diagrams show flows through the demineralization trailers below this rate. Please advise if the design intent is to run at this low flowrate or to run as a batch process at the higher required GPM for a shorter amount of time.**
- c. Please advise if there is a reason as to why regenerating on site is not being considered (e.g. to avoid trucking regen liquid).**

RESPONSE 25-3

- a. There is no requirement for redundancy for the demineralization trailer for the oil fired event. When using oil, the throughput of water increases and what is shown on the diagram is that there is a spare connection for an additional trailer that can be hooked up to allow a seamless transfer from one trailer to the next.

There will be one demineralized trailer at a time at the Facility, including the oil fired event.

The site plan has a space allocation for two demineralized trailers for ease of switching out the trailers.

- b. There is a minimum flow required to be processed through the trailer. The Facility will operate the demineralization trailer as a batch process.
- c. Regeneration on site is not possible. The regeneration process is a special treatment process and is proprietary to the supplier. Regenerating the trailers onsite, if it could be accomplished, would increase water demand and negate the key purpose of using the mobile demineralization trailers. The regeneration process would also involve a back wash cycle, which would increase the waste water discharged from the Facility. Utilizing the mobile demineralization trailers minimizes the total number of water and waste water trucks that need to travel to and from

the site.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: March 20, 2017

WATER

25-4

Please clarify the following about the evaporative cooling process.

- a. Please provide the anticipated conditions (dry bulb temperature, wet bulb temperature, and/or relative humidity) at which evaporative cooling will be used.**
- b. Figure 2.3 Water Source Capacity (page 13) in the Revised Water Supply Plan evaluated the “use to supply” capability assuming 8 hours per day and presents that this water source is more than adequate, but also that the use of the evaporator use is discretionary. Please provide the anticipated annual number of hours in evaporative cooling.**
- c. If the make-up water for the evaporative cooling flow requires the maximum flow of 4,600 GPH for 8 hours per day, that would increase the truck traffic by 4.6 trucks per day. Please clarify if this is correct or provide the anticipated duration and increase in daily truck traffic related to replenishing over time (similar to Table 2.5).**
- d. The conceptual flow models shown in Appendix C do not include any cases where the evaporative cooling is shown. The evaporative cooling is only mentioned in a note. Please include a revised mass balance diagram showing the case where the evaporative cooling is at a maximum, 4,600 GPH.**

RESPONSE 25-4

- a. Evaporative Cooling (“EC”) increases the plant efficiency to produce incremental power. The effectiveness of the evaporative cooling function depends on the difference between ambient temperature (dry bulb temperature) and relative humidity or wet bulb temperature, and the consumption rates vary based on the difference between these two temperatures (wet bulb and dry bulb). When the ambient temperature is high (high dry bulb temperature) and the humidity is high (high wet bulb temperature), the effectiveness of the EC is low, and its use would not consume as much water as compared to when it is hot and dry. In Rhode Island, normally hot days are accompanied by high humidity (i.e. high wet bulb temperatures), and the EC is not as effective. However, those are the conditions that create higher demand on the electrical system. Invenergy expects that it would only use EC when the demand for energy is high; for example, when the ambient temperature is above 80F.

The decision to operate the evaporative coolers is at the discretion of the Facility and this function is not required for normal plant operation. The decision on when to operate EC is a function of the effectiveness of the EC due to variable ambient weather conditions and the coincident demand on the electrical

system.

A review of the historical weather data in Providence indicates that temperatures above 80F, when it is more likely to operate evaporative cooling, occur approximately 400 hours a year.

As stated in the response to data set 22, response 31, Invenergy expects to run the evaporative coolers for 4-6 hours per day, and it would be used only during the summer months (part of June-part of September).

- b. Figure 2.3 Water Source Capacity (page 13) in the Revised Water Supply Plan was merely comparing a conservatively high estimate of CREC water use (i.e. 8 hours a day of evaporative cooling) against the capacity of the Providence Water Supply system. As mentioned above, there is a potential to operate the evaporative coolers for approximately 400 hours per year based on historical weather data. However, as stated in the response to data set 22, response 31, Invenergy expects to run the evaporative coolers when the circumstances warrant such usage, and, if so, for about 4-6 hours per day only during the summer months (part of June through part of September).
- c. The 4600 GPH is a maximum expected demand based on evaporative cooling when the ambient conditions are 90F/45% RH. Based on our review of historical ambient conditions, there are very few hours in a year that would see those high temperatures (above 90F). However, Invenergy does anticipate that there will be periods of time when consistent high temperatures occur over several days. Under these circumstances, CREC EC water needs can be met by up to 3 additional trucks per day maximum, for those times when consistent high temperatures warrant extended EC operation over the course of the summer months.
- d. See attachment.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: March 20, 2017

WATER

25-5 Please confirm that the design conditions stated in Appendix C are the worst case scenarios (e.g. Is the evaporative cooling designed for the ASHRAE maximum temperature?)

RESPONSE 25-5 The conditions included in the water balances represent the maximum expected cases that the Facility should be designed for. Although there could be hotter or colder days, the expected durations of those days are short and are not used for design purposes. The basis of the conditions used in the water balances are as follows:

Drawing WMB-01 in Appendix C of the revised Water Supply Plan represents an average ambient condition based on data from ASHRAE.

Drawing WMB-02 represents a summer ambient condition. This data point was chosen based on ISO-NE requirement for demonstrating the summer Claimed Capability which shall be based on a 90 degree Fahrenheit day.

WMB-03 represents a winter ambient condition firing on natural gas, and drawing WMB-04 represents a winter ambient condition firing on fuel oil. This case is a worst case from a water consumption stand point. This data point was chosen based on ISO-NE requirement for demonstrating the winter Claimed Capability which shall be based on a 20 degree Fahrenheit day.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
 Amid Nadkarni, Invenergy Thermal Development LLC

DATE: March 20, 2017

WATER

Request 27-12

(a) Why isn't there a maximum water demand/need per year set forth in the new "Water Supply Plan" and in the signed Water Agreement with Johnston? Please explain.

(b) What prevents the proposed facility from using over and above the maximum number of water trucks listed in the "Water Supply Plan"? Please explain.

(c) Is there anything in the Johnston contract that allows the facility to use more water other than the words "approximately" or "estimated to be"? Please explain.

(d) Can you guarantee that the proposed facility will always use the volume of water as outlined in the new "Water Supply Plan"? If not, what is Invenergy's/CREC's estimated/approximated maximum water demand/year? Please explain.

(e) Can you guarantee that the proposed facility will always use the recycling system as outlined in the new "Water Supply Plan"? Please explain.

RESPONSE 27-12

(a) As depicted in the Water Supply Plan (the "Plan"), Figure 2.3 (water source capacity), the annual water demand for CREC will be just a small fraction of the available capacity of the Providence Water Supply and the Town of Johnston water supply system will not be affected in its ability to supply water to its current and future customers. Therefore, a maximum water demand for the CREC facility was not a part of the discussion with the Town of Johnston.

Furthermore, CREC's annual water use will vary with plant load, ambient air temperature and to the extent the Facility is required to fire distillate oil. As such, CREC's actual water use will vary from year to year based on the above factors and the need for electricity from CREC, all of which are outside of CREC's control.

(b) The CREC water demand provided is a conservative analysis of the water needs of the Facility assuming the Facility is operated at its maximum capacity throughout the year. CREC conservatively estimated the maximum number of water trucks for each season that includes up to 3 additional trucks per day for evaporative cooling which was assumed for the entire summer season and the study accounts for 3 days of oil firing. Invenergy expects that the number of trucks represented in the Plan should be the maximum expected number of trucks on an annual basis since the facility will not be operating at full load every day of the year.

- (c) The Johnston water supply contract does limit the maximum number of trucks per day for a refill event. This is the maximum demand flow rate that CREC can use. CREC's water use is outlined in the water plan and limited to those services (steam cycle make up, evaporative cooling and injection for emissions control when firing oil) required by the Project. The only variable to those uses is how often CREC runs, on gas and oil, and the estimated demands were based on operational projections that assumed the plant would be running every day at its maximum output.
- (d) The water demand provided in the Plan is the projected maximum water demand, but this water demand is not guaranteed to account for variability in weather outside of CREC's control. As an example, the study accounts for 3 days of oil firing, should there be another event that requires the need for operating on distillate oil, the water demand would be higher.

The Water Supply Plan included Figure 2.3 "Comparison: CREC Annual Water Usage, Average Day Demand (Projected – 2030) and Safe Yield (83MGD)," which provided a comparison of a conservative estimate of the CREC annual water use with the Safe Yield of the Providence Water Supply System. To make this comparison, CREC estimated its annual water use based on the following conservative assumptions:

- The CREC Facility will operate every day of the year at full load
- A conservative approach to estimating evaporative cooling water use assuming evaporative cooler water use rate for as much as 8 hours per day with an ambient air that represents a 90 °F and 45% RH day for a total of 90 days, and
- The CREC Facility will be required to operate for a total of 3 days of distillate oil firing.

Under these conservative assumptions, the CREC's estimated annual water use would be 11.5 million gallons, which is 0.038% of the Safe Yield of the Providence Water Supply system.

If the conditions remain as specified in the Plan, then the water demand could be viewed as a maximum water demand.

- (e) Yes. The water mass balance provided in the Water Supply Plan stated that the HRSG blowdown water would be sent to the Wastewater Collection Tank during start-up and upset condition. This statement is being superseded by "just upset condition." In essence, the HRSG blowdown will be recycled directly to the

Service water/Fire water tank at all times but for upset conditions. An upset condition, although rare, could occur if the recycling system, including the filtration system failed to operate. In this case, the HRSG blowdown would be sent to the Waste Water Collection Tank and then recycled back into the Service Water Tank. Either way, the Facility will recycle the HRSG blowdown at all times.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-13 **On page 5 of “Water Supply Plan” it states: “Based on the annual average cycle makeup water demand, this is equivalent to approximately one trailer needing to be regenerated per month. To provide operational flexibility and avoid trailer demurrage charges, a higher volume of water may be processed through the demineralizer trailers than required for plant operation and the excess water stored in the demineralized water storage tank. Each demineralizer trailer is able to make approximately 400 gallons per minute of demineralized water from the municipal water supplied to the Facility.” Is Invenergy/CREC planning to have an option of utilizing more than one demineralizer trailer at a time?**

RESPONSE 27-13 CREC does not plan on operating more than one demineralizer trailer at any given point in time. There is a space allocation for an additional trailer in conjunction with a design that facilitates ease of hook up of the second trailer during change out of the exhausted trailer.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-17 **Will the Demineralizer trailer be “stored” on a site with secondary containment? If the Demineralizer leaks to the ground surface will this water affect the wetlands in the area? Please explain.**

RESPONSE 27-17 Demineralizer trailers will be parked indoors in an area designated for their use. The area will have floor drains connected to the floor drain system that is connected to the oily water separator, so any leaks will not migrate to the local wetland area. This area does not require a secondary containment as the only materials stored in the demineralizer trailers are ion exchange resin beads (a solid) and water in contact with the ion exchange resin beads. There are no chemicals stored in the demineralizer trailers as all chemical regeneration of the demineralizer trailers occurs off-site at the demineralizer trailer supplier’s regeneration station.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-18

On page 8 of the “Water Supply Plan”, it states: “Any wastewater stream that might be generated by the filtration system will be collected in a wastewater disposal tank or sump and hauled off-site for disposal at a POTW or other facility licensed to receive and treat these wastewaters. The filtered wastewater may still contain low amounts of oil/grease. The oil/grease can be removed by several types of filter pre-coats such as activated carbon....”.

(a) What POTW has Invenergy either already contacted or is thinking about contacting?

(b) What chemicals found in the waste stream will make it impossible for a POTW to treat thus making it necessary for “other facility licensed to receive and treat these wastewaters”?

(c) What “other facility” (not a POTW) has Invenergy contacted or is thinking of contacting?

RESPONSE 27-18

(a) Currently, Invenergy has not contacted any POTW. Invenergy intends to contract with qualified contractors to haul away the process waste water for disposal at a POTW or facility licensed to receive and treat those wastewaters.

(b) There will be no chemicals in the CREC process wastewater streams that would prevent any POTW from being able to successfully receive and treat CREC process wastewaters. 40 CFR 423, Steam Electric Power Generating Point Source Category, specifically allows discharge to POTWs and identifies, under part 423.17, specific pretreatment standards that must be met for electric generating facilities that plan to discharge wastewaters to a POTW. A projection of the CREC process wastewater composition was included in Table 3.1 of the Water Supply Plan, which fully meets the part 423.17 pretreatment standards for discharges to POTWs.

On page 8 of the Water Supply Plan, CREC simply identified that other than POTWs, there are commercial wastewater treatment facilities that are also licensed to accept and treat industrial wastewaters that could be considered to receive CREC process wastewater.

(c) Invenergy has not contacted any commercial wastewater treatment facilities.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-24 **If the Facility is approved by the EFSB and the construction phase is over, the Service/Fire Water Storage tank and the Demineralized Water storage tank must be filled.**

- (a) How many tankers of water will be needed to fill these two tanks?**
- (b) How many tankers per day will there be and for how many days?**
- (c) Where are these tankers' "Truck Emissions" (Exhibit 4 of Data Request Response #22) in the table provided?**
- (d) What are these tankers' VOC, THC, CO, NO_x, PM_{2.5}, PM₁₀ and CO₂ emissions for the period answered in #27 above (in lbs/day and total for the period of time provided in your answer to #27?**
- (e) How many times will the Demineralizer trailer need to be replaced over this period of time?**

RESPONSE 27-24 (a) These tanks will be filled up as a part of the construction phase of the project, to facilitate the commissioning and check out of the applicable plant systems, which happens prior to the Facility being operational. Approximately 360 tanker truck trips will be needed to fill these two tanks.

(b) The initial fill of the water tanks will be conducted over a period of a couple of months, and it is anticipated that the maximum daily number of trucks will not exceed the value reported in the Water Supply Plan of 13 water tanker trucks per day.

(c) **Exhibit 27-24** provides an estimate of these tanker truck emissions.

(d) **Exhibit 27-24** provides an estimate of these tanker truck emissions.

(e) The demineralizer trailer will need to be replaced twice over this period of time.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.
George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-27 **If the only portions of the Facility’s technology which has changed includes 1) changing from the RO/EDI to mobile Demineralizing systems and 2) maximum recycling of water:**

(a) Why is the total volume to the “Steam/Water Cycle” changed from 54 gpm (in the original application “Average Ambient Conditions”- 2 turbines firing natural gas) to 33 gpm (in the new Water Supply Plan’s “Average Ambient Conditions” — 2 turbines firing natural gas)?

(b) Why is the total volume to the “Steam/Water Cycle” changed from 63 gpm (in the original application “Summer Ambient Conditions” — 2 turbines firing natural gas) to 40 gpm (in the new Water Supply Plan’s “Summer Ambient Conditions” — 2 turbines firing natural gas)?

RESPONSE 27-27 (a) The original application presented a conservative volume of steam/water cycle makeup to the HRSG assuming worst case steam cycle chemistry and system losses. After finalizing the selection of a power island equipment supplier and receipt of more refined information from the equipment supplier, the assumptions for HRSG blowdown rate and non-recoverable losses in the steam cycle were reduced. This decreased the steam/water cycle makeup requirements depicted on the water balances.

(b) Please see (a) above.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-28

Note 9 (“Facility Water Balance” Sheets 1-4, 2-4, and 3-4) and Note 14 (“Facility Water Balance” Sheet 4-4) state: “HRSG Blowdown will be routed to the wastewater collection tank only during startup and plant upset conditions.”

(a) What will the gpm of water from this HRSG Blowdown be during startup of the plant?

(b) What are the possible “plant upset conditions”? Please list and describe in detail all possible “plant upset conditions” scenarios and state resulting gpm to the wastewater collection tank.

(c) This HRSG Blowdown (regardless of the plant function, i.e., startup or “plant upset conditions”), implies that this increase in flow to the wastewater collection tank will result in more wastewater tanker traffic to and from the facility.

- 1. Is this true? Please explain.**
- 2. How many more wastewater tankers will be needed during a “normal” startup?**
- 3. How many more wastewater tankers will be needed during each of the “plant upset conditions”?**

RESPONSE 27-28

(a) Notes 9 and 14 on Facility Water Balance Sheets 1-4, 2-4, and 3-4 are not correct and need to be revised to indicate that blowdown is directed to the waste water tank only during upset conditions. During start up conditions, the blowdown water is sent to the service water/firewater tank. See updated water balance diagrams attached as **Exhibit 27-28**. The flow of HRSG blowdown is intermittent and will vary depending on the duration of the startup (i.e. the condition of the plant equipment: cold, warm, hot) and the state of the cycle water chemistry within the HRSG. The maximum expected flow during start up would be 170 gpm, which is approximately 7% of the steam cycle flow during start up. Normal blowdown flow is typically 0.5% to 1.0% of steam cycle flow. However, in both cases the water will be recycled back to the service water/firewater tank, so there is no increased water demand.

(b) The only upset condition that could cause all of the blowdown flow to be diverted to the wastewater collection tank is a mechanical or control system logic failure. Water system operational upsets are not expected to occur. If the plant did have upset and if this situation occurred during a startup condition and the HRSG blowdown had to be recycled through the wastewater system, there is a potential of increased waste water being generated, which does not necessarily

correlate to increased wastewater trucks. The wastewater collection tank and the wastewater disposal tank/sump will be used as surge tanks to control the flow of wastewater and the number of trucks can be managed to remain the same. Secondly, the estimate of 1gpm of wastewater under normal operating conditions being discharged from the Facility is a conservative estimate given that the only other source going to the wastewater collection tank is from the oil water separator and that is not a continuous flow.

(c) While there may be plant conditions that lead to a temporary increase in flow to the wastewater collection tank, the majority of the water in that tank will be treated and recycled to the Fire/Service Water Tank.

1. No, Invenenergy does not expect an increase in waste water truck traffic. Please see the response above to part (b).
2. The normal startup accounts for recycling of the blowdown water to the service water tank. Therefore, no additional truck trips will be generated during the startup, normal operation, and the shutdown of the plant than what was stated in the Water Supply Plan. Note 9 of the water mass balances provided as a part of the Water Supply Plan that states the blowdown stream would be sent to the waste water collection tank during startup has been modified to upset condition only.
3. The wastewater collection tank and the wastewater sump/disposal tank will act as a buffer to avoid having more truck traffic due to wastewater discharge. This additional water can be discharged over time and would not increase the wastewater disposal truck traffic.

Secondly, the size of the truck used to haul wastewater was assumed to be 3,200 gallons while evaluating the Water Supply Plan. Based on current discussions with licensed facilities, an 8,000 gallon truck can be utilized to dispose of the wastewater, which will reduce the truck traffic due to wastewater disposal.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-29 **What are the Facility Startup water demands? Please explain with specifics.**

RESPONSE 27-29 The net plant water demand for startup during different ambient conditions will be the same as specified in the water balance drawings provided as a part of the Water Supply Plan due to recycling of the blowdown and the wastewater stream during the startup condition.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-30 What are the Facility Shutdown water demands? Please explain with specifics.

RESPONSE 27-30 Shutdown of the Facility requires 12 minutes, and the water demand is not more than the water demand in a normal operating condition as specified in the water balance drawings provided as a part of the Water Supply Plan.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 27-31 **What are the Facility Emergency Shutdown water demands? Please explain with specifics.**

RESPONSE 27-31 As described in the response to Data Request No. 27-14, it takes a couple of seconds to shut down the plant in an emergency. There are no special water requirements during that time frame.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

WATER

Request 32-9 **In light of the litigation concerning the proposed Johnston water supply arrangement, have any attempts been made to secure an alternate water supply? If so, please provide details.**

Response 32-9 Invenergy has not made any attempts to secure alternative water sources as a result of the litigation. As indicated in our response to the Town's Data Request No. 22-57, Invenergy continues to engage in sound, responsible business practices through the exploration of additional contingent water sources to supplement the contingency contained in our previously filed water supply plan.⁹

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 9, 2017

⁹ The Town's Data Request, No. 22-57, states: "Is Johnston your one exclusive primary water source or are you still considering any other water sources?" In response to the Town's Data Request, No. 22-57, Invenergy stated: "Johnston is Invenergy's primary supplier. Invenergy has identified a contingent/redundant source, Benn Water & Heavy Transport Corp. Invenergy is still considering additional contingent/redundant sources."

WATER

33-1 In Response to the Town’s data request 32-9, Invenergy stated “Invenergy has not made any attempts to secure alternative water sources as a result of the litigation.” (Emphasis added.) Invenergy went on to state that it is continuing “the exploration of additional contingent water sources to supplement the contingency contained in our previously filed water supply plan.”

Regardless of whether Invenergy’s attempts have been made to secure additional contingent water sources “as a result of the litigation” or not, please set forth in detail all of Invenergy’s efforts to explore additional contingent water sources to supplement the contingency contained in your previously filed water supply plan. Please identify any and all additional possible sources of water that have been considered or explored including, but not limited to, the location of the water supply.

RESPONSE:

Invenergy Thermal Development LLC (“Invenergy”) respectfully objects to the Town of Burrillville’s (“Town’s”) Data Request, No. 33-1 on the ground that it seeks confidential, proprietary, and irrelevant information that is plainly outside the scope of discovery and likely is sought for an improper purpose. The Town’s Data Request, No. 33-1 requests the following:

In Response to the Town’s data request 32-9, Invenergy stated “Invenergy has not made any attempts to secure alternative water sources **as a result of the litigation.**” (Emphasis added.) Invenergy went on to state that it is continuing “the exploration of additional contingent water sources to supplement the contingency contained in our previously filed water supply plan.”

Regardless of whether Invenergy’s attempts have been made to secure additional contingent water sources “as a result of the litigation” or not, please set forth in detail all of Invenergy’s efforts to explore additional contingent water sources to supplement the contingency contained in your previously filed water supply plan. Please identify any and all additional possible sources of water that have been considered or explored including, but not limited to, the location of the water supply.

Invenergy objects to Data Request, No. 33-1 on the following grounds: (i) The Request seeks information related to potential negotiations or potential other contingent/redundant sources that have not resulted in any formal agreement, which is wholly irrelevant to the issues before the Rhode Island Energy Facility Siting Board (“EFSB” or “Board”) and is unlikely to lead to the discovery of admissible evidence; (ii) The Request appears to seek information for the improper purpose of attempting to interfere with Invenergy’s attempt to negotiate with and/or contract with an alternative contingent/redundant water supplier and preventing Invenergy from conducting business in Rhode Island; (iii) The Request seeks confidential and proprietary

business information related to Invenergy's business strategy and negotiations; and (iv) The Request is unduly burdensome, in that if Invenergy is forced to provide the information requested, that production will adversely impact Invenergy's ability to fairly negotiate and secure other contingent water supply arrangements. The grounds for Invenergy's objections are articulated more fully below.

The information sought in Data Request, No. 33-1 is plainly irrelevant and beyond the scope of discovery permitted under the EFSB Rules of Practice and Procedure ("EFSB Rules"). EFSB Rule 1.27(b) only permits parties to request information that is "reasonable" and "relevant to the proceeding." EFSB Rule 1.6(b)(11) requires an Applicant to provide information on its support facilities, including water, and an analysis of their availability. Invenergy provided that information to the Board in its January 11, 2017 revised Water Supply Plan. If Invenergy actually enters into an agreement with an additional contingent/redundant supplier, it will supplement its Water Supply Plan and its response to the Town's Data Request, No. 32-9 to disclose the existence of that agreement and supplier.¹

Neither EFSB Rule 1.6(b)(11) nor any other EFSB Rule, however, requires an Applicant to provide information on its attempts to secure a contingent/redundant water source and/or the identities of possible prospective suppliers that the Applicant is talking to, "considering," or "exploring." Indeed, such information has no bearing on Invenergy's Water Supply Plan because Invenergy has not yet entered into an agreement, and it is purely speculative as to whether Invenergy will reach another agreement. *See, e.g., Micro Motion, Inc. v. Kane Steel Co., Inc.*, 894 F.2d 1318, 1328 (Fed. Cir. 1990) ("A litigant may not engage in merely speculative inquiries in the guise of relevant discovery."). Thus, the information sought in Data Request, No. 33-1 is beyond the scope of discovery permitted by the EFSB Rules and is flatly irrelevant.

In addition, Data Request, No. 33-1 is not only irrelevant, but also is unduly burdensome and improper in that it seeks sensitive and confidential business information and strategy on what Invenergy might be "considering" or "exploring." A party cannot obtain another party's proprietary and confidential business information (including information regarding negotiations), unless the information is relevant and not unduly burdensome and adequate protections are in place. *See, e.g.,* EFSB R. 1.27(b)(3) (stating that the relevancy of data requests is determined under the standards established by Rule 26 of the Rhode Island Superior Court Rules of Civil Procedure); R.I. Super. R. Civ. P. 26(b)(1) (noting that the court "shall" limit unduly burdensome discovery, even if it is relevant); R.I. Super. R. Civ. P. 26(c)(7) (noting that the court can enter into a protective order to protect a party from undue burden, including an order "that a trade secret or other confidential research, development, or commercial information not be revealed."); *Providence Journal Co. v. Convention Ctr. Auth.*, 774 A.2d 40, 47 (R.I. 2001) (determining that documents regarding negotiations that led to the booking of events "fall squarely within the [Access to Public Records Act ("APRA")] exemption for confidential commercial or financial information"); *see also Barnes v. District of Columbia*, 289 F.R.D. 1, 10 (D.D.C. 2012) ("The Court understands that the parties may try to gain a competitive advantage through gaming the discovery process."); *McCook Metals L.L.C. v. Alcoa Inc.*, No. 00 C 6782, 2001 WL 293626, at *2 (N.D. Ill. Mar. 13, 2001) (expressing concern that "this plaintiff could delve into the status of the ongoing negotiations between Boeing and other subcontractors . . . We fear that the pretrial

discovery in this suit could permit the plaintiff to gain unfair competitive advantages with respect to the pending contract negotiations and with respect to the legitimately confidential plans of its competitors.”); *JILCO, Inc. v. MRG of S. Fla., Inc.*, 162 So. 3d 108, 110 (Fla. Dist. Ct. App. 2014) (“The disclosure of a party’s financial or confidential business information may cause irreparable harm where the information is irrelevant to any pending matter.”).

Here, there is no question that the information sought is highly confidential and irrelevant. Moreover, even if the requested information was marginally relevant—which it is not—that marginal relevance would not override the clear burden to Invenergy in ordering it to produce information regarding its thought process and potential suppliers. Indeed, it appears likely that the Town seeks the identities of the potential water suppliers whom Invenergy has contacted or is considering contacting, so that the Town can approach these prospective water suppliers and attempt to convince them not to contract with Invenergy. This is not only an improper purpose of discovery, but also may constitute a violation of Rhode Island law. *See L.A. Ray Realty v. Town Council of Cumberland*, 698 A.2d 202, 207 (R.I. 1997) (finding a defendant liable for tortious interference with prospective contractual relations). Moreover, if the Board forces Invenergy to release this highly sensitive commercial information, that release will adversely impact Invenergy’s bargaining position and its ability to negotiate and secure additional contingent/redundant water supply arrangements.

In sum, if the Town is provided with the irrelevant information sought in Data Request, No. 33-1, the Town will have the ability to interfere with and potentially impact Invenergy’s negotiations via direct contact with a potential contingent/redundant supplier of water. The Town should not be allowed to abuse the discovery rules and obtain proprietary business strategy information that is irrelevant to this EFSB proceeding. If Invenergy reaches an agreement with an additional contingent/redundant supplier, Invenergy will provide that information to the Board (and the Town). Accordingly, Invenergy objects to the Town’s Data Request, No. 33-1.

¹ Invenergy previously identified a contingent/redundant source, Benn Water & Heavy Transport Corp. *See* Invenergy’s revised Water Supply Plan, filed with the Board on January 11, 2017; Invenergy’s Response to the Town’s Data Request, Nos. 22-57 & 32-9 n.1.

WATER

Request 36-1 **Please provide the details of all testing that has been performed for the installation of an onsite drinking water well and related appurtenances and provide the results of all drilling, soil sampling, or other testing performed in connection with the same.**

Response 36-1 No drilling, soil sampling, or testing has been performed to date in support of the installation of the proposed on-site drinking water well and related appurtenances. Given the limited potable water demand for the Clear River Energy Center (“CREC”), no advanced testing of the property is warranted. The installation of the CREC drinking water well will be similar to the installation of a typical private residential water supply well. Any water quality or yield testing of the CREC drinking water well will be performed concurrently with the drilling and installation of the well, which will be completed during facility construction.

RESPONDENT: Jeffrey Hershberger, ESS Group, Inc.

DATE: September 20, 2017

WATER

Request 38-5 **With regard to the Benn Water & Heavy Transport letter dated January 6, 2017 included as part of Invenenergy's revised water supply plan, please describe Benn Water's source water, water chemistry, whether the volumes are adequate, and Berm Water's ability to deliver the required volumes on a daily basis, both in the summer and the winter seasons. Please also identify if Invenenergy has performed the due diligence set forth in paragraph 4 of the January 6, 2017 memorandum of agreement and set forth the results of the due diligence. If the due diligence has not been performed, please explain why the due diligence has not been performed.**

Response 38-5 The requested information was included in Invenenergy's Supplement to the Water Supply Plan filed with the Board on September 28, 2017. The agreements that were provided in the Supplement were the result of the due diligence set forth in the Memorandum of Agreement the Clear River Energy Center ("CREC") has with Benn Water & Heavy Transport Corp. ("Benn Water").

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: October 4, 2017

WATER

Request 38-6 **Please provide any and all available information regarding Benn Water & Heavy Transport Corp, including, but not limited to, the number and type of vehicles available to transport the water, the number or employees, the number of drivers with appropriate CDL licenses necessary to drive the vehicles, available insurance coverages, and any other information that would determine the suitability of Berm Water to provide the water services described in the January 6, 2017 memorandum of agreement.**

Response 38-6 Benn Water's fleet consists of seven (7) class eight road tractors with a selection of five (5) semi tanker trailers that are 8,000 gallons or more. Only one of which, would be required to service CREC's average daily needs.

Benn Water currently employs nine (9) employees.

The insurance requirements are outlined in Exhibit A of the Benn Water Transportation Agreement.

Eight (8) of the nine (9) employees possess the necessary CDL credentials.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 4, 2017

WATER

Request 39-3 **Does Invenergy or any of its related companies or subsidiaries operate a so-called “dry cooled” plant of the size and scope of the CREC project in Burrillville? If so, where are those plants located?**

Response 39-3 The only other dry cooled plant in Invenergy’s fleet is Lackawanna Energy Center (“LEC”), which is under construction in Lackawanna County, PA. LEC is a 1,500 MW project using the same technology as CREC in a three by three configuration.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 13, 2017

WATER

Request 39-4 **Are water tanker trucks normally filled to capacity? For instance, will a tanker truck of 8,000 gallons actually carry 8,000 gallons of water, or will it be less? Does that calculation remain the same for winter and freezing conditions?**

Response 39-4 The trucks are normally filled to capacity with no adjustments for seasonal conditions.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 13, 2017

WATER

Request 39-5 **During drought conditions, and when water bans or restrictions are implemented by water producing entities, how will CREC procure water to supply the needs of the plant — both in normal operating conditions and when running on fossil fuel oil?**

Response 39-5 CREC's proposed design for heat rejection and for sourcing its water supply is more resilient to the potential impacts of a drought than any other electric generating facility in New England.

- CREC has chosen to rely on a dry cooling system to reject waste heat from the Facility to reduce the Facility's overall water use. As compared to any other existing electric generating facility in New England employing a wet recirculating cooling tower, many of which require millions of gallons of water per day, electric generating facilities employing dry cooling are less susceptible to impacts on their operation as a result of a local or regional drought, due to their lower water demand.
- CREC's water supply plan has been developed to rely on trucking of water from primary and contingent water suppliers, all of whom can provide the Facility's daily water supply requirements. As a result, CREC, unlike other existing electric generating facilities located in New England, is not tied by pipeline to only one source of water which might be subject to use restrictions resulting from a local or regional drought. CREC by its reliance on a trucked water supply plan can determine which of the many water suppliers to the Facility are those that are least impacted by a drought and adjust its water sourcing to meet the water supply needs of the Facility and to reduce reliance on those water suppliers most impacted by the drought.
- CREC's primary water supplier is the Town of Johnston which secures its water supply from the Providence Water System. The Providence Water System has significant storage within the Scituate Reservoir making this water supply the least susceptible water supply in Rhode Island to impacts from either a local or regional drought. A comparison of the annual water supply requirements of CREC (Figure 2.3 of the CREC Water Supply Plan, dated January 11, 2017) to the Safe Yield water supply of the Providence Water Supply system found that CREC's total projected annual water use (allowing for up to 90 days of evaporative cooling at 8 hours per day) would be only 0.04% of the annual Safe Yield of the Providence Water system.

- CREC's Water Supply Plan identifies that water required to support operation of the Facility on Ultra-Low Sulfur Distillate ("ULSD") will be provided if needed by drawing down the on-site water and ULSD storage tanks in the winter and filling these tanks during a 30-day replenishment fill event that will likely occur in late winter or in the spring. As a result, any need for CREC to fire ULSD will be met from the on-site water and ULSD storage tanks that will be re-filled in late winter or early spring when local water supplies have typically been replenished by winter snow melt.
- Summer seasonal use of evaporative cooling of the inlet air supply to CREC's gas fired combustion turbines is an optional feature that when used, increases the electric generation output of the Facility during periods of high summer temperatures and high summer energy requirements. During drought conditions, if required, CREC can choose to forego use of its evaporative cooling system to further reduce summer water demand in response to a drought declaration by the State of Rhode Island or its multiple water suppliers.
- Lastly, impact of a drought on the operation of CREC is a business risk that will impact Invenergy and will not impact the Town of Burrillville or the State of Rhode Island should for any reason the above options for addressing local or regional drought impacts are not effective.

For the above reasons, Invenergy believes that CREC has an overall design and water supply plan that allows the Facility to modify its operation if needed and modify its water sourcing plans to provide a reliable electric supply to the New England region that is least susceptible to local or regional droughts.

RESPONDENT: George Bacon and Jeff Hershberger, ESS Group, Inc.

DATE: October 13, 2017

WATER

Request 40-1

With regard to Invenergy's contract with the Narragansett Indian Tribe (Narragansetts) and their agreement to provide a back-up or contingent water supply for the applicant's proposed power plant, please provide the following:

- a. Copies of legible maps outlining the entire aquifer from which the Narragansetts draw water;**
- b. Copies of all deeds, grants, treaties or any other document granting the land to the Narragansetts;**
- c. Copies of all acts under any agreement with any federal or state governmental agency which authorizes or permits the Narragansetts to sell water from tribal or settlement land**

Response 40-1

(a) Please see the report prepared by ESS Group, Inc., dated October 23, 2017, entitled "CREC's Proposed Water Use from the Lower Wood Watershed," Figure 3, attached hereto.

(b) Invenergy Thermal Development LLC ("Invenergy") does not have any deeds, grants, treaties and/or any other documentation granting land to the Narragansett Indian Tribe ("NIT"). Please see United States Public Law 95-395, 25 U.S.C. §§ 1701 through 1716, which codified a Joint Memorandum of Understanding which was signed by the NIT, then-Rhode Island Governor J. Joseph Garrahy, the Charlestown Town Council and certain landowners. Please also see letter from William P. Devereaux, Esq., attorney for the Narragansett Indian Tribe, to the Rhode Island Energy Facility Siting Board, dated October 25, 2017, attached hereto (not including attachments).

(c) Please see letter from William P. Devereaux, Esq., attorney for the Narragansett Indian Tribe, to the Rhode Island Energy Facility Siting Board, dated October 25, 2017, attached hereto, pages 3-5 (not including attachments).

DATE:

October 31, 2017

WATER

Request 40-2 **Please advise whether the Narragansetts and/or Invenergy and/or CREC have any verbal or written agreements with any other municipality or entity which draws water from the subject aquifer. If so, please identify all such municipalities or entities and the names and titles of the authorized municipal officials or persons who made such verbal or written agreements on behalf of said municipality or entity.**

Response 40-2 Invenergy does not have any verbal or written agreements with any other municipality or entity which draws water from the Lower Wood Aquifer. Invenergy does not know whether the NIT has any verbal or written agreements with any municipality or entity that draws water from the Lower Wood Aquifer.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 31, 2017

AIR

1-18 Please identify any study or other information the company has regarding the expected impact of air emissions on the air quality in the homes in the immediate neighborhood of the proposed facility.

RESPONSE: The Project's impact to air quality in the area surrounding the Facility is detailed in Section 6.1 of the EFSB application. The Project will require a Major Source Air Permit from RIDEM prior to its construction. RIDEM will require the Project to comply with all applicable state and federal air pollution control regulations, implement Best Available Control Technology and the Lowest Achievable Emission Rate for applicable pollutants, fully offset its NOX and VOC emissions, and complete an air quality impact assessment and health risk assessment prior to approval. The Major Source Air Permit application process will ensure that the Project's impacts to air quality in the area surrounding the Facility have been minimized to the greatest extent that is technologically feasible for such a source.

Section 6.1.5 details the air quality impact assessment completed for the Project. This assessment concluded that the maximum predicted criteria pollutant air quality impacts resulting from Facility operation, when combined with existing background concentrations, and the maximum impact concentrations from other nearby sources, will not exceed any of the National Ambient Air Quality Standards ("NAAQS") at any location at or beyond the property line of the Facility. The NAAQS, which have been established by the EPA and adopted by RIDEM, are ambient concentration which have been determined through health studies to be protective of human health and welfare, including the most vulnerable of the population, with a margin of safety.

The Project air quality impact assessment also concluded that the maximum predicted air toxics air quality impacts resulting from Facility operation will not cause an exceedance of a RIDEM Acceptable Ambient Level ("AAL") at any location at or beyond the property line of the Facility. The AALs have been established by RIDEM through health studies to be protective of human health, with a margin of safety. Invenergy has also submitted a Project Health Risk Assessment to RIDEM which demonstrates that all of the applicable health risk standards established by RIDEM to protect the local residents will be met during Facility operation.

As described in Section 6.1 of the EFSB application, and with the completion of each of the assessments required by RIDEM for a Major Source Permit Application, Invenergy has demonstrated that the Project's

air quality impacts at all locations at or beyond the property line will comply with all applicable health based air quality standards during Facility operation.

RESPONDENT: John Niland, Director, Business Development, Invenergy
Michael Feinblatt, ESS Group, Inc.

DATE: March 31, 2016

AIR

4-44 Please explain the air pollutant trading allowance program generally. Explain the cost of allowances, amount paid by Invenergy and the amount of pollution being purchased above regulatory limits. Please explain this for each pollutant type. Please explain what is the flow of the money for such purchases (i.e., does it get deposited to a State or Federal Agency or traded to another project in the U.S.)?

RESPONSE 4-44: Invenergy will be required to make a one-time purchase of Emission Reduction Credits (“ERCs”) to offset the CREC’s NO_x and VOC emissions prior to receiving its final Major Source Air Permit. Invenergy is also required to obtain allowances for its annual CO₂ emissions throughout its operating life to comply with the RI CO₂ Budget Trading Program and obtain allowances for its annual SO₂ emissions to comply with the federal Acid Rain Program. These programs are all market based so the cost of the allowances is determined by the market at the time of the purchase. The cost of the allowances and the distribution of the funds by the state and federal government are beyond Invenergy’s control.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

AIR

4-45 You state that H-rated General Electric engines are the highest efficiency in the Nation. Does that mean they are the best in terms of air quality? Do other engines exist that burn cleaner?

RESPONSE 4-45: Yes, this is the most efficient way to produce electric power using a fossil fuel. The emissions of pollutants from a combustion turbine are proportional to the amount of fuel burned. The GE 7HA.02 combustion turbine has a low heat rate and burns less fuel to produce a megawatt of power than any other turbine commercially available at this time. When the turbine is used in a combined cycle application (i.e. with a heat recovery steam generator and steam turbine), it will generate fewer emissions than any other means for producing electric power using a fossil fuel.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

AIR

4-46 What has been Ocean State Power's air emissions, by pollutant type as reported to the EPA, over the past ten years and how does that compare to what Invenenergy projects for the Clear River Energy Center during its first ten years of operation?

RESPONSE 4-46: Ocean State Power's average nitrogen oxides (NO_x) and carbon dioxide (CO₂) emission rates over the past ten years, as reported to the EPA, have been 0.39 (NO_x) and 1,458 (CO₂) pounds per megawatt-hour (lb/MW-hr), respectively. (EPA CEMS data with hourly production data can be found at <https://ampd.epa.gov/ampd/>.) The average NO_x and CO₂ emission rates from the CREC will be approximately 0.046 and 781 lb/MW-hr, respectively. For each MW-hr of power produced, the CREC will emit approximately one eighth (1/8) of the NO_x emissions and approximately one half (1/2) of the CO₂ emissions that OSP has emitted on average over the past ten years. Although OSP is not required to report its emissions of other pollutants to the EPA, the CO₂ emission rate of the CREC will be substantially lower than the emission rate from OSP on a lb/MW-hr basis, as these emissions are generally proportional to the amount of fuel fired. Because CREC is more efficient, it will burn approximately one-third (1/3) less fuel as OSP to produce the same amount of power.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

AIR

5-12 Can any emissions or pollution from the contamination build up in the activated carbon filtration system pollute the local air or water? Please explain.

RESPONSE 5-12: There will be no emissions associated with the operation of the carbon treatment system as it will be a closed system with no exhaust. The activated carbon treatment system will absorb the contamination onto the carbon. Once the carbon becomes exhausted, the activated carbon with the absorbed contaminants will be removed from the site. The spent or exhausted activated carbon will be sent by truck to a licensed facility for disposal or reactivation through a permitted and licensed process. A typical manufacturer and/or provider of this service is Calgon Carbon Corporation.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

AIR

6-13 Please identify the anticipated combined air pollution levels in the immediate area when considering this proposed power plant, the emissions generated by the adjacent gas plant, and Ocean State Power.

RESPONSE 6-13 The EPA has established the National Ambient Air Quality Standards (“NAAQS”), which are the concentrations of criteria pollutants in the ambient air that have been determined through extensive health studies to be safe for human health and the environment, including the most vulnerable of the population, with a margin of safety. As required by RIDEM, Invenergy has completed an air quality impact analysis to demonstrate that the ambient air impact concentrations resulting from the simultaneous operation of the CREC emission sources, the emission sources at the Algonquin Compressor Station and the emissions sources at Ocean State Power, when combined with existing ambient concentrations, will not cause an exceedance of any NAAQS.

The methodology used for this analysis and the results are summarized in the Air Dispersion Modeling Report for the project submitted to RIDEM on October 30, 2015. The analysis was completed using AERMOD, an EPA refined air dispersion model approved for use by RIDEM. All emission sources were modeled at full operation and at their worst-case emission rate of each pollutant. The model was run at all hourly meteorological conditions that have occurred over the most recent five-year period for which such data is available, in this case 2010-2014. A polar receptor grid was established out to 50 kilometers with receptors located at 25 meter intervals out to 1 km, at 100 meter intervals out to 2 km, at 200 meter increments out to 5 km, at 500 meter increments out to 10 km, and at 1,000 meter increments out to 50 km. The model then predicted the maximum ambient air impact concentrations resulting from all sources operating simultaneously, at each hourly meteorological condition and at every receptor location within the receptor grid to determine the maximum predicted total impact concentration for each pollutant and averaging period.

The results of the project’s NAAQS compliance determination were detailed in Table 15 of the report and are summarized below (all values are in micrograms per cubic meter):

Criteria Pollutant	Averaging Period	Predicted Impact	Background Conc.	Total Conc.	NAAQS
CO	1-hour	64	2,346	2,410	40,000
CO	8-hour	47	1,495	1,542	10,000
NO ₂	1-hour	36	80	116	188
NO ₂	Annual	2	20	22	100
SO ₂	1-hour	40	123	163	195
SO ₂	3-hour	44	45	89	1,300
SO ₂	24-hour	19	21	40	365
SO ₂	Annual	0.4	3.7	4.1	80
PM ₁₀	24-hour	8	17	25	150
PM _{2.5}	24-hour	5	13	18	35
PM _{2.5}	Annual	0.7	5.2	5.9	12

As shown above, CREC will not cause an exceedance of the NAAQS at any location beyond its property line, even when operating simultaneously with the emissions sources at the Algonquin Compressor Station and at Ocean State Power. Note that the results presented above represent the maximum predicted total impact concentration at a single receptor location at a single hourly meteorological condition for each pollutant and averaging period. The margin of compliance with the NAAQS will be greater at every other receptor location and during every other hourly meteorological condition, providing further assurance that air quality levels in the area surrounding the facility will be at levels which have been deemed safe by the EPA during CREC operation.

RIDEM has established a list of air toxic compounds and the concentration levels of each air toxic which are safe for public health and the environment (Acceptable Ambient Levels or “AALs”) in RIDEM Air Pollution Control Regulation No. 22. Invenergy was required to apply the results of the air quality impact analysis described above to its emissions of air toxic compounds. As detailed in Table 16 of the Air Dispersion Modeling Report, the worst-case emission rates of air toxic compounds from the CREC will not cause an exceedance of any RIDEM AAL beyond its property line. (Table 16 is attached as **Exhibit 1**.) The results presented in Table 16 are for the single receptor location and hourly meteorological condition at which the highest impacts were predicted for each pollutant and averaging period. The project impact concentrations will be lower than the values presented in Table 16 at every other receptor location and hourly meteorological condition during CREC operation.

RIDEM has also established the “Guidelines for Assessing Health Risks from Proposed Air Pollution Sources.” Invenergy was required to complete a multi-pathway human health risk assessment for the CREC in accordance with the RIDEM Guideline. The results of the assessment are detailed in the CREC Health Risk Assessment Report submitted to RIDEM on January 27,

2016. As detailed in the report, the results of the health risk assessment completed for the CREC project met all of the applicability criteria of the RIDEM Guideline, demonstrating that any short or long term health risks which could be associated with exposure to the all of the pollutants that could be emitted from the project are within the acceptable levels established by RIDEM to be protective of human health.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: May 11, 2016

AIR

6-14 How does the height of the “smokestack” affect emissions disbursement and, specifically, the abutting properties?

RESPONSE 6-14 Emissions from a stack mix with the ambient air and become more dilute before reaching the ground. There are many factors that influence the degree of dilution, including the stack height, velocity and temperature, as well as ambient conditions, such as the temperature, relative humidity, wind direction and wind velocity at the stack exit. A higher stack will result in a higher plume, which will travel a longer distance to reach the ground at a point further away from the stack, allowing more time for dilution and will result in lower ground level concentrations.

Invenenergy conducted a turbine stack height optimization as part of the air dispersion modeling analysis completed for the project. The purpose of this optimization was to determine a range of turbine stack heights at which compliance with all applicable air quality standards could be achieved, while still minimizing CREC’s visual impacts to the surrounding community and its potential impact on air traffic navigation from nearby airports and airfields.

The results of the optimization confirmed that taller turbine stacks would decrease the air impacts to abutting properties but would increase CREC’s visual impact while shorter stacks would increase air impacts to abutting properties but decrease the visual impact further, which is already minimal. The proposed CREC turbine stack height (200 feet) was the height at which it was determined that air quality impacts and visual impacts to the surrounding community would be best balanced, while still achieving full compliance with all applicable air quality standards. The turbine stack is approximately the same height as the adjacent cell tower, which is 190 feet.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: May 11, 2016

AIR

7-1 *Property Line and Fence Line Location*

The facility's property line and/or fence location(s) appear to be inconsistent between not only different document submissions, but also within individual documents themselves. Compliance with certain air quality regulations and standards is dependent upon estimated ambient air concentrations at points along both the property line and the fence line. A change in the location of either line used in the final model approved by RIDEM in support of issuing the air construction permit may require performance of a revised air dispersion modeling compliance demonstration.

Please provide a legal description of the property line and fence line used in the model results submitted to and approved by RIDEM as demonstrating compliance with applicable standards and the basis for issuing the proposed facility's air quality construction permit. This will allow for a clear comparison by Town officials of the approved property line and/or fence line with the legal description included with the deed that will be recorded in the Town's Land Evidence Records.

RESPONSE 7-1: The facility's proposed property line has changed since the air modeling report was submitted to RIDEM as the project design and layout have been optimized to minimize impacts. The attached Site Arrangement figure shows the revised proposed facility property line which has been submitted to, and is currently under review by, the Town of Burrillville Planning Board.

The property line changes will not impact the results of the air modeling results submitted to RIDEM because the modeled impact values presented in the modeling summary tables, which are the values used for the compliance demonstrations, were at receptors located beyond both the original and the revised facility property lines.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-2 *Proposed use of Ultra-Low Sulfur Diesel (ULSD) as a Secondary Fuel in the Combustion Turbines*

Please clarify when the facility will use ULSD in the combustion turbines as a fuel. Specifically, please identify whether the use ULSD will be a contractual obligation or a choice presented to facility operators on any given day.

The conflicting text includes the use of the word “unavailable” in the RI Energy Facility Siting Board (EFSB) Application, Section 1.2, Page 1: “Each gas turbine will fire natural gas as a primary fuel and ultra-low sulfur diesel (ULSD) fuel as a backup fuel from two-1,000,000 gallon on-site storage tanks for limited periods when natural gas is unavailable.” And in Section 3.1, Page 6: “Each gas turbine will fire natural gas as a primary fuel and ultra-low sulfur diesel (ULSD) fuel as a backup fuel for limited periods when natural gas is unavailable.” Typically, using the word “unavailable” in this situation would mean that natural gas is not available for use as a fuel.

However, the EFSB Application, Section 3.10, Page 18 states: “Additionally, if during the winter season natural gas supplies coming into New England are in short supply or constrained, the gas turbines can be fired by ultra-low sulfur distillate (ULSD), as requested by Independent System Operator New England (ISO-NE).”

Finally, the EFSB Application, Appendix C, Water Balance contains the third drawing in the set submitted, HDR Drawing WMB-04, Rev. C, “Water Mass Balance – 1 CT on GAS, 1 CT on Fuel Oil”. This would appear to indicate that while one combustion turbine uses ULSD as a fuel, the other combustion turbine will still be using natural gas as a fuel. In addition, the drawing set does not include a 4th drawing showing a scenario of both combustion turbines firing ULSD concurrently.

RESPONSE 7-2 Unavailability of natural gas is defined as when there is insufficient gas for the project to meet its capacity obligation and as such could be subject to penalties under Market Rule 1, Section III.13.7 “Performance Payments and Charges in the Forward Capacity Market, otherwise known as “Pay for performance.” Use of ULSD will be a contractual obligation under the “Pay for Performance” construct of the ISO NE Tariff. CREC expects combustion turbine ULSD use will be limited to that needed to maintain oil system readiness and times when natural gas is unavailable. The potential loss of natural gas is expected to be unlikely and if it were to occur would be short lived. Natural gas will be deemed to be unavailable when the natural gas supplier (Spectra) informs Invenergy Thermal Development LLC (“Invenergy”) that the natural gas supply is being curtailed or if there is a Force Majeure event. The availability natural gas is monitored by ISO-NE, who may declare a “Cold Weather

Event”, a “Cold Weather Watch”, or a “Cold Weather Warning”, as defined in:

<http://www.iso-ne.com/markets-operations/system-forecast-status/current-system-status/alert-descriptions>

Attached is a Water Mass Balance showing both combustion turbines firing ULSD concurrently. Complete loss of natural gas is not expected, but if it were to occur, this mode of operation will be limited to the capacity of the PUD well (700 GPM) and use of our onsite raw water and demineralized water storage tanks to provide the water injection into the combustion turbines. As mentioned above, we do not expect to operate in this mode as the project expects to have firm gas supply for one of the combustion turbines, (“CT”) so only one CT will run on oil at a time.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: May 17, 2016

AIR

7-3 *Proposed Air Permit Limits for use of ULSD in the Combustion Turbines*

Please clarify the proposed permit operation limit(s) proposed for the combustion turbines when using ULSD.

- **How is “the equivalent total ULSD fuel usage of up to 60 days per year at base load” calculated?**
- **What is the basis for calculating daily ULSD fuel usage?**
- **Does the facility propose an annual ULSD operation limit of 720-hours per year at steady state for each combustion turbine?**
- **Does the facility propose an annual ULSD startup & shutdown operation limit of 20-hours per year for each combustion turbine?**

Table 1 shows estimated annual emissions from each combustion turbine when using ULSD based upon using an Annual Operation value of 720-hours/year. An annual operating rate of 720-hours is equivalent to 30-days (720-hours * (1-day/24-hours) = 30-days). An annual operating rate of 60-days is equivalent to 1440-hours (60-days * (24-hrs/1-day) = 1440-hours). Is the facility proposing to limit ULSD operation on an individual combustion turbine basis at 30-days/year or on an aggregate basis of 60-days/year to be split between the two combustion turbines on not necessarily a 50:50 basis?

RESPONSE 7-3 Invenergy is not proposing an annual limit on the number of days of combustion turbine ULSD usage per year nor is Invenergy proposing individual ULSD usage limits for each turbine. Invenergy is proposing to limit total ULSD usage by both combustion turbines to the equivalent usage of 60 days at base load. This will be calculated by multiplying the maximum single turbine ULSD usage rate at base load (gallons per hour) times 24 hours per day (gallons per day) times 60 days (gallons per 60 days).

Invenergy is not proposing a limit on the number of hours of ULSD startup and shutdown time per year. Invenergy is proposing that the annual emissions from the facility during startup and shutdown periods be limited to the total potential emissions presented in the air permit application for startup and shutdown periods.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-4 *ULSD Storage Tanks*

Please clarify the number of tanks, capacity of each tank, and size/dimensions of each tank proposed for storage of ULSD at the site. Conflicting values are present in the document submissions, including, but not limited to, the following:

- EFSB Application, Section 3.1, Page 6: “The ULSD will be stored in two 1,000,000-gallon on-site storage tanks.”
- EFSB Application, Section 3.5.3, Page 13: “...two 1,000,000 gallon above ground ULSD storage tanks...approximately 30 feet tall and 80 feet in diameter.”
- EFSB Application, Section 6.1.2, Page 36: “The facility will include a pair of a [sic] 1,000,000-gallon aboveground ULSD storage tanks... potential fugitive VOC emissions (working losses and breathing losses) associated with the ULSD storage tanks at the Facility have been estimated using the EPA’s TANKS program. Appendix A of the Major Source Permit Application (See Appendix B) contains a summary of the results and the data printouts from the TANKS analysis for the ULSD storage tanks.”
- EFSB Application, Appendix B, Major Source Permit Application, Section 1.2, Page 1: “Each gas turbine will fire natural gas as a primary fuel and ultra-low sulfur diesel (ULSD) fuel as a backup fuel from a 2,000,000 gallon on-site storage tank for limited periods when natural gas is unavailable.”
- EFSB Application, Appendix B, Major Source Permit Application, Section 2.6, Page 4 “The Facility will include a 2,000,000 gallon aboveground ULSD storage tank...”
- EFSB Application, Appendix B, Major Source Permit Application, Appendix A- Emission Data Summaries, “TANKS 4.0.9d, Emissions Report - Detail Format, Tank Identification and Physical Characteristics”

Identification

User Identification:	Invenergy ULSD Storage Tank
City:	Burrillville
State:	Rhode Island
Company:	Invenergy, LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	Invenergy Rhode Island Energy Center Burrillville, Rhode Island

Tank Dimensions

Shell Height (ft):	35.00
Diameter (ft):	120.00
Liquid Height (ft):	24.00
Avg. Liquid Height (ft):	24.00
Volume (gallons):	2,000,000.00
Turnovers:	18.42
Net Throughput(gal/yr):	36,846,720.00

RESPONSE 7-4 Initially the project design included a single 2,000,000 gallon storage tank. The current design of the facility includes two 1,000,000 gallon above-ground ULSD storage tanks. Each tank will be approximately 80 feet in diameter and 30 feet tall.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-5 Emission Calculations – General

Please explain why the Combustion Turbine potential emissions for Criteria Pollutants are estimated using Annual Operation (per Unit) values of 8020-hours/year for Natural Gas and 740-hours/year for ULSD, but potential emissions for Non-Criteria Pollutant are estimated using 8040-hours/year for Natural Gas and 720-hours for ULSD.

RESPONSE 7-5 The criteria pollutant potential emissions were estimated for each combustion turbine based on 7,865 hours per year firing natural gas at steady-state, 720 hours per year firing ULSD at steady-state, 155 hours per year firing natural gas during startup and shutdown, and 20 hours per year firing ULSD during startup and shutdown. The criteria potential emission rates during steady state operation and during startup and shutdown periods on both fuels were provided by the turbine manufacturer.

The non-criteria pollutant potential emissions were estimated for each combustion turbine based on 8,040 total hours per year firing natural gas and 720 total hours per year firing ULSD during steady-state operation only. Based on the available emission factors, the non-criteria pollutant emissions from the combustion turbines will be proportional to fuel usage, and will therefore be lower during startup and shutdown periods, because less fuel is being burned. To be conservative, the non-criteria pollutant potential emissions were estimated assuming steady-state operations only, which would include up to 8,040 hours firing natural gas and up to 720 hours of firing ULSD per turbine per year.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-6 Please provide a calculation showing the equivalent steady-state emission rate in lb/hr at full-load during typical operational conditions the “Proposed Emissions” values listed in Table 1 for the Combustion Turbine, specifically:

NO_x 2.0-ppmvd @ 15% O₂ for Natural Gas and 5.0-ppmvd @ 15% O₂ for Diesel

CO 2.0-ppmvd @ 15% O₂ for Natural Gas and 5.0-ppmvd @ 15% O₂ for Diesel

VOC 1.7-ppmvd @ 15% O₂ for Natural Gas and 5.0-ppmvd @ 15% O₂ for Diesel

RESPONSE 7-6

NO_x (as NO₂) example calculations for NG and ULSD:

$$2.0 \text{ ppmvd} = \frac{2.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{46 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{8,710 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{386 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,393 \text{ MMBtu}}{\text{hr}} = 24.9 \frac{\text{lb}}{\text{hr}}$$

$$5.0 \text{ ppmvd} = \frac{5.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{46 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{9,190 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{383 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,507 \text{ MMBtu}}{\text{hr}} = 68.6 \frac{\text{lb}}{\text{hr}}$$

CO example calculations for NG and ULSD:

$$2.0 \text{ ppmvd} = \frac{2.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{28 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{8,710 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{386 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,393 \text{ MMBtu}}{\text{hr}} = 15.1 \frac{\text{lb}}{\text{hr}}$$

$$5.0 \text{ ppmvd} = \frac{5.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{28 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{9,190 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{383 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,507 \text{ MMBtu}}{\text{hr}} = 41.8 \frac{\text{lb}}{\text{hr}}$$

VOC (as CH₄) example calculations for NG and ULSD:

$$1.7 \text{ ppmvd} = \frac{1.7 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{16 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{8,710 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{386 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,393 \text{ MMBtu}}{\text{hr}} = 7.4 \frac{\text{lb}}{\text{hr}}$$

$$5.0 \text{ ppmvd} = \frac{5.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{16 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{9,190 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{383 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \times \frac{3,507 \text{ MMBtu}}{\text{hr}} = 23.9 \frac{\text{lb}}{\text{hr}}$$

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-7 *Emission Calculations – Emission Factors*

Emission factors used to calculate estimated emissions and submitted to RIDEM were difficult to verify, as no references were provided. For emission factors based on US EPA AP-42, please specify Chapter and Table for each emission factor or group of emission factors.

For those emission factors used in the calculations that are not based on AP-42, please provide a copy of the reference document used as source for the emission factor(s).

RESPONSE 7-7

The criteria pollutant emission rates from all project emissions sources were provided by the equipment manufacturer. The combustion turbine ammonia and sulfuric acid emission rates were also provided by the equipment manufacturer. The metals emissions from gas turbine ULSD usage were estimated using Siemens Westinghouse's Survey of Ultra-Trace Metals in Gas Turbine Fuels (2004), which is attached. The gas turbine formaldehyde emissions were provided by the equipment manufacturer based on the MACT standard for combustion turbines (91 ppb@15%O₂) previously proposed by the EPA, but currently stayed by court order.

All of the other non-criteria pollutant emission rates from each emissions source were estimated using emission factors from the EPA's AP-42 Compilation of Emission Factors.

The following tables from AP-42 were used:

AP-42 Chapter 1.4, Table 1.4-3: Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

AP-42 Chapter 1.4, Table 1.4-4: Emission Factors for Metals from Natural Gas Combustion

AP-42 Chapter 3.1, Table 3.1-3: Emission Factors for Hazardous Air Pollutants from Natural Gas-Fired Stationary Gas Turbines

AP-42 Chapter 3.1, Table 3.1-4: Emission Factors for Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines

AP-42 Chapter 3.1, Table 3.1-5: Emission Factors for Metallic Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines

AP-42 Chapter 3.3, Table 3.3-2: Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines

AP-42 Chapter 3.4, Table 3.4-3: Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines

AP-42 Chapter 3.4, Table 3.4-4: PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-8 The partial-stayed EPA MACT Standard for Combustion Turbines (40 CFR 63, Subpart YYYYY) published on March 5, 2004 limited formaldehyde emissions to 91 ppbvd @ 15% O2 when firing natural gas, as well as during the firing of oil. Please provide rationale for selecting the stayed MACT Standard as the emission factor source during firing of natural gas described in Section 5.3.10, but not ULSD.

RESPONSE 7-8 The combustion turbine formaldehyde emission factor, which was provided by the equipment manufacturer, utilized the stayed MACT Standard as the emission factor source during both natural gas firing and ULSD firing.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

- 7-9 It is unclear how the EPA MACT Standard limit for formaldehyde of 91 ppbvd @ 15% O₂ relates to the Combustion Turbine natural gas uncontrolled formaldehyde emission factor. Please provide calculation showing the method of determining the 2.2-lb/MMBtu formaldehyde emission factor listed in Table A-2.**

RESPONSE 7-9
$$91 \text{ ppbvd} = \frac{91 \text{ dscf}_{\text{gas}}}{10^9 \text{ dscf}_{\text{stack}}} \times \frac{30.031 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{8,710 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{386.1 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} = 2.2 \times 10^{-4} \frac{\text{lb}}{\text{MMBtu}}$$

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-10 For sources using an oxidation catalyst, the EPA MACT Standard for formaldehyde of 91 ppbvd @ 15% O2 is the limit for controlled emissions. Since the proposed facility intends to use an oxidation catalyst as a control device, please provide rationale for basing the uncontrolled formaldehyde emission factor on the MACT Standard's limit for controlled formaldehyde emissions.

RESPONSE 7-10 The combustion turbine formaldehyde emission factor was provided by the equipment manufacturer.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-11 It is unclear how the CO₂ emission rates were calculated for the combustion turbines. Please provide the calculation methodology for the natural gas 814-lb/MW-hr and the ULSD 1227-lb/MW-hr values listed in Section 4.4.3.

RESPONSE 7-11 The average CO₂ emission rate while firing natural gas will be 781 lb/MW-hr. The average CO₂ emission rates for each fuel were calculated using CO₂ lb/hr emission rates and MW output values provided by the equipment manufacturer for base load operation as follows:

Natural Gas

399,000 lb/hr/turbine x 2 turbines / 1,021.183 MW = 781 lb/MW-hr

ULSD

577,000 lb/hr/turbine x 2 turbines / 940.536 MW = 1,227 lb/MW-hr

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-12 Please clarify whether the combustion turbine's natural gas emission rate is 814-lb/MW-hr as described in Section 4.4.3 or 781-lb/MW-hr as listed on Table 1.

RESPONSE 7-12 The combustion turbine's annual average natural gas emission is 781 lb/MW-hr.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-13 Table 2 shows Acrolein potential emissions at 6.1-lb/yr for the Combustion Turbines (CT) when using Natural Gas (NG). Table A-2 lists the Acrolein emission factor (EF) as 6.4E-06-lb/MMBtu for the CT when using NG. Table A-2 also lists a Maximum Unit Heat Input of 3,393-MMBtu/hr, an Annual Operation value of 8,040-hr/yr, and an Acrolein control efficiency of 90% for the CT when using NG. Using the basic calculation methodology shown below, annual Acrolein potential emissions are estimated to be 34.9-lb/yr. Please clarify whether an alternate calculation methodology was used for estimating potential Acrolein emissions from the CT when using NG.

$$\begin{aligned} & (\text{Acrolein EF}) * (\text{Max Unit Heat Input}) * (\text{Annual Operation}) * (1 - \text{Control Efficiency}) * (\# \text{ CT}) \\ & (6.4\text{E-}06\text{-lb/MMBtu}) * (3,393\text{-MMBtu/hr}) * (8,040\text{-hr/yr}) * (1 - 0.90) * (2 \text{ CT}) \\ & \quad (0.021715\text{-lb/hr}) * (8,040\text{-hr/yr}) * (1 - 0.90) * (2 \text{ CT}) \\ & \quad \quad (174.6\text{-lb/yr}) * (1 - 0.90) * (2 \text{ CT}) \\ & \quad \quad \quad (17.46\text{-lb/yr}) * (2 \text{ CT}) \\ & \quad \quad \quad \quad (34.9\text{-lb/yr}) \end{aligned}$$

RESPONSE 7-13 The potential emissions of acrolein from the combustion turbines while firing natural gas will be 35 pounds per year, as listed in Table A-2 and calculated using the same calculation methodology detailed above.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-14 Please clarify whether a control device is proposed for installation on the Emergency Generator, since the estimated Benzene emission rate calculated using the method shown above is an order of magnitude less than the values contained in Table 2.

RESPONSE 7-14 The emergency generator will not be equipped with a control device. The potential benzene emissions from the emergency generator were listed as 4.5 pounds per year in Table 2. The potential emissions of benzene from the emergency generator were estimated as follows:

$$[7.76 \times 10^{-4} \text{ lb/MMBtu}] \times [19.5 \text{ MMBtu/hr}] \times [300 \text{ hours/yr}] = 4.5 \text{ lb/yr}$$

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

7-15 BACT/LAER Selection

EFSB Application, Appendix B, Major Source Permit Application, Section 4.1, Page 23 states that “A BACT Determination is a top-down process in which all available control technologies for that pollutant and emission source are identified. Each control technology is then evaluated for its technical feasibility and those demonstrated to be technically infeasible are eliminated from consideration. The remaining control technologies are then ranked in descending order of control effectiveness. The most effective remaining control technology is deemed to be BACT unless it is demonstrated that technical considerations, or the associated energy, environmental, or economic impacts justify a conclusion that the control technology is not available for the source.” Subsequent text within the application document indicates that “Appendix B contains a listing of the recent BACT determinations considered for this analysis.” While Appendix B-BACT/LAER Documentation of the Major Source Permit Application does contain a summary table of emission rates and/or emission factors, no documentation of the full and complete “top-down” process, such as the ranking of control technologies “in descending order of control effectiveness” is provided in Appendix B. Please provide.

RESPONSE 7-15 The available control technologies for the types of sources associated with this project are well established. All available control technologies for each emission source and pollutant which have been previously applied to similar sources were discussed in Section 4.3. In each case, the most effective control technologies available were used based on the source type and its proposed use. Consistent with EPA BACT guidelines, when the most effective control technology is used (top-case BACT), a detailed evaluation of the less effective control technologies is not required.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-16 *AERMOD Emission Sources*

The Auxiliary Boiler is not included as a source in the AERMOD input files used to predict off-site criteria pollutant for neither the SteadyState nor the Soils scenarios. Please explain the rationale for excluding one of the primary criteria pollutant emission sources proposed for the site.

RESPONSE 7-16 The auxiliary boiler will only operate prior to and during combustion turbine startup periods and will not operate during normal, steady-state combustion turbine operating periods. Therefore, the auxiliary boiler was included in the modeling of startup conditions, but not included in any modeling of steady state facility operation.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-17 The diesel storage tank(s) is/are not included as an emission source for the Air Toxics modeling. Please explain why the TANKS program was not used to estimate emissions of speciated compounds from the ULSD storage tank(s) and included as an on-site emission source when using AERMOD.

RESPONSE 7-17 The fugitive VOC emissions associated with the ULSD storage tanks were estimated using the TANKS program. The Air Dispersion Modeling Protocol submitted for the project, which was approved by RIDEM, did not include the ULSD tanks as a source to be included in the air toxics modeling because it is not expected that any temporary, intermittent, localized fugitive VOC emissions resulting from the use of the ULSD storage tanks would make a measurable contribution to any off-site ambient air impacts predicted from the project.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-18 *Figure 3 General Arrangement*

Please clarify whether Combustion Source No. “AE-8 LP Fuel Gas Dew Point Heater” listed in “Air Emission Sources (Combustions Sources)” table/text box: is proposed for installation at the facility. If proposed for installation, please describe purpose, size, and rationale for not including this source in the model report text, emission calculations, modeling files, air permit application, etc.

RESPONSE 7-18 Only a single dew point heater is needed for the Project. Invenergy has determined that it will not install a second dew point heater that was labeled as AE-8 LP Fuel Gas Dew Point Heater at the facility. The purpose of the Dew Point Heater is to heat the fuel when the pipeline gas pressure is greater than approximately 700 psig, when this happens the pressure needs to be reduced to match the pressure required by the combustion turbine and the pressure reduction creates a cooling effect that must be controlled to prevent freezing of the gas pressure regulator.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-19 “Air Emission Sources (Combustions Sources)” table/text box lists northing and easting coordinates that appear to be based on the UTM Coordinate System, Zone 19 N. Please verify that the table note “* UTM Coordinates are for Zone 19 T” is an error, since Zone 19 T is not a valid zone descriptor for the UTM Coordinate system, and most likely is an erroneous reference to the zone description system related to the USNG/MGRS (United States National Grid/Military Grid Reference System) coordinate system, since the USNG coordinate format is 19T BG 71822 49656, rather than N4,649,656N E271,822. Please explain/clarify.

RESPONSE 7-19 All UTM northing/easting coordinates are based on the UTM Coordinate System, Zone 19 N.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-20 Twenty-six (26) structures were included in the BPIP-Prime analysis. All structures listed on *Figure 3 General Arrangement* “Building and Equipment List” table/text box with heights 20-feet and above are included in the analysis. In addition, the 15-foot tall ammonia tank has been included in the BPIP-Prime analysis. Please provide the rationale for excluding other structures proposed for the site with heights equal to the ammonia tank, such as the Fire Pump Building, Emergency Generator, and Hydrogen Tube Trailer.

RESPONSE 7-20 Consistent with EPA and RIDEM modeling guidance, the AERMOD analysis only evaluated the impacts of plumes potentially entrapped within cavity regions of those structures for which there is a potential for the cavities to extend off-site. Other structures for which there are no potential for the cavities to extend off-site were not included in the analysis.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-21 *Figure 6 Receptor Grid* displays a receptor layout that includes polar grid receptor array and what appear to be discrete receptors placed along a boundary line. However, the boundary line presented in Figure 6 is not consistent with either the “Proposed Property Line” nor the “40’-0” Setback From Property Line” displayed on *Figure 2 Site Layout*. This inconsistency in the location of the boundary receptors shown on Figure 6 is also apparent when compared to the hatched area on *Figure 4 Topographic Map* and the outlined area on *Figure 5 Surrounding Land Use (3 km)*. Please explain/clarify.

RESPONSE 7-21 CREC’s proposed property line has changed since the air modeling report was submitted to RIDEM as the project design and layout have been optimized to minimize impacts. The attached Site Arrangement figure shows the revised proposed facility property line which has been submitted to and is currently under review by the Town of Burrillville Planning Board.

The property line changes will not impact the results of the air modeling results submitted to RIDEM because the modeled impact values presented in the modeling summary tables, which are the values required to demonstrate compliance, were at receptors located beyond both the original and the revised facility property lines.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-22 AERMOD Receptors

All model input files for AERMOD contain discrete boundary line receptors that are consistent with the Figure 6, but not consistent with Figures 2, 4, and 5. In addition, it is unknown whether this set of discrete receptor locations is meant to represent the proposed Property Line or Fence Line which is inconsistently represented (as noted above). Please explain/clarify.

RESPONSE 7-22 CREC's proposed property line has changed since the air modeling report was submitted to RIDEM as the project design and layout have been optimized to minimize impacts. The attached Site Arrangement figure shows the revised proposed facility property line which has been submitted to and is currently under review by the Town of Burrillville Planning Board.

The property line changes will not impact the results of the air modeling results submitted to RIDEM because the modeled impact values presented in the modeling summary tables, which are the values required to demonstrate compliance, were at receptors located beyond both the original and the revised facility property lines.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-23 *Figure 8 Significant Impact Area* appears to show stack locations that are inconsistent with the emission sources locations identified and displayed on *Figure 3 General Arrangement*. Specifically, Figure 8 appears to show an emission point to the east of HRSG Exhaust Stack 1 (AE-1). In addition, Figure 8 appears to display the location of seven (7) discrete emission points, which is different than the six (6) stationary sources listed in *Section 4.4 Screening Results* that were part of the “refined modeling with AERMOD (that) was performed to assess the total ambient pollutant concentrations” from the project. In addition, there are only six (6) discrete emission sources/points listed on *Table 1 Potential Criteria Pollutant Emissions* and *Table 3 Modeling Input Parameters*. Please explain/clarify.

RESPONSE 7-23 The six sources listed on Table 1 and Table 3 were the only emission sources included in the modeling analysis.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-24 *Table 3 Modeling Input Parameters* lists physical and operational details for emission sources and their stacks. Each emission source has Stack Location coordinates provided using UTM northing and easting values (Zone 19). However, none of the stack locations used for BPIP-Prime or AERMOD are the same as those listed on Table 3. Please explain this discrepancy.

RESPONSE 7-24 The stack location coordinates are the ones used for BPIP-Prime and AERMOD. Table 3 was not updated to reflect the stack coordinates from the most recent General Arrangement. Invenergy has determined that it will not install an AE-8 LP Fuel Gas Dew Point Heater installation at the facility.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-25 *Table 4 GEP Stack Height Analysis Summary and Table 5 Cavity Analysis* reference individual stacks using an abbreviated naming convention of ES-1, ES-2, EG, DP Heater, Aux Boiler, and FP. Some of the abbreviated names are easily associated with a corresponding emission source such as ‘Aux Boiler’ for the Auxiliary Boiler; however, there does not appear to be any way to verify that ES-1 represents Gas Turbine/HRSG/Duct Burner 1, since the abbreviated names are not included on Table 3 Modeling Input Parameters where details for individual stacks are listed. Please clarify the abbreviated naming convention and the associated stacks.

RESPONSE 7-25 The abbreviated naming convention was as follows:

ES-1: HRSG Exhaust Stack 1
ES-2: HRSG Exhaust Stack 2
EG: Emergency Generator
DP Heater: Dew Point Heater
Aux Boiler: Auxiliary Boiler
FP: Fire Pump

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-26 *Table 16 Air Toxics Modeling Results Summary* lists various air toxic hourly emission rate values for the HRSG Duct Burners. However, the HRSG Duct Burners were not listed as an individual emission source within the air toxic modeling files, and thus are not represented in the unit emission rate impact table by source. Comparison to RIDEM APCR No. 22 Acceptable Ambient Levels is not valid unless all relevant emission sources are included. Please explain/clarify.

RESPONSE 7-26 Although the HRSG duct burners are separate sources of emissions, they exhaust from the same stacks as the combustion turbines. Each of the HRSG exhaust stacks was modeled as a single emission source which included the combined emissions from the associated combustion turbine and HRSG duct burner.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

AIR DISPERSION MODELING REPORT

7-27 For the comparison to RIDEM APCR No. 22 Acceptable Ambient Levels that was included in Table 16, it is difficult to evaluate without example calculations showing methodology for estimating ambient air impact levels from each source for each pollutant for each period of comparison. Please provide.

RESPONSE 7-27 Example calculation for annual 1-3-Butadiene:

GT/HRSG-1&2 (Natural Gas)

$$[2.92 \times 10^{-4} \text{ lb/hr}] \times [453.6 \text{ g/lb}] \times [1 \text{ hr}/60 \text{ min}] \times [1 \text{ min}/60 \text{ sec}] \times [0.15676 \text{ ug/m}^3/\text{g/sec}] \times [8,040 \text{ hrs/yr}] / [8,760 \text{ hrs/yr}] = 5.29 \times 10^{-6} \text{ ug/m}^3$$

GT/HRSG-1&2 (ULSD)

$$[1.12 \times 10^{-2} \text{ lb/hr}] \times [453.6 \text{ g/lb}] \times [1 \text{ hr}/60 \text{ min}] \times [1 \text{ min}/60 \text{ sec}] \times [0.14672 \text{ ug/m}^3/\text{g/sec}] \times [720 \text{ hrs/yr}] / [8,760 \text{ hrs/yr}] = 1.70 \times 10^{-5} \text{ ug/m}^3$$

Fire Pump

$$[8.21 \times 10^{-5} \text{ lb/hr}] \times [453.6 \text{ g/lb}] \times [1 \text{ hr}/60 \text{ min}] \times [1 \text{ min}/60 \text{ sec}] \times [17.31881 \text{ ug/m}^3/\text{g/sec}] \times [300 \text{ hrs/yr}] / [8,760 \text{ hrs/yr}] = 6.13 \times 10^{-6} \text{ ug/m}^3$$

$$\text{Total Impact: } [5.29 \times 10^{-6}] + [1.70 \times 10^{-5}] + [6.13 \times 10^{-6}] = 2.84 \times 10^{-5} \text{ ug/m}^3$$

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-28 Section 1.2 indicates that vendor for combustion turbines will be selected before major source permit finalized, but the major source permit was submitted concurrent with this document (permit also dated June 26, 2015). The turbine equipment is identified in subsequent HRA (dated Jan. 27, 2016), Section 1.2. Please verify that the equipment identified in HRA Section 1.2 is the selected equipment and representative of what is modeled in the air modeling report and the air permit application.

RESPONSE 7-28 CREC will consist of two General Electric 7HA.02 gas turbines. AERSCREEN was applied to determine the gas turbine and operating condition which resulted in the highest predicted ambient air impact concentrations for each pollutant and averaging period. This screening analysis was applied for each of the three turbines (GE, Siemens, MHI) being considered at the time for the project.

The turbine and operating condition which exhibited the highest modeled impact concentration for each pollutant and averaging period was then modeled using AERMOD for the compliance determinations. The use of the turbine and operating condition with the highest predicted impact concentration for each pollutant and averaging period, which was approved by RIDEM, produced modeling results that were conservative and applicable regardless of which turbine was selected for the project. For any pollutant averaging period for which the Siemens or MHI turbine was used to demonstrate compliance, the modeled impacts from the GE turbine will be lower than the values presented, providing further assurance of compliant operation.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-29 Section 2.1 notes 90% reduction in HAPs by oxidation catalyst (OC). Please provide basis of this assumption.

RESPONSE 7-29 The 90% in reduction in HAPs by the oxidation catalyst was provided by the equipment manufacturer.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-30 Section 2.1 states the facility will only use diesel when natural gas “unavailable”. As noted above, please define or provide information on when natural gas is “unavailable”.

RESPONSE 7-30 Unavailability of natural gas is defined as when there is insufficient gas for the project to meet its capacity obligation and as such could be subject to penalties under Market Rule 1, Section III.13.7 “Performance Payments and Charges in the Forward Capacity Market, otherwise known as “Pay for performance.” Use of ULSD will be a contractual obligation under the “Pay for Performance” construct of the ISO NE Tariff. CREC expects combustion turbine ULSD use will be limited to that needed to maintain oil system readiness and times when natural gas is unavailable. The potential loss of natural gas is expected to be unlikely and if it were to occur would be short lived. Natural gas will be deemed to be unavailable when the natural gas supplier (Spectra) informs Invenergy Thermal Development LLC (“Invenergy”) that the natural gas supply is being curtailed or if there is a Force Majeure event. The availability natural gas is monitored by ISO-NE, who may declare a “Cold Weather Event”, a “Cold Weather Watch”, or a “Cold Weather Warning”, as defined in:

<http://www.iso-ne.com/markets-operations/system-forecast-status/current-system-status/alert-descriptions> .

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-31 HRAP states that diesel use is being proposed up to 60 days / year. However, subsequent HRA states that diesel will only be fired 720 hours/year or 30 days on page 4 (which represents a decrease from amount stated in HRAP). However, page 5/Section 2.1 of HRA states that turbines will be permitted for up to 60 days of diesel firing. Please clarify inconsistent statements.

RESPONSE 7-31 Invenergy is not proposing an annual limit on the number of days of combustion turbine ULSD usage per year nor is Invenergy proposing individual ULSD usage limits for each turbine. Invenergy is proposing to limit total ULSD usage by both combustion turbines to the equivalent usage of 60 days at base load. This will be calculated by multiplying the maximum single turbine ULSD usage rate at base load (gallons per hour) times 24 hours per day (gallons per day) times 60 days (gallons per 60 days).

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-32 Section 3.0, the Lifespan of the facility is identified as 25-30 years and was used to determine exposure scenario for pollutants. This may understate actual exposure to contaminants if plant operates longer. That is, this is significantly less than typical “human lifespan” exposure scenario used in most risk assessments. Please provide basis or source of this assumption.

RESPONSE 7-32 The use of this timeframe, which was approved by RIDEM, was consistent with Section II.A of RIDEM’s “Guideline for Assessing Health Risks from Proposed Air Pollution Sources” states the following:

“The focus of the risk assessment is the impact to the theoretical “most exposed individual” (“MEI”). For the purpose of this guideline, RIDEM is defining MEI as a person who lives for thirty years, including childhood, at the location of the facility’s maximally impacted residential receptor ...”

Section 3(1) of the RIDEM Guideline states the following:

“All multi-pathway risk assessment must focus on the MEI, a theoretical person who lives for thirty years, including childhood, at the facility’s residential (or potentially residential) point of maximum impact ...”

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-33 Section 3.2 states that RIDEM indicated focus of study was to be PAH, PBTs, and metals. Please provide the source of this statement or reference RIDEM correspondence.

RESPONSE 7-33 Attached is an email from Ms. Barbara Morin of RIDEM dated April 9 2015 which states the following:

“As discussed above, the multiple exposure pathway analysis portion of the assessment should focus on metals and PBTs. EPA’s list of PBTs is at <http://www2.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri> . Note that the EPA list includes polycyclic aromatic hydrocarbons (PAHs).”

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Protocol (HRAP), dated June 26, 2015

7-34 Section 5.2.4 states that no farms in 5 miles. RIDEM subsequent comments dispute this statement. The Sensitive Receptor List included in the HRA Table 4 was the same list as provided in HRAP. RIDEM's comments indicated that some farms observed during a cursory review were missing from list. However, no receptors were added to HRA list from original HRAP. Please provide rationale for no additional receptors being added to list when RIDEM states that farms can be seen in a "cursory review".

RESPONSE 7-34 Following RIDEM comments, additional review identified several area farms. The individual pollutant deposition rates at the impacted farms were used as the basis for the Crop, Beef, Dairy, Pig, Chicken, and Egg Ingestion values for all residential receptors in the HRA study area. No additional receptors were added to the list, but all pollutant exposure input values were affected by the use of these ingestion values. The CREC health risk assessment conservatively assumed that the impacted residents exclusively ingested locally grown meat and dairy products because there are local farms in the area.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-35 Cover letter indicates that RIDEM conditionally approved Air Dispersion Modeling Protocol within July 27, 2015 correspondence. Please provide a copy of this letter, if available.

RESPONSE 7-35 Attached is a copy of the July 27, 2015 RIDEM letter.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-36 Cover letter indicates that RIDEM's *Guidelines for Assessing Health Risk from Proposed Air Pollution Sources* document was finalized October 21, 2015 and notes that a January 5, 2016 telephone call from RIDEM's Mr. Doug McVay verified that the Health Risk Assessment Protocol was approved based on revised *Guidelines* document. Please provide any documentation and/or correspondence indicating that the *Guidelines* document has been formally approved/issued by RIDEM, in addition to a published version of the Guidelines. Further, please provide any written correspondence from RIDEM which states that the HRAP was approved.

RESPONSE 7-36 The October 21, 2015 revised RIDEM Guideline is attached and can be found on the RIDEM web-site at the following hyperlink:

<http://www.dem.ri.gov/programs/benviron/air/pdf/riskguid15.pdf>

The HRAP was verbally approved by the Chief of RIDEM's Office of Air Resources by telephone on January 5, 2016.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-37 As stated above, Section 2.0 of HRA states that diesel will only be fired 720 hours/year or 30 days on page 4 (which represents a decrease from amount stated in HRAP). However, page 5/Section 2.1 states that turbines will be permitted for up to 60 days of diesel firing. Please clarify inconsistent statements.

RESPONSE 7-37 Invenergy is not proposing an annual limit on the number of days of combustion turbine ULSD usage per year nor is Invenergy proposing individual ULSD usage limits for each turbine. Invenergy is proposing to limit total ULSD usage by both combustion turbines to the equivalent usage of 60 days at base load. This will be calculated by multiplying the maximum single turbine ULSD usage rate at base load (gallons per hour) times 24 hours per day (gallons per day) times 60 days (gallons per 60 days).

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-38 Section 2.0 of HRA narrative states that facility will be major source for CO₂, which was not mentioned in Protocol. Please clarify how or why this change from HRAP occurred.

RESPONSE 7-38 The definition of “Major Stationary Source” in RIDEM Air Pollution Control Regulation No. 9 (Section 9.5.1(f)) does not include a major source threshold for CO₂ emissions. Section 9.1.41(e) states that beginning July 1, 2011, the pollutant greenhouse gas emissions (“GHG”) will be subject to regulation at a new stationary source that will emit or have the potential to emit 100,000 tpy CO_{2e}. The CREC will be a major stationary source with the potential to emit 100,000 tpy CO_{2e}, and thus its GHG emissions are subject to the applicable RIDEM major source permitting requirements contained in Sections 9.4 and 9.5 of Air Pollution Control Regulation No. 9.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-39 Please provide additional information regarding the calculation of ammonia emissions contained within Table 3.

RESPONSE

NH3 example calculations for NG and ULSD:

7-39

$$2.0 \text{ ppmvd} = \frac{2.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{17 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{8,710 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{386 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \\ \times \frac{3,393 \text{ MMBtu}}{\text{hr}} = 9.2 \frac{\text{lb}}{\text{hr}}$$

$$2.0 \text{ ppmvd} = \frac{2.0 \text{ dscf}_{\text{gas}}}{10^6 \text{ dscf}_{\text{stack}}} \times \frac{17 \text{ lb}}{\text{lb} \cdot \text{mol}} \times \frac{9,190 \text{ dscf}_{\text{stack}}}{\text{MMBtu}} \times \frac{1 \text{ lb} \cdot \text{mol}}{383 \text{ dscf}_{\text{gas}}} \times \frac{20.9}{20.9 - 15} \\ \times \frac{3,507 \text{ MMBtu}}{\text{hr}} = 10.1 \frac{\text{lb}}{\text{hr}}$$

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-40 HRAP initially stated one (1) 2MM gallon diesel fixed roof AST will be utilized. HRA states two (2) 2MM gallon diesel AST. Please provide TANKS emission calculation output sheets and provide any documentation relating to size, number, and configuration of proposed diesel AST(s). Please clarify/explain.

RESPONSE 7-40 The current design of the facility includes two 1,000,000 gallon above-ground ULSD storage tanks. Each tank will be approximately 80 feet in diameter and 30 feet tall. The fugitive VOC emissions associated with the ULSD storage tanks were estimated using the TANKS program. The TANKS data printouts for the two ULSD storage tanks are attached.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-41 Section 3.1, Sensitive Receptor List included as Table 4 contains same information as in HRAP. However, RIDEM's comments indicated that some farms were observed during a cursory review were missing from list. No receptors were added to this HRA list from HRAP. Please provide rationale for no additional receptors being added to list when RIDEM states that farms can be seen in a "cursory review".

RESPONSE 7-41 Following RIDEM comments, additional review identified several area farms. The individual pollutant deposition rates at the impacted farms were used as the basis for the Crop, Beef, Dairy, Pig, Chicken, and Egg Ingestion values for all residential receptors in the HRA study area. No additional receptors were added to the list, but all pollutant exposure input values were affected by the use of these ingestion values. The CREC health risk assessment conservatively assumed that the impacted residents exclusively ingested locally grown meat and dairy products because there are local farms in the area.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

Health Risk Assessment Report (HRA), dated January 27, 2016

7-42 Section 4.1, More recent meteorological data is being used (2010-2014) within HRA rather than what was specified in HRAP (2007-2011). Please provide any RIDEM/Permittee correspondence relating to this change in model data.

RESPONSE 7-42 RIDEM's July 27, 2015 letter conditionally approving the project's Air Dispersion Modeling Protocol (attached) stated that "OAR's pre-processed five years off-site meteorological data shall be used for air toxics modeling. Those data are provided by OAR." The more recent meteorological data subsequently provided by OAR was used for the air toxics modeling which formed the basis of the health risk assessment.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 17, 2016

AIR

19-1 Please provide electronic files that support the most recent air dispersion modeling submitted to the Rhode Island Department of Environmental Management..

RESPONSE 19-1 Invenergy Thermal Development LLC (“Invenergy”) provided the Town of Burrillville’s (“Town”) attorney with a CD-Rom with the electronic data on October 11, 2016. If any other Party wishes to receive the data, please contact Invenergy’s attorneys to receive a CD-Rom with the electronic files. Please note, to access the data will require the modeling program, AERMOD. The AERMOD model program can be downloaded from the Environmental Protection Agency’s website: https://www3.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 25, 2016

AIR

Request 27-25 **If the Facility is approved by the EFSB and the construction phase is over, the Ammonia storage tank must be filled. Please answer the same questions as #27 (a) through (d) (above) for the ammonia tankers.**

RESPONSE 27-25 (a) This tank will be filled up as a part of the construction phase of the project, to facilitate the commissioning and check out of the applicable plant system, which happens prior to the Facility being operational. Approximately 4 tanker truck trips will be needed to fill this tank.

 (b) There will be one tanker truck trip per day on average over a week long period.

 (c) **Exhibit 27-24** provides an estimate of these tanker truck emissions.

 (d) **Exhibit 27-24** provides an estimate of these tanker truck emissions.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-1 **The Algonquin Compressor Station (ACS) apparently intends to retire at least 2 of the 3 compressor engines at the site. Therefore, it appears that CREC only modeling is completed in the MSPAA, i.e., no multisource modeling was performed. At the time, of the MSPAA, no firm commitment from the ACS was documented. What is the current status?**

RESPONSE 28-1 On September 22, 2016, a Minor Source Permit Application was submitted to Rhode Island Department of Environmental Management (“RIDEM”) for the ACS proposing to install clean burn technology and an oxidation catalyst on one of the existing compressor engines and to shut down the other two existing compressor engines.

A revised Clear River Energy Center (“CREC” or “Project”) multisource modeling analysis based on the ACS configuration proposed in the September 22, 2016 Minor Source Permit Application was completed and submitted to RIDEM in the CREC Multisource Modeling Addendum (“MSMA”)(dated October 18, 2016), filed with the Rhode Island Energy Facility Siting Board (“EFSB”) on May 26, 2017.

RIDEM’s EFSB Status Update, dated June 13, 2017, stated that the CREC Major Source Air Permit is contingent upon the issuance of a permit for the proposed modifications to the ACS, which is currently under review. It further stated that within thirty (30) days of the issuance of the permit for the ACS, RIDEM anticipates rendering a preliminary decision on the CREC permit.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-2 **A revised property and fence line are now included. Is the property line supported by a Class I survey?**

RESPONSE 28-2 Yes. Please see attached **Exhibit A**.

RESPONDENT: Richard Lipsitz, Waterman Engineering Company

DATE: July 18, 2017

AIR

Request 28-3 **Page 3 of the MSPAA notes that the Siemens and MHI gas turbine models are no longer being considered for the project. GE Model 7H.02 Model turbines appear to be selected for installation at CREC. Please verify the values and model input data included in the MSPAA to determine if up to date information was utilized.**

RESPONSE 28-3 GE Model 7H.02 Model turbines have been selected for installation at CREC. Table 3 and Table A-1 of the Major Source Permit Application Addendum (“MSPAA”) provided the most up to date modeling input data provided by GE for the Model 7H.02 gas turbine available for inclusion in the MSPAA.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-4 **The revised Figure 6 (Maximally Impacted Receptors) of the Health Risk Assessment report (HRA) of the MSPAA indicates significantly fewer Maximally Impacted receptors than was identified in the original HRA Figure 6. The basis of this reduction or the methodology of the receptor analysis is not adequately explained. Please explain/clarify.**

RESPONSE 28-4 The version of Figure 6 that was included in the original HRA Report identified the maximally impacted receptor of each receptor type (school, place of worship, etc.) within the study area. The revised version of Figure 6 that was included in the MSPAA identified the maximally impacted receptor for each exposure pathway (inhalation, crops, drinking water, etc.) evaluated within the study area to be more consistent with RIDEM's definition of the "Most Exposed Individual". Regardless, the health risk analysis was conducted at all of the receptor sensitive locations shown on Figure 5 of the HRA for both the original HRA Report and for the MSPAA.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-5 **The revised Table 1, Facility Potential Emission Summary, contains an additional column for Gas Turbines/HRSG/Duct Burner Steady State Operations, identified as “N.Gas w/DB”. It is likely this represents natural gas firing with duct burners. It is not clear if this scenario was not considered in previous permit application materials, or if this was the previous application assumption. Additional clarification is needed to distinguish this from other “N.Gas” column, to determine what scenario was previously considered in 2015 application, and what facility information triggered this additional column/information. Please explain/clarify.**

RESPONSE 28-5 In the Major Source Permit Application, the potential emissions were conservatively calculated assuming that all turbine operating hours firing natural gas included the potential emissions from duct burner firing. On Page 2 of the MSPAA, CRE proposed to limit HRSG duct burner usage to the total natural gas usage equivalent of 6,100 hours per year per turbine at the duct burner’s maximum firing rate. Thus, in the revised version of Table 1 presented in the MSPAA, the potential emissions from the turbines firing natural gas while firing the duct burners (“N.Gas w/DB”) for 6,100 hours per year per turbine was calculated separately from the potential emissions from the turbines while firing natural gas without firing the duct burners (“N.Gas”) for 2,150 hours per year per turbine. There was no need to separate these columns in the prior versions of Table 1 because it was previously conservatively assumed that the duct burners were being fired during all turbine operating hours while firing natural gas because no limit on duct burner firing was proposed.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-6 **Based on the CREC Class II Significant Impact determination included in the MSPAA, Significant Impact Area (SIA) now includes an annual NO₂ significant area up to 0.375 km from the proposed facility. This annual SIA was not previously identified in the original permit submission. Additionally, the maximum distances from the CREC at which the modeled facility impacts were greater than Class I Significant Impact Level (SIL) have increased (refer to page 4 of the MSPAA and page 13 of the original Air Dispersion Modeling Report, 10/30/15). Please explain/clarify.**

RESPONSE 28-6 The revised air dispersion modeling analysis presented in the MSPAA was based on revised versions of the Site Arrangement and General Arrangement and the updated emissions estimates provided by GE and the updated emissions data from Enbridge for the compressor station. As detailed in the MSPAA, the results of the revised analysis exceeded the annual NO₂ SIL and resulted in a larger SIA than was determined from the original modeling analysis. However, since the sole purpose of the significance determination is to determine whether multisource modeling is needed, and multisource modeling was required by RIDEM regardless, these differences in the significant impact determination results are immaterial. Both the original analysis and the revised analysis demonstrated the Project's full compliance with the NAAQS, the available PSD increments, and RIDEM's AALs, which are the RIDEM acceptance criteria for the air quality impact analysis required for a major source permit application.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 28-7 **The MSMA states that changes to the Algonquin Compressor Station will take effect prior to the commencement of CREC operation. Therefore, new multisource modeling was undertaken to reflect the proposed changes to the Algonquin facility. What is the status of this? It is not clear if there is a contractual or legal requirement relating to the noted changes to the Algonquin facility. Please explain/clarify.**

RESPONSE 28-7 RIDEM's EFSB Status Update, dated June 13, 2017, stated that the CREC Major Source Air Permit is contingent upon the issuance of a permit for the proposed modifications to the ACS, which is currently under review. It further stated that within thirty (30) days of the issuance of the permit for the ACS, RIDEM anticipates rendering a preliminary decision on the CREC permit.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AIR

Request 38-7

Please explain in detail which of the EC4 GHG Plan’s 10 mitigation options siting the CREC in Burrillville would fulfill and which it would fail to fulfill in whole or in part.

Response 38-7

The Pre-Filed Direct Testimony of Dr. Ellen G. Cool of Levitan & Associates, Inc., testifying as the sponsor for the Advisory Opinion of the Rhode Island Office of Energy Resources, detailed why the development and operation of CREC would not hinder or impair Rhode Island’s ability to implement the GHG mitigation options detailed in the EC4’s December 2016 Rhode Island Greenhouse Gas Emissions Reduction Plan. Dr. Cool advised that the development and operation of CREC will not hinder Rhode Island’s ability to implement the proposed mitigation options, at page 26 of her testimony. As stated by Dr. Cool, except for preservation of the nuclear units, “each of these mitigation options can be implemented, at least in part, through public policy tools that are available to Rhode Island, and that build upon existing state programs, such as Least Cost Procurement, the RES, the Renewable Energy Growth Program, the Long Term Contracting Standard for Renewable Energy and the Affordable Clean Energy Security Act.” (Pages 26-27 of Dr. Cool’s testimony.) She then goes on to state: “These tools available to Rhode Island and the other states in the region will continue to increase the percentage of energy sold in Rhode Island that is derived from clean energy resources. . . CREC’s operation would contribute to lowering GHG emissions in the near term until a decreased demand for fossil-fueled generation leads to its output being replaced by lower and zero carbon emitting resources in the long term.” (Page 27) I agree with Dr. Cool’s analysis.

The following details the EC4 GHG Plan’s 10 mitigation options and the expected impact of the siting the CREC in Burrillville would have on each:

Mitigation Option	Expected CREC Impact
Energy Efficiency	CREC would help fulfill as the most efficient fossil-fuel generator in ISO-NE displacing the operation of less efficient existing generating resources in the region
VMT Reductions	CREC will not hinder implementation
Utility-Scale Renewable Energy	CREC’s would help fulfill as its quick-start and fast ramping capabilities will be uniquely compatible with the intermittent nature of utility-scale renewable technologies, unlike many of the

	existing generating resources in the region which have slower startup and load ramping capabilities which are not compatible with the intermittent nature of renewables
Distributed Generation	CREC will not hinder implementation
Clean Energy Imports	CREC will not hinder implementation
Nuclear Re-Licensing	CREC will not hinder implementation
Electric Heat	CREC will not hinder implementation and will support this goal by making electricity available on demand
Biodiesel/Biomass Heat	CREC will not hinder implementation
Electric Vehicles	CREC will not hinder implementation and will support this goal by making electricity available on demand
Transport Biofuels	CREC will not hinder implementation

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: October 4, 2017

AIR

Request 39-2 **If standby generators or other equipment is to be used to provide emergency power and/or to insure that safety protocols are maintained, are the emissions from such equipment incorporated into permit applications and submissions required to permit this project?**

Response 39-2 The emissions from the proposed project emergency generator have been incorporated into all permit applications and submissions required to permit this project which address project emissions, including the Major Source Air Permit Application and Invenergy Thermal Development LLC's ("Invenergy's") Energy Facility Siting Board Application.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: October 13, 2017

PROPERTY VALUES

1-19 Please explain how Invenergy plans to deal with the impact of diminished property values in the neighborhood.

RESPONSE: Invenergy does not believe that there will be any diminishment of property values and in order to stand behind that statement, Invenergy is prepared to offer abutters a Property Value Protection Agreement that will provide protection against diminished value, if it were to occur.

RESPONDENT: John Niland, Director, Business Development, Invenergy

DATE: March 31, 2016

SUPPLEMENTAL RESPONSE: Please see attached Memorandum titled: "Market Impact Analysis, Proposed Clear River Energy Center, Wallum Lake Road, Burrillville, Rhode Island" dated May 17, 2016.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2016

PROPERTY VALUES

14-1 The May 17, 2016 Market Impact Analysis prepared by MaRous & Company states that MaRous & Company has consulted on the proposed Allegheny Energy Center, the proposed Lackawanna Energy Center, the Oakwood Hills Energy Center, the Twin Forks Wind Farm, the Walnut Ridge Wind Farm, and the proposed solar farm on Long Island, NY. Please summarize the results of the Market Impact Study conducted on these energy facilities and specifically whether MaRous & Company ever opined that any of the proposed energy facilities would have a negative impact on property values either on the neighborhood where the energy facility was located or on residential properties in the general vicinity. Please explain your answer in detail.

RESPONSE 14-1

The “summary of findings” for the projects specifically included in the request in this paragraph are included below where reports have been completed.

Allegheny Energy Center - The report is not yet complete. However, it does not appear that the research conducted for this proposed project will support a finding that there is any impact on residential property values by proximity to a power plant.

Lackawanna Energy Center - Following are the conclusions of this market impact analysis.

As a result of the market impact analysis undertaken, it is our opinion that the proposed power plant will not have a negative impact on the property values either in the neighborhood where it is to be located or to residential properties in the general vicinity.

Specifically:

- There are significant financial benefits to the local economy and to the local taxing bodies from the development of the proposed power plant, including the creation of well-paid jobs in the area which will benefit overall market demand;
- There is little demand for the existing “brownfield” site for Lackawanna; however, were the site to be developed with industrial uses, negative impacts of trucks and vehicular traffic could have a greater impact on the community than those of the proposed operating power plant;
 - The proposed power plant will be one of the most efficient power plants in its class in the world, using state-of-the-art technology which will result in extremely low emissions;
 - The site is zoned for industrial use, is surrounded on three sides by an industrial park, and is compatible with the existing and planned development;
 - There already is electrical and natural gas infrastructure located in the area of the proposed plant;

- The site property boundary is located approximately 2,211 feet from the nearest residence and is separated from the larger residential areas by the Lackawanna Valley Industrial Highway;
- The site is further buffered from the residential development in the area by the rolling topography and woods;
- An analysis of residential sales proximate to existing power plants did not support any finding that proximity to a power plant had a negative impact on property values; and
- None of the real estate brokers interviewed believed that proximity to a power plant adversely affected the value of the residential properties with which they were involved.

Oakwood Hills Energy Center - The project was cancelled; no report was completed for this project. However, as part of our preliminary consulting, we raised the following concerns:

- The economic benefits to the local community were poorly defined;
- The improvements were to be enclosed in an enormous building, with the stack at approximately 350 feet;
- Including the appurtenant structures, the foot-print encompassed nearly the entire 11.88-acre site;
- The level topography and lack of a buffer zone would have resulted in the plant being visible for miles;
- The nearest residential properties were 650 feet from the property line, and at least one house was located within the 45 decibel ring.

Twin Forks Wind Farm - Following are the conclusions of this market impact analysis.

As a result of the market impact analysis undertaken, it is my opinion that the proposed wind farm will not have a negative impact on the property values in the neighborhood, nor will it impede the orderly development of the area for uses permitted in the zoning districts. Specifically:

- There are significant financial benefits to the local economy and to the local taxing bodies from the development of the proposed wind farm;
- The proposed wind farm will create well-paid jobs in the area which will benefit overall market demand;
- An analysis of recent residential sales in the area of existing wind farms did not support any finding that proximity to a wind turbine had a negative impact on property values;
- An analysis of agricultural land values in the area and in other areas of the state with wind farms did not support any finding that the agricultural land values are negatively impacted by the proximity to wind turbines;
- Reports indicate that wind turbine leases add value to agricultural land;

- A survey of County Assessors in all 18 Illinois counties in which wind farms are located determined that there was no market evidence to support a negative impact upon residential property values as a result of the development of and the proximity to a wind farm, and that there were no reductions in assessed valuations; and
- There is no evidence that development of or proximity to a wind farm impedes the orderly development in the area.

Walnut Ridge Wind Farm - Following are the conclusions of this market impact analysis.

As a result of the market impact analysis undertaken, it is my opinion that the proposed wind farm will not have a negative impact on the property values in the neighborhood, nor will it impede the orderly development of the area for uses permitted in the zoning districts. Specifically:

- The proposed use will meet or exceed all the required development and operating standards;
- Controls are in place to insure on-going compliance;
- There are significant financial benefits to the local economy and to the local taxing bodies from the development of the proposed wind farm;
- The proposed wind farm will create well-paid jobs in the area which will benefit overall market demand;
- An analysis of recent residential sales in the area of the Big Sky wind farm did not support any finding that proximity to a wind turbine had a negative impact on property values;
- An analysis of agricultural land values in the area and in other areas of the state with wind farms did not support any finding that the agricultural land values are negatively impacted by the proximity to wind turbines;
- Reports indicate that wind turbine leases add value to agricultural land;
- An updated and expanded survey of County Assessors in all 18 Illinois counties in which wind farms are located determined that there was no market evidence to support a negative impact upon residential property values as a result of the development of and the proximity to a wind farm, and that there were no reductions in assessed valuations; and
- There is no evidence that development of or proximity to a wind farm impedes the orderly development in the area.

Long Island Solar Farm – MaRous & Company did not perform a market impact analysis for this consulting assignment.

Natural-Gas-Fired Power Plants Market Impact Conclusions

MaRous & Company has undertaken objective analyses in all assignments, as required by USPAP. We have been unable to find any instances where a paired sales analysis supports a

finding that a natural-gas-fired power plant has had a negative impact on property values. (We have not studied coal-fired power plants.)

Moreover, we continue to conduct research into the question of potential impact on property values. For example, I recently visited a state-of-the art Invenenergy power plant located in Rock Falls, Illinois. This plant is consistent with modern manufacturing uses, with no visible smoke, and no noise at the entrance drive from the road.

This visit contributed to, and supported the conclusions we have drawn regarding modern natural-gas-fired power plants. We have determined that certain design elements contribute to the lack of impact: carefully chosen sites, with good topography, and adequate buffer zones; a location sufficient distance from residential uses to limit noise; the lack of visible smoke; and adequate traffic controls.

Neither have we been able to find any instances where a paired sales analysis supports a finding that proximity to a wind turbine has had a negative impact on property values, once the wind farm is operational. We have not studied the transition period between the time the wind farm is proposed, is under construction, and comes on line.

On the other hand, we have been able to document negative impacts on property values using matched pair analyses for residential properties in proximity to quarries, waste transfer stations, and large truck distribution facilities.

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE:

August 18, 2016

PROPERTY VALUES

14-2 In the May 17, 2016 Report, MaRous & Company stated that none of the real estate brokers interviewed believe that proximity to a power plant adversely affected the value of residential properties with which they were involved. Please identify the name and contact information of each real estate broker you contacted in the State of Rhode Island, a summary of what you asked, and how they responded.

RESPONSE 14-2:

None of the brokers interviewed were located in Rhode Island. Efforts to discuss the market impact with local brokers were unsuccessful because either they were not comfortable expressing an opinion, or said they had no opinion to provide. One broker located in Maryland expressed the opinion cited in the report concerning employment in the area, but did not agree to have a name included in the report.

All broker interviews (regardless of their location or the project) follow the same basic format:

1. Introduction of person doing the interview, the nature of the assignment being undertaken by MaRous & Company, and the willingness of the broker to talk further.
2. Questions concerning the broker's familiarity with the area in which the project is located.
3. Questions concerning the condition of the residential market including:
 - How are market conditions in general?
 - What factors impact the selling prices of houses in the area? (i.e. Sale price, house size, lot size, proximity to schools.)
 - If it is not mentioned previously, the broker is asked if proximity to the project affect either property values or marketing times.
4. If the broker is being contacted concerning a specific property, the details of the that transaction are discussed.
5. If the broker's firm has been involved with any recent transactions in the area, the details of those transactions are discussed and/or the other broker may be contacted.

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE:

August 18, 2016

PROPERTY VALUES

14-3 In the May 17, 2016 Report, you have used somewhat similar, but different terms, including “the area of the proposed power plant,” “the general market area of the proposed power plant,” “approximate area,” and “surrounding residential properties.” Please define each of these terms more precisely and explain how they differ, if at all.

RESPONSE 14-3:

The “area of the proposed power plant” is specifically used to describe the demographics included; in this instance, it is further defined on page 4 as being Burrillville township. Sometimes, information on demographics might be based on individual villages, or even on a 3-, 5- or 10-mile distance measurement from a specific location.

We could not find a specific reference to “approximate area” but would be happy to clarify the statement further when it is pointed out. Admittedly any reference to “area” is somewhat amorphous. For example, in the Executive Summary, the first bullet point is discusses the creation of well-paid jobs “in the area,” while the third bullet point discusses the infrastructure “in the area of the proposed plant.” Any definition of the job market has very different, and likely larger parameters, than would a description of the proximity of infrastructure.

The term “surrounding residential properties” is used in the discussion of the scope of the assignment and in the discussion of the purpose of the assignment. The specific area this term describes is not defined, and changes from project to project. It is difficult to attempt to draw a specific lineal reference because there are many factors that influence whether or not an area should be included. Among these factors are: distance; intervening uses; line of sight (visibility); and prevailing winds (for odor issues and noise.)

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE:

August 18, 2016

PROPERTY VALUES

14-4 Please explain the process you used to select each matched paired analysis in Rhode Island.

RESPONSE 14-4

Selection of matched pairs is a time consuming process, and there is no difference in the process whether the assignment is a waste transfer station, a wind farm, a power plant, or some other facility. In the process below, the generic word “facility” is used.

First, research is conducted to find a facility similar to that being proposed in a comparable location. In this instance, the Ocean State natural gas plant was chosen. Although not a natural gas plant, the Spectra Energy Compressor Station shares some characteristics of a natural gas plant and also was considered for study.

Second, sales of residential properties in proximity to these facilities are researched. It is preferable to find sales that are arm’s length transactions and that sold without significant discounts for condition. It is also preferable to find properties that are close to the facility being studied in terms of distance. Finally, it is imperative to choose sales where there are no other issues that could have impacted value, for example, proximity to both a power plant and a waste transfer station. Usually, there are very few sales that meet the criteria. Ideally, a sale and resale of the same property is available; however, this is a rare occurrence.

Third, sales of similar properties that occurred under the same market conditions in the broader market area are researched. Care must be taken to find properties located in substantially similar geographic areas, and which are of similar site size, similar construction vintage, similar room counts, and similar finishes. Further, the property must not be proximate to a use that might negatively impact the value of that property; for example, a house next to a freeway would not be considered. As might be expected, no two properties are ever identical, and often no matched pair can be developed.

Finally, if a sale of a property near an existing facility can be matched with a similar property located away from such a facility that occurred under very similar market conditions, the sale prices of the two properties can be compared. Admittedly, this analysis requires appraisal experience and judgment.

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE: August 18, 2016

PROPERTY VALUES

14-5 Other than the matched pair analyses set forth in the May 17, 2016 Report, was there any other analysis performed in Rhode Island? If not, please explain why not.

RESPONSE 14-5

Because we were able to find matched pairs for the Spectra Energy Compressor Station, and for the Ocean State plant, we did not research additional examples within Rhode Island. The matched pairs for these two facilities were sufficient to conclude that there has not been a negative impact on property values from the development of these two facilities. However, because we had data from similar facilities in eastern Pennsylvania, we included that data as well.

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE:

August 18, 2016

PROPERTY VALUES

14-6 Please provide a copy of the article cited in footnote 7 of the Report on page 12.

RESPONSE 14-6

Attached are pages 25-27 regarding “Paired Sales Analysis” and “Sale/Resale Analysis” in the Randall Bell, MAI, book entitled *Real Estate Damages, Applied Economics and Detrimental Conditions*, published in 2008. I note that this is described as an article in the request for additional information; however, it is a book.

RESPONDENT:

Mike Marous, MAI, CRE, MaRous & Company

DATE:

August 18, 2016

DECOMMISSIONING

3-1 Please set forth in detail Invenergy’s plans to decommission the Clear River Energy Center, including Invenergy’s proposal for fully funding the entire decommissioning process, including, but not limited to, any costs associated with clean up of any hazardous wastes.

RESPONSE 3-1: Invenergy Thermal Development LLC (“Invenergy”) is prepared to enter into a Decommissioning Agreement between the Clear River Energy Center Project and the Town of Burrillville (“the Town”). The Agreement will include dismantlement and other decommissioning activities. Invenergy will prepare a draft copy for the Town’s review.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 26, 2016

LOCATION

3-2 Please explain what alternatives, other than the ones provided in the filing that relate to alternative energy options and no action, the company has considered relating to siting options throughout southern New England for this facility, including the criteria utilized for eliminating these other alternative sites that led to the selection of the Clear River site.

RESPONSE 3-2: Please see the pre-file testimony of John Niland filed with the Public Utilities Commission (“PUC”) on April 22, 2016 discussing the alternative technologies considered. Regarding alternative sites, Invenergy investigated several sites in the SEMA/RI zone using criteria for sites or areas that have both existing gas and electric infrastructure and proper zoning that could support a project of the type proposed. Invenergy identified several areas that had potential, but those areas were eliminated due to insufficient gas pipeline capacity, insufficient electric transmission capacity or inadequate zoning. The Clear River Energy Center site was selected because it has all the necessary key attributes.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 26, 2016

LOCATION

4-35 Were any other towns investigated as locations to build the plant? Please explain.

RESPONSE 4-35: Yes, Invenergy examined several sites in RI, MA and CT. The criteria used to evaluate a site are as follows:

- Proper zoning;
- Available land area;
- Proximity to gas pipeline infrastructure;
- Proximity to electric infrastructure.

Sites in CT were ruled out because CT is not in the SEMA/RI zone where new capacity was deemed to be needed by ISO NE. The Town of Burrillville was selected because the site met all of the above-listed criteria. There were other industrial sites examined, however either the gas or electric infrastructure or both could not support the plant with significant upgrades. Generally, new power projects need to be located on the main gas pipeline (which is why there are other projects being proposed in the region in both CT and MA within close proximity to the Burrillville site).

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

LOCATION

4-36 Are there any other “Brown” areas in the state that could accommodate the plant?

RESPONSE 4-36: *See response to Data Question 4-35.*

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-1 How much cut and fill of earthen material will be involved in this project?

RESPONSE 4-1: The cut and fill required for the Clear River Energy Center (“CREC”) site is relatively neutral. Based on conceptual grading, approximately 80,000 cubic yards of cut and 85,000 cubic yards of fill are anticipated. Based on the geotechnical investigations conducted to date, much of the existing soil will be re-used.

RESPONDENT: John Niland, Invenergy Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-2 How much existing material is reusable on site, how much material must be trucked off site, and how much material will need to be brought onto the site?

RESPONSE 4-2: Based on the results of the geotechnical report, all excess material anticipated will be utilized on site as fill. Additional materials, such as crushed stone and gravel, are anticipated to be brought onto the site. The approximate amount of new material to be brought on the site is anticipated to be about 5,000 cubic yards.

RESPONDENT: John Niland, Invenergy Thermal Development, LLC

DATE: April 27, 2016

CONSTRUCTION

4-3 How many trucks will be traveling Town roads during construction of this project?

RESPONSE 4-3: Truck traffic during construction will vary depending on the phase of the project. The estimated number of trucks that will access the site for various phases of construction are listed below:

- A. Mobilization Phase: an average of 12 trucks per day.
- B. Underground Work Phase: an average of 15 trucks per day.
- C. Aboveground Work and Equipment Delivery Phase: an average of 15 trucks per day.
- D. Demobilization Phase: an average of 12 trucks per day.

Further details on the anticipated truck traffic are included in Section 6.8 of the EFSB Application. Invenergy Thermal Development LLC (“Invenergy”) is having a traffic study prepared that will be provided to the Town of Burrillville when it is completed.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Maureen Chlebek, McMahon and Associates

DATE: April 27, 2016

CONSTRUCTION

4-4 Is this a project where concrete foundations will be required to be done in a constant pour? If so, what are the volumes? (A constant pour means that trucks will be dumping and then returning to the concrete plant at a rate of one truck each way every twenty minutes on an average. As an example, utilizing a fleet of fifteen yard concrete trucks and a constant pour of 1,000 yards would consist of 66 truck trips both coming and going every twenty minutes. This 1,000 yard pour would be for a continuous period of 22 hours non-stop of trucks traveling through the village of Pascoag and along Wallum Lake Road which consists of a residential area.) How many times is this going to happen during the two separate proposed construction phases?

RESPONSE 4-4: Concrete foundations requiring constant pours are anticipated to occur four times for each of the two units and include: the HSRG foundation, CTG foundation, STG foundation and transformer foundation. Foundation will be designed to match the volume of concrete that can be hauled within the extended daily truck traffic window between 2:00 a.m. and 4:00 p.m. The balance of foundations can be staged placements and deliveries will occur during normal daylight hours (7:30 a.m. and 4:00 p.m.).

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-5 Has Invenergy considered bringing a portable cement manufacturing plant onto the site to resolve the problem of trucking through the area? If not, why not?

RESPONSE 4-5: There is ample local supply of concrete. Use of a separate batch plant installed on site is not warranted. Only a relatively small amount of concrete is needed relative to a batch throughput capacity.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-6 The plans that were incorporated into the package consist of five sheets with no details. Please provide fully detailed plans.

RESPONSE 4-6: Site grading and stormwater detailed plans are in the process of being developed and will be provided as soon as they are completed which should be in four weeks. Other detailed plans associated with buildings, underground utilities and piping systems are prepared by the EPC construction contractor after detailed engineering has been completed. The EPC contractor has not yet been selected for this project. For power generation projects, additional detailed drawings are normally provided at the time the project applies for the local building permit. Detailed plans will be provided at that time.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-11 Will independent environmental compliance monitoring be active on the site during construction hours throughout the construction process? Please explain in detail.

RESPONSE 4-11: Invenergy will retain the services of a qualified environmental firm to monitor environmental compliance over the duration of CREC construction. Invenergy will also require its construction contractor to monitor environmental compliance throughout CREC construction. The environmental monitor will be on-site during construction activities that could result in environmental impacts, such as during the soil excavation stage. The environmental monitor will be responsible for ensuring that the CREC construction activities comply with all applicable local, state and federal regulations and guidance, as well as all relevant project permits and approvals. The environmental monitor will have the authority to stop any construction activities which pose a potential risk to the environment and to require the implementation of additional preventive measures or mitigation before such activities can resume. Invenergy will work closely with the environmental monitor and the construction contractor to ensure that all CREC construction activities will be conducted in a safe, environmentally responsible and compliant manner.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

CONSTRUCTION

4-40 During construction, will travel on truck routes or to abutting homes be restricted during certain times of day?

RESPONSE 4-40: The project has planned for truck deliveries to be scheduled between the hours of 7:00 a.m. and 4:00 p.m., Monday through Friday. Invenergy is not requesting any travel restrictions for abutting homes.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

4-41 What can the company do, or has it done in the past in regards to its energy projects, to mitigate noise, sight, and air disturbances?

RESPONSE 4-41: All Invenergy projects are designed to meet all applicable ordinances and regulations related to noise, sight and air. The CREC has been designed with extensive noise mitigation to meet the A-weighted noise limit in the Burrillville Town Ordinance at the nearest residences. The CREC has been sited to minimize visual impacts by maintaining surrounding wooded buffer areas. As detailed in Section 6.12 of Invenergy's EFSB Application, less than one percent of the five-mile area surrounding the facility will be able to see it. The CREC has been designed with state-of-the-art emission controls and will comply with all applicable local, state and federal air pollution control regulations and air quality standards during its operation.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

CONSTRUCTION

5-2 Please identify the exact water pipe line route and plans for construction.

RESPONSE 5-2: The ground survey for the new pipeline route has begun and should take approximately 5 weeks to complete. Invenenergy will proceed with the development of the design plans at survey completion. The geotechnical borings are scheduled to begin on May 5, 2016 and should take approximately 7 days to complete. Exact water pipe line route and plans will take some time to develop.

Please see the proposed water pipe line route, attached as **Exhibit 1**.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: April 28, 2016

CONSTRUCTION

5-8 Please provide detailed information regarding the impacts on biodiversity of noise, the towers, the diesel fuel tanks, the air cooled condensers, the construction site, the new overhead transmission line right of way, the connection to the existing 345 kV line, the construction of the switch yard, the new gas line connection to the newly reconstructed compressor station, the new facility access road, the construction of an underground pipe to a sewer main to the Burrillville sewage treatment plant, and the construction of a 6.8 mile new 345 kV line.

RESPONSE 5-8: The CREC has been designed to minimize impacts to vegetation and wildlife habitats, as detailed in Sections 6.5 and 6.6 of the EFSB Application. Although there will be impacts to vegetation and wildlife species resulting of the clearing of forested areas, the site is zoned F-5 which allows power generation through a special use permit. Section 6.5.2 describes the expected impacts of project construction on vegetation. Section 6.6.2.2 details the expected impacts of project construction on wildlife and ecology.

Invenergy will restore vegetated and habitat areas temporarily impacted during construction wherever feasible. Invenergy will also limit tree clearing activities during the breeding season of any threatened species identified in the areas to be cleared, and will work with local, state and federal authorities to implement practical measures to minimize impacts to vegetation and wildlife species during CREC construction and operation.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

CONSTRUCTION

5-10 Please calculate the number of impacted acres of land, for not only the construction of the power plant, but the construction of the staging area, the new road built for the construction phase, the construction of the 150-foot wide overhead transmission line right of way, the construction of new gas, waste water, and power lines, and any other impacted acres.

RESPONSE 5-10: The CREC has been designed to minimize land impacts.
The estimated impacted acres of land are as follows:

- For the construction of the power plant, the construction staging areas and the new site access road the impacted area is approximately 50 acres;
- For the construction of the 150-foot wide overhead transmission line right of way the impacted area is approximately 14 acres;
- The area impacted by the construction of the new gas line is included in the power plant impacted area;
- The water and waste water lines do not need additional cleared area; and
- The new power line installed on the National Grid ROW is approximately 57 acres.

The CREC project design is still in the process of being refined, in part to further avoid and minimize such impacts. Invenenergy is currently preparing its applications to alter wetlands to RIDEM and the ACOE. These applications will require a complete inventory of all impacted areas, including the facility, the access road, the transmission line, the new gas, water, and sewer lines, the water treatment system and the areas for construction staging.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenenergy Thermal Development LLC

DATE: April 28, 2016

CONSTRUCTION

5-20 Please describe the extent of land clearing that will be required along the 6-mile stretch of the existing National Grid corridor.

RESPONSE 5-20: Additional clearing within the existing limits of the National Grid ROW will include 65 feet along 1.6 miles and 85 feet along 4.4 miles.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

CONSTRUCTION

6-7 Please describe in detail the planned start and end times of construction for each day as well as planned workdays (Business days M-F or full week Sun-Sat).

RESPONSE 6-7 The regular shift for craft will be between the hours of 7:00am-5:30pm from Monday to Friday. It is customary for the contractor's staff to be at the site 30 minutes prior to starting the shift and 30 minutes after the shift is complete. Working over the weekends (Saturdays) will take place occasionally during the peak of construction to make up for lost time due to inclement weather. There will be a small crew of approximately 25 tradesmen working the swing shift at the peak of construction. This shift will last between the hours of 5:30pm-3:30am from Monday to Friday.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development, LLC

DATE: May 11, 2016

CONSTRUCTION

8-5 Should other federal agencies be listed as involved, especially FERC, as FERC is part of the Forward Capacity Market/Auction which seems to be one of the major driving forces for the construction timeline of this facility? Please explain/clarify.

RESPONSE 8-5: The Federal Energy Regulatory Commission (“FERC”) is an independent agency that regulates by license the interstate transmission of electricity, the siting of natural gas pipelines and certain types of power generation projects (e.g. Hydro-Electric projects). However, FERC is not a permitting/licensing agency for the siting and construction of a new natural gas electric generation project such as CREC. As referenced in the application (pg 115), with FERC Orders 888 and 889 there began substantial de-regulation of the energy markets.

Under the Federal Power Act (“FPA”), CREC will be subject to FERC rate regulation with respect to its wholesale sale of energy, capacity and ancillary services, once it begins making such sales. Accordingly, prior to CREC going into commercial operation, the Project Company will need to have a rate tariff (e.g., market-based rate tariff) or rate schedule on file with, and accepted by, FERC with respect to the Project Company’s sale of energy, capacity and ancillary services from the project. This rate schedule filing would need to be made in the future before the Project Company begins generating test power. However, unlike gas-pipeline projects (e.g. Spectra’s expansion or hydro-power projects) Invenergy will not need a FERC permit or license for the siting or construction approvals for this natural gas combined cycle energy generation project.

Also, since CREC intends to sell power only at wholesale and own facilities used only for wholesale power sales, it will be considered eligible for exempt wholesale generation (“EWG”) status under the Public Utility Holding Company Act (“PUHCA”)

Also, with regard to the gas lines to interconnect to Spectra, pursuant to the federal Natural Gas Act, the gas interconnection facilities that CREC plans to construct and own do not require FERC approval because they are not interstate (they do not cross state lines), and they are to be built and owned by the Project Company and used solely to transport natural gas for use by its generation plant.

Lastly, ISO-New England administers the Forward Capacity Market auctions. ISO-New England is an independent, not-for-profit corporation responsible for ensuring that the region has reliable, competitively priced

wholesale electricity today and into the future. ISO-NE is not a FERC permitting agency for purposes of NEPA.

The other federal agencies that are identified in the application are the Federal Aviation Administration (“FAA”) which will be consulted, as relates to the height of the stacks.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

CONSTRUCTION

22-19 **Mr. Niland recently publicly stated that the facility will cost approximately \$1 billion to build, not \$700 million. What is the impact of this \$300 million cost increase in Invenergy's financial projections? Has Invenergy revised its financial model based on this \$1 billion cost estimate? If not, why not? If so, please provide a copy.**

RESPONSE 22-19 The cost estimate that was provided in Invenergy's Application (Section 4, Project Costs) did not include impact fees payable to the Town of Burrillville, the interconnection costs for the transmission line and electric facility upgrades and did not include financing costs and security requirements. Additionally, the costs that it did include have been updated to incorporate bid estimates and firm quotes for equipment and construction.

Invenergy's financial models and the firm quotes Invenergy has received are highly confidential and proprietary and will not be provided. The Project is being privately financed without ratepayer funds and the power produced will be sold into the competitive ISO-NE market through a competitive bidding process.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

CONSTRUCTION

22-20 **Has Invenergy requested PA consulting Group (“PA”) to update its “monthly 20-year forecast (2019 through 2038) of the ISO-NE power market and a 20-year forecast (2019 through 2038) of PEC’s operations and cash flows,”¹ based on the revised Water Supply Plan filed with the EFSB on January 1, 2017? If not, why not? If so, please provide a copy.**

RESPONSE 22-20 No, Invenergy has not requested PA update its forecast. Invenergy does not believe that the Water Supply Plan will have any material impact on the PA forecasts.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

CONSTRUCTION

Request 27-9 **Is Invenergy/CREC able to guarantee that there will be no blasting during construction? Please explain.**

RESPONSE 27-9 Yes. Based on the geotechnical information currently available for the CREC site and the anticipated elevation of grade at various points around the site, a minimal amount of rock removal (less than 5,000 cubic yards) may be required for excavations for the CREC project, and this can be accomplished with mechanical means.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

CONSTRUCTION

Request 27-10 **Will there be on-site permanent housing for contractors during construction? Please explain.**

RESPONSE 27-10 No. CREC does not plan on having on-site housing for the workforce that will be employed during construction. On-site housing is usually provided only for projects that are in remote areas.

RESPONDENT: John Niland, Clear River Energy

DATE: July 18, 2017

AMMONIA

4-7 What is the volume of ammonia to be stored? What is the concentration level of the ammonia? What are the security plans and evacuation plans and procedures?

RESPONSE 4-7: 40,000 gallons of 19% aqueous ammonia will be stored in a single storage tank.

The project itself will be secured by razor wire fencing, a closed caption security camera system and 24/7 security personnel staffing.

An ammonia leak detection system will be installed that includes multiple monitors located at the perimeter of the storage tank containment area. If ammonia is detected, a common alarm signal will be triggered in the control system and will initiate an audible alarm (horn) and a red halogen strobe (beacon) located on top of the storage tank to notify plant personnel.

Since the ammonia to be used is 19% by weight, aqueous ammonia with a low release rate, security plans and evacuation plans are not required. This is the same type of system that Ocean State Power (“OSP”) uses.

The Environmental Protection Agency (“EPA”) only requires a Risk Management Plan for the storage of aqueous ammonia when the concentration is 20% or greater, because it does not consider aqueous ammonia stored at a concentration less than 20% to pose a public health risk upon release. Although the storage of aqueous ammonia at the CREC will not pose a threat to public health, Invenenergy will work with local emergency response personnel to implement an emergency response procedure that is appropriate for the types of incidents that could potentially occur at the facility.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

AMMONIA

11-3 Will Invenergy be conducting an impact zone analysis for the proposed 40,000 gallons of 19% aqueous ammonia storage at CREC?

RESPONSE 11-3: The United States Environmental Protection Agency (“EPA”) requires facilities with large quantities of hazardous chemicals to prepare and implement a Risk Management Program to prevent the accidental release of those chemicals and mitigate the consequences of any releases that do occur. The EPA only requires a Risk Management Plan for the storage of aqueous ammonia when the concentration is 20% or greater, because it does not consider aqueous ammonia stored at a concentration less than 20% to pose a public health risk upon release.

Acute Exposure Level Guidelines (“AEGLs”) are used by emergency planners and responders as guidance in dealing with accidental releases of chemicals into the air. AEGLs are expressed as concentrations of airborne chemicals at which health effects may occur and are designed to protect the elderly and children, as well as other individuals who may be susceptible.

AEGL levels are dictated by the severity of the toxic effects caused by the exposure, as follows:

- AEGL-1 (Level 1): Notable discomfort, irritation, or certain asymptomatic non-sensory effects. Any effects are not disabling and are transient and reversible upon cessation of exposure.
- AEGL-2 (Level 2): Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- AEGL-3 (Level 3): Life-threatening health effects or death.

Airborne concentrations below the AEGL-1 are exposure levels which could produce mild, transient, odor, taste and sensory irritation. These effects are non-disabling, allowing for safe evacuation from any impacted areas.

For ammonia, the 1-hour AEGL concentrations have been defined as follows:

- AEGL-1: 30 parts per million (“ppm”)
- AEGL-2: 160 ppm
- AEGL-3: 1,100 ppm

The 19% aqueous ammonia will be stored in a single-walled steel above-ground storage tank. The ammonia storage tank and its associated transfer pumps, valves and piping will be contained within a concrete containment area designed to contain up to 110% of the storage tank capacity. Ammonia sensors within the containment area will alert plant operators of any system leaks. To minimize the evaporation rate of ammonia into the ambient air, the containment area will be filled with passive evaporative controls to reduce the exposed surface area of any aqueous ammonia within the containment area by 90 percent.

Although the CREC is not subject the Risk Management Program, a worst-case accidental release scenario has been evaluated to assess the potential consequences in the extremely unlikely event of a release of the full 40,000 gallons of 19% aqueous ammonia into the containment area. This assessment was performed using the Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration and included as a prescribed technique under the Risk Management Program. It was completed in accordance with the procedures contained in the EPA’s “Risk Management Program Guidance for Offsite Consequence Analysis.”

The results of the worst-case accidental release scenario assessment completed for the CREC aqueous ammonia storage tank are shown in both tabular and graphical form in **Exhibit 1**. Based on the ALOHA modeling results, the furthest downwind distances from the ammonia storage tank at which the in-air ammonia concentrations would exceed each of the ammonia AEGL levels during a worst-case accidental release are as follows:

- AEGL-1: 121 yards
- AEGL-2: 53 yards
- AEGL-3: 20 yards

As shown on the figure in Exhibit 1, all of the areas in which the in-air ammonia concentration would exceed the AEGL-1 level are within the facility fenceline. Emergency procedures will be established to evacuate facility personnel from these areas in the event of a release and to require emergency personnel to utilize the proper personal protective equipment before entering these areas until the released ammonia has been properly recovered.

The in-air ammonia concentrations in all other areas of the facility and in all areas beyond the facility property line during a worst-case accidental release would be below the AEGL-1 level, thus resulting in

no adverse health effects upon exposure. Although there would be no public health risk, Invenergy will work with local emergency responders to establish emergency procedures in the unlikely event there is an accidental release of ammonia from the facility.

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

AMMONIA

15-1 Are you aware of whether any databases exist for accidents that have occurred at power plant sites, including, but not limited to, accidents that involve chemical spills, hydrogen accidents, fuel oil accidents, and/or ammonia accidents? If so, please provide information regarding any such databases, including, but not limited to, electronic links, if any exist.

RESPONSE 15-1 The United State Environmental Protection Agency (USEPA) maintains a database called "Enforcement and Compliance History Online" (ECHO). The purpose of this database is used for maintaining toxic releases for all facilities in the United States. The URL for the USEPA ECHO database is located here: <https://echo.epa.gov/>.

The Right-to-Know (RTK) Network is a database that provides free access to numerous databases and resources on the environment, including spills and accidents. The URL for the RTK network is located here: <http://www.rtknet.org>.

The only other data bases that we are aware of are:

- The Chemical Safety Board (CSB) has major incidents/spills that typically result in large scale impacts to the environment – website: <http://www.csb.gov/>.
- Accidents that **do not result in employee injury** are not reported to OSHA nor recorded on OSHA forms/recordkeeping (only internal)

Unless requested the **employee injury** reports are internal only – shared with OSHA upon request.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 19, 2016

AMMONIA

15-4 What onsite resources at the facility will be provided to address onsite accidents, including chemical spills and other possible accidents? Please provide all details.

RESPONSE 15-4: Please refer to Section 13.2.4 (Countermeasures) of Exhibit 1, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the onsite resources which will be provided to address onsite accidents at the Facility.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

AMMONIA

15-5 What do you expect the Town of Burrillville should do regarding service levels needed to address possible accidents at the facility, including chemical spills?

RESPONSE 15-5: Invenergy will coordinate with the Town of Burrillville with regard to the location and amount of storage of hazardous materials on-site and the associated training, personal protective equipment and emergency procedures which may be required in the event of a release.

Please refer to Section 7.0 (Notifications), Section 13.2.4 (Countermeasures), and Appendix A of **Exhibit 1**, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the emergency response procedures which will be implemented at the Facility and the service levels needed to address possible accidents.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

AMMONIA

17-1 Is there any possibility, no matter how small, that there could be an explosion at the Spectra/Algonquin compressor station which could cause an explosion at the Invenergy plant? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE 17-1 Invenergy Thermal Development LLC (“Invenergy”) does not believe there is a possibility that an explosion at Spectra’s Burrillville Compressor Station (“BCS”) could cause an explosion at Clear River Energy Center (“CREC”). As discussed in our response to questions 17-2, 3# and 17-4 Invenergy engaged Exponent as an expert consultant who has ample experience in evaluating the types of events that are being postulated in the question. Exponent estimated the area that could be impacted by an event at either location is really a function of the size of the enclosed area (e.g. building) where gas could accumulate and given that the powerhouse building at CREC is larger and has more volume than the building at Spectra’s site, an event at CREC would be governing. Please refer to the response to question 17-2 for the results of this event.

As it relates to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC, Invenergy contacted Spectra with regard to this question, and Spectra provided the attached letter that highlights the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In the attached response Spectra indicates that their Integrity Management Program has determined the Potential Impact Radius (“PIR”) of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the CREC in the remotely possible event of a fire or explosion.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

AMMONIA

17-2 Is it at all possible that a problem at the Invenergy plant could cause an explosion at the Spectra/Algonquin compressor station? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE:

We do not believe it is possible that a problem at the Clear River Energy Center (CREC) could cause an explosion at the Spectra/Algonquin compressor station. The codes and standards incorporated into the design and construction of the CREC and the physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the Spectra/Algonquin compressor station in the remotely possible event of a fire or explosion at CREC.

The design of the CREC incorporates the requirements of dozens of industry standards including but not limited to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, National Fire Protection Association (NFPA), National Electric Code (NEC), American Petroleum Institute (API). Adherence to these standards minimize the likelihood that there would ever be a fire or explosion at the CREC.

In order to determine potential scenarios that should be examined, Invenergy examined the systems and associated design features at CREC. These systems and features are typical to gas fired power plants, and as such, the Project design will also include design features to mitigate consequential damage to other portions of the CREC facility and keep any impact area within the confines of the CREC property. The key systems that could have a potential to cause a fire or explosion are listed below and their associated specific design features include:

1. Natural gas: The natural gas piping systems and components are separated from the other sections of the Project (to the extent possible) and all areas where natural gas systems and components are located are designated with an area classification that requires special design features that include explosion proof electrical components, gas detectors that are linked to automatic isolation systems and fire detection and suppression systems. Should a leak occur, the gas detection sensors are set to detect the gas before a concentration level is reached that would be capable of creating an explosion that could impact a larger area of the plant. For these reasons, the amount of any gas that could leak is limited such that it would not spread to an ignition source.

The CREC fuel gas system will be equipped with automatic detection and emergency shutdown systems, including the following:

- The natural gas will be odorized for detection.
- A network of low concentration natural gas detectors will be installed to monitor

for fuel gas leaks in the gas yard and within all areas where fuel gas equipment is located, both indoors and outdoors. The detectors will be set to alarm in the facility main control system (“DCS”). The custom-designed fire alarm and detection system will be in accordance with NFPA 72.

- In accordance with NFPA 850 the plant will include emergency shutdown systems to isolate the gas piping, stop equipment and safely vent station gas. The natural gas supply pipeline will include an emergency shutoff valve (ESV) at the outlet of the metering yard and the ESV will automatically close in the event that a fire is detected.
- Individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component.
- Main line isolation valves will be fire safe, as defined by API 607.
- Nitrogen hose connections and vent lines will be provided between all isolatable sections of the fuel gas piping to allow nitrogen purges and inerting for maintenance activities.
- The fuel gas piping will be cleaned and purged in accordance with NFPA 56.
- Pressure control devices to maintain the operating pressure at or below the maximum allowable operating pressure. In addition, overpressure protection devices with sufficient capacity and sensitivity will be installed to ensure that the maximum allowable operating pressure of the station piping and equipment will not be exceeded by more than 10 percent (10%) in the case of a malfunction of the pressure control equipment.
- All electrical equipment will be explosion proof.
- System design to accommodate changes in gas quality, periodic maintenance (e.g., filter change-out), redundancy, separation of ignition sources (e.g., National Electric Code compliance), combustion controls and hardened to resist impacts.
- Prevent damage to pipe by as-built mapping, below-grade flagging (above grade) and clear labeling of gas-bearing components.
- Flame detection that uses ultraviolet sensors.

Safe operating practices will include the following at a minimum:

- Periodic walk-through surveys of pipeline systems with hand-held gas detectors at all flanges, valves and other fittings; this is particularly important in the Gas Yard at filter, dewpoint heater equipment, pressure control valves and metering runs where many fittings and gas state changes occur that may contribute to leakage events.
- Strong operating and maintenance procedures, including use of inert gas purging, maintenance of coating and cathodic protection systems, dewpoint heating, filtration and verification of valve and instrument functionality.

The gas system design features include, controls utilizing gas detection, fire detection and suppression and when combined with regular inspections and proper maintenance of gas system equipment, limits this type of event to be confined within a smaller area thereby virtually eliminating the potential for undetected gas leaks that could lead to a fire or explosion.

2. Hydrogen: Modern utility generators larger than about 300 MW are hydrogen or hydrogen and water cooled. Hydrogen has safely been used as the coolant medium in utility generators for over 70 years. General Electric (“GE”) estimates that there are more than 2,400 hydrogen cooled GE designed generators in service today. The generator and associated hydrogen cooling system include a number of features to ensure the safe operation of the equipment:

The generator applied to CREC is hydrogen cooled, and as with the potential for a natural gas leak, there will be hydrogen leak detection sensors located on the generator which stringently monitor for potential leaks. These detectors will be set to monitor, alarm and take protective actions when hydrogen is detected at a level that is below the lower explosive limit.

The generator is equipped with end shields on each end, designed to support the rotor/bearings, to prevent gas from escaping, and to be able to withstand a hydrogen explosion in the unlikely event of such a mishap. In order to provide the required strength and stiffness, the end shields are constructed from steel plate and are reinforced. Horizontally split inner and outer oil deflectors are bolted into the end shield and provide sealing of the oil along the shaft.

Furthermore, the hydrogen systems and components will be located in areas that are designated with an area classification that requires special design features including explosion-proof electrical components, gas detectors that are linked to automatic isolation of systems and integrated with the fire detection and suppression systems.

The generator will have an internal volume of hydrogen that will be maintained in a sealed condition using multiple redundant seals. The seals will include mechanical seals and a seal oil system that uses pressurized oil barrier between the mechanical seals and the rotating shaft. The seal oil maintains an air-side seal and a hydrogen-side seal by forcing oil in both directions. The oil is monitored to detect any hydrogen that may get entrained into the oil and provide a means to scrub the hydrogen from the oil.

Hydrogen, like all flammable gases, is only reactive when it is present in concentration levels between the lower explosion limit and the upper explosive limit. That is, when there is sufficient oxygen present to sustain combustion. The generator will be equipped with a purity monitoring system that measures the quality of hydrogen in the generator. If the purity level begins to decrease toward the upper explosive limit, this system adds hydrogen to maintain purity.

The generator will also be equipped with an inert gas (one that does not react with hydrogen) purge system to purge the generator of hydrogen should generator maintenance be necessary. This system will also be used to purge and dilute the hydrogen to below the lower explosive limit if there is a leak. These systems are used throughout the power industry and have successfully controlled and prevented hydrogen explosions. Daily inspections and proper maintenance of equipment help to reduce this hazard

3. Main Transformer: The potential for an explosion is remote, its causes include lightning strike or transformer fault. The design features fire detection and suppression systems, location within a three sided concrete wall structure to protect immediately adjacent equipment systems and buildings and such that the open side has adequate space separation for protection for adjacent transformers and other equipment. Given the small impact area and the three sided walled enclosure, this scenario was ruled out as having any potential to impact Spectra's Burrillville station.

While we believe that the impact of any conceivable event at CREC will not migrate to the Algonquin compressor station, in order to address the question on the likelihood of an explosion occurring, we contacted Exponent, Inc., who is an industry recognized expert in conducting the type of analysis that was requested and asked that they conduct an evaluation of the probability of either a natural gas explosion or a hydrogen explosion event and to determine the maximum impact radius of the worst case scenario, no matter how unlikely. Exponent performed the evaluation which is included as an attachment.

As can be seen in the attached study provided by Exponent, the likelihood of either the Algonquin Station or the CREC facility suffering a gas explosion event as described in the question is anticipated to be on the order of 10^{-5} to 10^{-6} /yr, or once every 100,000 to 1 million years.

We also requested Exponent to describe what conditions, along with any assumptions and associated reasoning, would be necessary, no matter how unlikely, in order for such an event to occur and to determine the size of the impact radius that could result from such an event. Their inputs, assumptions and analysis are included in the attached report which concludes that even with postulating physically impossible scenarios like having the maximum possible volume of gas be released instantaneously and fill the largest contained area (the power block building) with a "stoichiometric natural gas/air mixture in order to maximize the confined volume of fuel involved in the explosion," the resulting impact area does not impact the Spectra compressor station.

Also, as addressed in the response to question 17-4, Exponent determined the distance away from the source of a worst case hypothetical explosion, where the blast wave pressure threshold of 1 pound per square inch gauge could reach. This threshold is the lowest pressure criterion for damaging explosion effects described in the ALOHA technical documentation and the EPA Risk Management Program Offsite Consequence Analysis. At 1 psig of pressure, a blast wave could shatter glass windows, however much higher pressures are necessary to damage the buildings or equipment at the compressor station. The calculated distance to the 1 psig pressure threshold for the maximum postulated scenario (no matter how improbable) was found to be no more than 884 feet from the source on the CREC site which does not create any damage to equipment at the Spectra/Algonquin compressor station, please refer to the attached Exponent letter response for the details of this analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC – November 1, 2016

AMMONIA

17-3 Please explain/calculate the probability of a certain blast events occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

17-3 Please explain/calculate the probability of a certain blast events [sic] occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

RESPONSE 17-3: Please refer to the response to question 17-2 and the attached Exponent Report that calculated the probability of a certain blast events occurring.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

AMMONIA

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

RESPONSE 17-4: Please refer to the response to question 17-2 and the attached Exponent report for the response to this question.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: November 1, 2016

AMMONIA

22-1 **Under the water plan, is it correct that ammonia deliveries increased from 2 per month to 15 per month, or a 13 truckload per month delivery? That equals 26 new trips to and from the site. Please explain the reasons for the increase and the details.**

RESPONSE 22-1 The amount of ammonia anticipated to support the Clear River Energy Center (CREC or Project or Facility) did not change from the May 2016 Traffic Impact Study to the revised Water Supply Plan, filed with the Energy Facility Siting Board (EFSB or Board) on July 11, 2017 (Water Supply Plan or revised Water Supply Plan). However, during a comprehensive review of the trucking option for the Water Supply Plan, Invenergy Thermal Development LLC (“Invenergy”) noticed that the assumptions in the May 2016 Traffic Impact Study regarding the number of ammonia deliveries were not correct. The traffic analysis submitted as Appendix E of the revised Water Supply Plan corrected the number of ammonia trucks to approximately 15 per month and confirmed that “the traffic impacts are still minimal.”

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

AMMONIA

Request 27-11 What is the estimated ammonia emissions in pounds per year which will be released from the ammonia tank and the piping systems?

RESPONSE 27-11 The ammonia emissions from the CREC ammonia tank and the piping systems will be insignificant by design, and there are no appropriate correlations available to accurately estimate vapor losses from pressure tanks.

The ammonia storage tank and piping will specifically be designed to keep ammonia losses to the environment to an absolute minimum. The storage tank will be designed as a pressure tank and will include a pressure/vacuum relief valve that maintains tank pressure during normal operation, thus preventing any venting of ammonia from the tank during normal storage and operation.

There will be two permanent connections on the aqueous ammonia storage tank, a vapor return connection and a tank fill connection. During a filling event, two hose connections will be made between the storage tank and the delivery truck, one to the fill line of the storage tank and the other to the vapor return connection on the tank. The aqueous ammonia delivery truck will be equipped with an on-truck pump that transfers the aqueous ammonia solution from the delivery truck to the storage tank and returns the vapor from the storage tank back to the delivery truck. By using this delivery system, there will be no venting of ammonia from either the delivery truck or from the storage tank during a filling event.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AMMONIA

Request 27-39 **Please explain the issue of “ammonia slip” in the NOx (SCR system) in detail. How will Invenergy/CREC/ guarantee that there will be no or minimal “ammonia slip”?**

RESPONSE 27-39 The selective catalytic reduction (“SCR”) system, which is the best available control technology for the control of NOx emissions from combustion turbines, uses ammonia as a reagent in reducing NOx emissions to molecular nitrogen, which is a natural constituent of air. The reduction reaction between ammonia and the NOx compounds is promoted by a catalyst that is installed as a layer of modules across the HRSG casing. The catalyst is typically composed of vanadia/titania that is applied to a substrate material, but the actual formulation of the catalyst is specific to each catalyst supplier. The catalyst layer within the HRSG casing is installed at a location where the flue gas temperature is within a specific temperature range where the activity of the catalyst is optimal. Ammonia is injected into the flue gas upstream of the catalyst layer so that it is evenly distributed at the catalyst face. As the flue gas passes through the catalyst layer, the ammonia reacts with the NOx to produce nitrogen and water.

Ammonia slips refers to stack emissions of unreacted ammonia that can result from the incomplete reaction of the NOx in the gas stream and the ammonia injected. The CREC Major Source Permit will limit the ammonia slip concentration in each of the two turbine/HRSG stacks to two parts per million dry by volume corrected to fifteen percent oxygen (2 ppmvd @ 15% O₂) during steady-state operation at all operational loads while firing either natural gas or ULSD. The air toxics modeling analysis completed for the project has demonstrated that at the permitted stack ammonia concentration, the maximum predicted ambient air impact concentrations resulting from the operation of the facility will not exceed the RIDEM Acceptable Ambient Levels (“AAL”) for ammonia at or beyond the property line under any operating condition or meteorological condition.

The catalyst of the SCR system slowly degrades over time and becomes less active. At initial operation when the catalyst is new and clean, there will be very little ammonia slip past the SCR catalyst. As the catalyst ages and the activity decreases, there will be a point where the ammonia slip starts to approach the 2 ppm limit. At this point, some or all of the catalyst will be replaced. The typical life cycle of catalyst in a natural gas plant is on the order of 5 to 7 years.

A continuous emissions monitoring system (“CEMS”) will be installed on each turbine/HRSG stack to monitor continuous compliance with the permitted ammonia stack concentration limits. The CEMS will measure

and record the stack ammonia concentrations continuously whenever the turbine is in operation. The Major Source Permit will require the submittal of quarterly excess emissions reports to RIDEM detailing any permit limit exceedances measured by the CEMS during the previous calendar quarter. The Permit will also require that RIDEM be notified in writing whenever a permit limit is exceeded.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

AMMONIA

Request 27-40 **The SCR will use ammonia at the catalyst to reduce the amount of NO_x in the emissions. The “oxidation catalyst system” will reduce the amount of carbon monoxide and VOC’s in the emissions. Please explain the “oxidation catalyst system” in detail. What are the chemicals in the oxidation catalyst system which interact with the CO and the VOCs?**

RESPONSE 27-40 The CREC combustion turbines will be equipped with oxidation catalyst systems to control the emissions of CO, VOC, and organic hazardous air pollutants (“HAP”). Oxidation catalyst systems typically achieve 90 plus percent control of the emissions of CO, VOC, and other organic compounds from combustion turbines and their use is considered to be the best available control technology for the control of these emissions from combustion turbines.

The oxidation catalyst system is composed of catalyst modules installed in the flue gas path within the HRSG. The catalyst does not require the addition of a reagent for operation, but promotes the oxidation of CO and VOCs to carbon dioxide (“CO₂”) and water using the excess oxygen and heat of the flue gas. Oxidation catalysts are typically made of a precious metal such as platinum, palladium, or rhodium that are applied on a substrate material that is assembled into modules. The modules are installed into a metal frame system in the HRSG casing. The rate of the reaction is controlled by the temperature of the catalyst chamber and the amount of time the gas stream is able to react with the catalyst. The actual formulation of the catalyst is proprietary to the system supplier and is determined based on the required emissions reduction levels and the expected conditions of the flue gas at the inlet to the catalyst modules. The catalyst material is replaced periodically to maintain optimal performance of the oxidation catalyst system.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

DIESEL FUEL

4-8 What is the volume of diesel fuel to be stored? Is this the volume required for the amount of time that the plant will be allowed to run on diesel fuel? Can the storage volume be reduced with trucking to the site in instances when the diesel is to be used? If not, why not?

RESPONSE 4-8: Approximately 2,000,000 gallons of ultra low sulfur diesel fuel (“ULSD”) will be stored at the site which will allow one generating unit to operate at base load for 72 hours during a curtailment of natural gas availability. This volume was selected based on the reasonable worst case expected gas curtailment. If a gas curtailment is anticipated to extend beyond 72 hours, delivery of ULSD by trucks will be required to operate the plant beyond the 72 hour time frame.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

DIESEL FUEL

4-25 What is the capacity and structure of the retaining dike around the fuel tanks?

RESPONSE 4-25: The fuel oil storage secondary containment berm (dike) will be designed and installed in accordance with National Fire Protection Agency (“NFPA”) 30 (22.11.2.1 through 22.11.2.8) and local environmental regulations. It will be sized to hold the full volume of one storage tank (1,000,000 gallons).

The structure of the containment berm will consist of compacted engineered fill placed at a slope not steeper than 2:1 and sized to exceed the volume of the tank inside the berm as required by code. The berm and containment area will be covered with an impermeable synthetic liner.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

DIESEL FUEL

5-11 With regard to the diesel fuel, are the filling, conveyance, and pumping areas going to be lined to protect the ground water? Please explain.

RESPONSE 5-11: Drainage and spill containment within the diesel fuel oil unloading station area will be in accordance with all applicable codes, standards and local jurisdictions.

The filling and pumping areas will be lined to contain any oil spills. Underground conveyance (transportation piping) will be double walled. Above ground piping will be inspected periodically for leaks.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

DIESEL FUEL

5-14 Please explain where your oil supply will come from.

RESPONSE 5-14: The oil supply will be provided by truck from a nearby oil storage and transport company. There are several of these companies in Rhode Island and the oil will likely come from one of them.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

DIESEL FUEL

5-15 Please explain in detail when oil will be involved in the operation of the facility.

RESPONSE 5-15: The plant will be operated on low sulfur diesel oil only during periods of natural gas curtailment or supply interruption. This is expected to occur only when there are extended periods of extremely cold weather (like the “polar vortex” of 2014). There have only been a few occasions over the past several years in which the unit would have operated on oil, and our estimate is that on average there would be less than 5 to 10 days per winter where oil operations would be needed. This will vary from year to year. As an example, this past winter there would have been zero days of operation on oil.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

DIESEL FUEL

15-1 Are you aware of whether any databases exist for accidents that have occurred at power plant sites, including, but not limited to, accidents that involve chemical spills, hydrogen accidents, fuel oil accidents, and/or ammonia accidents? If so, please provide information regarding any such databases, including, but not limited to, electronic links, if any exist.

RESPONSE 15-3: The vehicle type was obtained from the crash reports provided for the study horizon analyzed (2013-2015). From this data, it has been determined that within the truck route corridor from South Main Street at the Gloucester town line to Wallum Lake Road at the proposed site entrance, there were a total of 18 truck related crashes that occurred over this three year period.

The operation of the power plant proposes a small number of ammonia and oil deliveries over the course of the year. Oil is expected to be delivered by truck 3-4 times per hour over the course of several days on rare occurrences to the facility, and ammonia deliveries are expected by truck approximately twice per month (every 15 days).

Based on the existing daily number of trucks traveling on the truck route and the expected number of trucks expected to access the proposed site, there would be an increase of approximately 1% of truck traffic along the truck route to the proposed site. Based on this, it is expected that there would be a negligible increase (a small fraction of a vehicle) of truck crashes per year along this corridor.

RESPONDENT: Maureen McMahon, McMahon Associates
Robert Smith, McMahon Associates

DATE: August 19, 2016

DIESEL FUEL

15-4 What onsite resources at the facility will be provided to address onsite accidents, including chemical spills and other possible accidents? Please provide all details.

RESPONSE 15-4: Please refer to Section 13.2.4 (Countermeasures) of Exhibit 1, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the onsite resources which will be provided to address onsite accidents at the Facility.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

DIESEL FUEL

15-5 What do you expect the Town of Burrillville should do regarding service levels needed to address possible accidents at the facility, including chemical spills?

RESPONSE 15-5: Invenergy will coordinate with the Town of Burrillville with regard to the location and amount of storage of hazardous materials on-site and the associated training, personal protective equipment and emergency procedures which may be required in the event of a release.

Please refer to Section 7.0 (Notifications), Section 13.2.4 (Countermeasures), and Appendix A of **Exhibit 1**, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the emergency response procedures which will be implemented at the Facility and the service levels needed to address possible accidents.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

DIESEL FUEL

18-2 The Invenenergy October 2015 Application states:

During the infrequent periods when the Facility is requested to fire one of the gas turbines on oil, the daily water demand for the Facility will increase to approximately 925,000 gpd, or 0.925 MGD for each day of oil firing. Although the total water use of the Facility increases when firing ultra low sulfur diesel (ULSD) oil, the total number of days that the Facility will be required to fire oil will typically be determined by the grid operator (ISO-NE) based on the severity of winter conditions when there is a need to conserve natural gas for heating needs of the region. Generally, based on history, the number of days per year the Facility will be requested to use ULSD will be approximately five days. (October 2015 EFSB Application, Page 18).

To put the above in perspective, over the last five years with the current limited pipeline capacity into the region, there has been an average of only five days per year when gas fired electric generation was asked to switch to distillate oil. Five days per year means, if the Project had existed for the last five years, that the Project would have fired natural gas 98.6% of the time, and as a result, the Project's daily water use and wastewater discharge would have been in the range of 102,240 gpd and 69,000 gpd respectively 98.6% of the year. Projecting forward with the natural gas pipeline expansions underway, the total annual days of Project oil firing should lessen with the increasing supplies of natural gas helping to reduce winter shortage of this critical fuel to the region.

Provide a confirmation from ISO-NE that this information is accurate. We understand that the plant can operate in this condition for as long as 3.6 days based on information provided by John Niland of Invenenergy. Would the expected days be consecutive or not? Please provide information for operating in this condition for the last five years.

RESPONSE:

Please see Invenenergy's Responses to the Town's 16th data requests, particularly 16-2 and 16-4. Invenenergy checked with multiple ISO-NE staff members in Operations and System Planning and was informed that ISO-NE does not provide confirmation as to when generators should be expected to switch to ULSD. What the ISO-NE could provide was data on when a Reserve Constraint Penalty Factor ("RCPF") Activation event had occurred over the past five years (and back to 2006). Please see the publically available spreadsheet which can be found at: https://www.iso-ne.com/static-assets/documents/2015/12/rcpf_event_data_from_may_2015.xlsx

The RCPF indicates when reserves (peakers) were called upon, which can be a good indicator of when dual fuel units may have had to switch to oil.

The availability of natural gas is monitored by ISO-NE, who may declare a “Cold Weather Event,” a “Cold Weather Watch” or a “Cold Weather Warning” according to its market rules. Natural gas will be deemed to be unavailable when the natural gas supplier informs the Clear River Energy Center (“CREC”) that the natural gas supply is being curtailed or if there is a Force Majeure event.

Invenergy examined the publically available data over the past five years from data of dual fuel units running on oil were built using the [Velocity Suite Online](#) application, created by ABB Group, Inc. (“ABB”). The ABB Database of Unit Generation & Emissions - Hourly (Standard) provides unit-level hourly generation and emissions data for fossil-fuel generating units. This data comes from the United States Environmental Protection Agency (CEMS reporting), ISO-NE and the Nuclear Regulatory Commission.

The CEMS database can be accessed directly from this public website:
<https://ampd.epa.gov/ampd/>.

Invenergy has included this data in the attached spreadsheet which includes the raw data and its source reference. Invenergy summarized the data to show the oil fired and dual fuel units run times (in hours) both annually and monthly for all units. This is the data used to create the maps that were included in Invenergy’s Response to the Town’s 16th Set of Data Requests. The summary data tab provides the number of hours each unit ran on oil by year and the maximum consecutive run time on oil.

The reason that Invenergy provided the map for these units in Invenergy’s Response to the Town’s 16th Set of Data Requests is that most of these units are not on the main pipeline (with the exception of Ocean State Power), and as can be seen from the maps that further away from the main pipeline a unit is located or if it is a highly constrained area like downtown Boston or Providence, the consecutive run times for these units increases as compared to other units that are closer to the main pipeline. Based on this data, Invenergy expects that the times when the unit would need to switch to oil would be short lived, i.e. less than a day, however the facility has been configured to allow for longer duration runs on oil should it be necessary.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 4, 2016

DIESEL FUEL

22-8 Under the water plan, is it correct that the worst case scenario you present is that oil tank depletion (2 MG) will equal 19 trucks per day to replenish, or 38 trips to and from the site? Is this a guarantee? Please explain.

RESPONSE 22-8 The worst-case-scenario presented is a total of 22 trucks per day following an oil fired event as indicated in the traffic analysis, Appendix E to the Water Supply Plan. The analysis assumes approximately 13 water trucks (2 for normal operation and 11 for water replenishment), 7 oil trucks, and 2 additional trucks consisting of either 1 aqueous ammonia truck, 1 wastewater truck or 1 mobile demineralizer trailer.

No, this is not a guarantee but represents a reasonably conservative estimate of the number of trucks per day that are expected. It is difficult to guarantee because there could be weather events or unexpected disruptions that could cause the number of trucks during one day to be less and correspondingly the number could be more on the following day.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

DIESEL FUEL

22-15 **What will happen if an oil operation event occurs more frequently, or lasts longer due to a gas shortage? All the events above indicate that in addition to the figures provided, a 3 truck a day rate is needed just to supply water in addition to the figures above. Do you agree? Please explain.**

RESPONSE 22-15 It is difficult to predict the frequency or duration of oil operation events. Invenergy anticipates that they will not be frequent or long in duration. Generally speaking, Invenergy anticipates that it will replenish the tanks shortly following an oil operation event, at the rate specified in the Water Supply Plan. The rate of approximately 22 trucks a day as specified in the Water Supply Plan includes the water trucks needed for continued operation on gas following an oil operation event. The units can run only as long as there is an adequate supply oil and water onsite. Once the oil and water is depleted, the units cannot run, as set forth in 22-7 and 22-8.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

DIESEL FUEL

22-18 How exactly will Invenergy “limit winter distillate oil firing” as discussed in paragraph 2.2.1 (third paragraph)? Will the CREC be subject to pay for performance payments? If so, how much?

RESPONSE 22-18 Winter distillate oil firing is limited by the quantity of water and oil available onsite as well as the ability to re-fill the on-site storage. Invenergy will participate in the ISO-NE day ahead energy market and is subject to all of its associated rules. In the event that both natural gas and oil are not available for the unit(s) to operate and the unit(s) are called on to operate, it is possible that CREC would be subject to pay for performance penalties. It is not possible to determine the penalty amount as that is dependent on the specific market conditions at the time of the capacity shortfall.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

DIESEL FUEL

22-41 **Is there a plan for monitoring and/or enforcing the voluntary extension of the oil-firing replenishment duration? Are the specifics of this duration extension documented somewhere? Wouldn't this be inefficient and costly for the operators? Please explain.**

RESPONSE 22-41 The durations that were based on the 22 trucks per day, were based on Invenergy's reasonable expectation and is Invenergy's commitment to balance the needs for replenishment with traffic impacts. The specifics are documented in Invenergy's Water Supply Plan, Section 2.2.1, Section 2.3.1 and Appendix E.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WETLANDS

4-9 It appears that the site slopes upward from Wallum Lake Road at an approximate elevation of 560 towards the area of development to a high point elevation of 580 at the approximate center of the area of development and then down to the western most edge of the development at the edge of the wetland buffer. Is this correct?

RESPONSE 4-9: Yes that is correct.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

WETLANDS

4-10 It appears that access to the site requires three separate wetland crossings and the perimeter of much of the site abuts directly to the wetland buffers. Is this correct?

RESPONSE 4-10: Yes, according to the current site plan, the access road will require three separate wetland crossings. However, the access road will follow an existing road which already crosses the wetlands at those locations.

Based on the current general arrangement and conceptual site grading plan, the existing wetland features described are correct. The site footprint has been designed to avoid wetlands and wetland buffer areas.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WETLANDS

4-12 It appears that storm water detention pound #1 is located within a limited upland area surrounded by wetlands. Is this correct? It appears that this location could cause damage to the surrounding wetlands. Could the detention pond be relocated to a more suitable location? If not, why not?

RESPONSE 4-12: CREC will require a “Permit to Alter Freshwater Wetlands” from the Rhode Island Department of Environmental Management (“RIDEM”) and an “Individual Permit” from the United States Army Corps of Engineers (“ACOE”) for its proposed wetland impacts. In order to receive these approvals, Invenergy will be required to demonstrate to RIDEM and the ACOE that CREC’s wetland impacts have been avoided and minimized to the maximum extent practicable. For each proposed wetland impact, Invenergy will be required to present an alternative analysis demonstrating that all other feasible project alternatives would result in greater impacts. These permits from RIDEM and the ACOE will be issued only if the regulatory agencies are satisfied that Invenergy has fully assessed all feasible alternatives and that the wetlands’ impact has been avoided and minimized. Invenergy will also be required to propose mitigation for all CREC wetland impacts in accordance with the ACOE guidelines.

Based on the current general arrangement and conceptual site grading plan, the described location of the stormwater management pond is correct. To reduce aquatic resource impacts, alternate locations for the stormwater management ponds have been evaluated. To the maximum extent practicable, the current plan minimized the wetland impacts.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WETLANDS

4-14 It appears that the “construction laydown” area abuts against wetland buffers. Is this correct? Exactly what is going to be stored within this area? Please explain in detail your proposal for protection of the wetlands in this area, considering the materials being stored.

RESPONSE 4-14: The proposed onsite construction laydown area is roughly 9 acres and abuts the wetland buffers. The laydown area will be used for construction parking and to store the materials needed to construct the facility which could include fabricated equipment components, equipment skids, pipes, wires and cables, conduits, raceway, etc. There may be provisions for covered storage of more delicate components. The area may also be used for staging fabrication and assembly of equipment and structures to improve construction efficiency. Also, the area may be used for parking construction equipment and vehicles. The engineering, procurement and construction (“EPC”) contractor will be required to have in place a Spill Prevention, Control, and Countermeasure (“SPCC”) plan which will require secondary containment around temporary fuel storage areas.

Invenergy will be required to obtain a Rhode Island Pollutant Discharge Elimination System (“RIPDES”) Construction General Permit from RIDEM prior to commencing with any construction activities. The RIPDES Construction General Permit prohibits the discharge of pollutants into waters of the State and requires best management practices for soil, runoff, and erosion control as described in the Rhode Island Soil Erosion and Sediment Control Handbook. To be covered under this permit, a Stormwater Management Plan must be developed, incorporating the minimum standards of the Rhode Island Stormwater Design and Installation Standards Manual. A Soil Erosion, Runoff, and Sediment Control Plan will also be required. The RIPDES Construction General Permit Application for the CREC and the required plans require the implementation of best management practices to fully protect the surrounding wetland areas at the site during construction activities.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WETLANDS

5-6 With regard to wetlands and species, please identify measures that Invenergy is proposing to reduce impact and to provide mitigation for impacts that cannot be avoided.

RESPONSE 5-6: The CREC is designed to minimize impacts to wetlands and wildlife habitats. Invenergy will restore vegetated and habitat areas temporarily impacted during construction wherever feasible. CREC will also limit tree clearing activities during the breeding season of any threatened species identified in the areas to be cleared. Invenergy, in coordination with RIDEM and the ACOE, will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the CREC, as is required by the ACOE. The plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- preservation measures.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WETLANDS

5-21 Will the 4 to 5 acres of permanent wetlands that will be filled and altered be restored elsewhere or replicated? Please explain.

RESPONSE 5-21: Invenergy does not anticipate that there will be 4 to 5 acres of permanent wetlands that will need to be filled or altered. There will be some perimeter wetland impacts on the project site and some biological wetland impacts (i.e. permanent wetlands). The current estimate for these impacts is approximately one acre in total. There will be no filling of permanent wetlands on the National Grid ROW. Invenergy, in coordination with RIDEM and the ACOE, will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the CREC, as is required by the ACOE. The plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- preservation measures.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

WETLANDS

8-11 It appears that wetland descriptions may not have been accurately made within the vegetation section of the document. Please explain/clarify.

RESPONSE 8-11: The site wetlands were delineated in accordance with the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands and the Regional Supplement. Section 6.3 of the EFSB Application discusses each delineated wetland individually, providing detail on the vegetation, soils and hydrology exhibited. Additionally, general classifications and corresponding descriptions of wetland habitats and cover types that occur within the project area are also included in Section 6.5 (Vegetation) and Section 6.6 (Terrestrial Ecology and Earth Resources) of the EFSB Application.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

WETLANDS

8-12 It appears that there is no mention of the perennial stream associated with the wetlands. Please explain/clarify.

RESPONSE 8-12: A discussion of all perennial and intermittent streams that are present in or adjacent to the project area was included in Section 6.2.2 of the EFSB Application. Fish and benthic population assessments of Iron Mine Brook were also conducted at the site of the proposed CREC and the results are documented in Table 6.2-1 of the EFSB Application. In addition, the individual wetland descriptions in Section 6.3 (Wetlands) of the EFSB Application include information on which streams each wetland drains to, where applicable.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

WETLANDS

8-13 It appears that there is no mention of sensitive natural areas such as vernal pools. Please explain/clarify.

RESPONSE 8-13: During the initial wetland assessment, delineation and edge verification process completed in cooperation with RIDEM's Office of Water Resources at the proposed CREC site, no vernal pools were observed. This was confirmed in a letter dated January 28, 2016 from a RIDEM Senior Environmental Scientist in response to a request to verify the delineated edge of freshwater wetlands onsite.

Other sensitive natural areas and protected species were discussed in detail in the EFSB Application. Section 6.6.2.1 (Northern Long Eared Bat) discusses a USFWS-vetted Northern long-eared bat (NLEB, the only federally listed species potentially occurring within the project area) survey which resulted in no NLEB being identified onsite. Section 6.6.2.2 (Impacts to Wildlife and Ecology) discusses impacts to forest interior habitat and the criteria used for establishing the square footage of these impacts. The studies on fish and benthos that were conducted in streams onsite resulted in a determination that no cold water fisheries exist within the proposed project area.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

WETLANDS

8-14 It appears that no flood storage compensation has been included if wetland/stream areas/flood plains are being impacted. Please explain/clarify.

RESPONSE 8-14: Digital floodplain data available from FEMA indicates that the proposed locations of fill associated with the project are located outside of the FEMA mapped 100-year floodplain associated with Iron Mine Brook as well as the perennial tributary to Dry Arm Brook (EFSB Application Figure 6.3-3). As 100-year floodplain elevations were not available, modeling for this location was conducted. The only potential change to floodplain impacts would be a permanent crossing of where the overhead transmission corridor crosses the tributary to Dry Arm Brook, in which case the floodplain impacts and proposed flood storage compensation will be addressed in the RIDEM and USACE wetlands permit applications for the project.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

WETLANDS

22-35 **Is it possible that this revised process may impact the overall footprint of the facility and further impact wetlands? Please explain, and please submit a site plan for the revised facility.**

RESPONSE 22-35 The new water plan affected individual components within the plant but not the overall footprint of the Facility. Accordingly, there is no further impact to wetlands.

A revised site plan is being prepared and will be provided in the near future.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WETLANDS

Request 34-1 **We understand that RIDEM issued an Edge Verification (No. 15-0239) on January 28, 2016. Please provide a copy.**

Response 34-1 Please see **Exhibit 34-1**, which includes the Rhode Island Department of Environmental Management's ("RIDEM's") issued Edge Verification (No. 15-0239).

RESPONDENT: Jason Ringler, ESS Group, Inc.

DATE: September 12, 2017

STORM WATER

4-12 It appears that storm water detention pound #1 is located within a limited upland area surrounded by wetlands. Is this correct? It appears that this location could cause damage to the surrounding wetlands. Could the detention pond be relocated to a more suitable location? If not, why not?

RESPONSE 4-12: CREC will require a “Permit to Alter Freshwater Wetlands” from the Rhode Island Department of Environmental Management (“RIDEM”) and an “Individual Permit” from the United States Army Corps of Engineers (“ACOE”) for its proposed wetland impacts. In order to receive these approvals, Invenergy will be required to demonstrate to RIDEM and the ACOE that CREC’s wetland impacts have been avoided and minimized to the maximum extent practicable. For each proposed wetland impact, Invenergy will be required to present an alternative analysis demonstrating that all other feasible project alternatives would result in greater impacts. These permits from RIDEM and the ACOE will be issued only if the regulatory agencies are satisfied that Invenergy has fully assessed all feasible alternatives and that the wetlands’ impact has been avoided and minimized. Invenergy will also be required to propose mitigation for all CREC wetland impacts in accordance with the ACOE guidelines.

Based on the current general arrangement and conceptual site grading plan, the described location of the stormwater management pond is correct. To reduce aquatic resource impacts, alternate locations for the stormwater management ponds have been evaluated. To the maximum extent practicable, the current plan minimized the wetland impacts.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

STORM WATER

4-13 It appears that the site entrance at Wallum Lake Road is down gradient of the project. Is this correct? Could additional storm water storage be required at the entrance to prevent storm water flows from being increased onto Wallum Lake Road?

RESPONSE 4-13: The current stormwater plan includes stormwater management “Best Management Practices” along the proposed access road to mitigate increased flowrates in accordance with Rhode Island Department of Environmental Management regulations. Additional stormwater attenuation at the site entrance to Wallum Lake Road is not anticipated at this time.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

STORM WATER

4-15 The site appears to be creating a large amount of impervious space. Is this correct? Please explain the site's storm water management plan. Has a storm water report been done? If so, please provide a copy. Will the detention basins handle a one hundred year storm event? Is the site going to comply with best management practices?

RESPONSE 4-15: Based on the current general arrangement and conceptual site grading plan, impervious areas are anticipated. The stormwater management plan is currently being developed and will comply with RIDEM regulations including best management practices, including complying with the 100-year, 24-hour stormwater attenuation criteria. A copy of the stormwater report will be provided upon completion.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

STORM WATER

18-1 The Addendum submitted to the EFSB on August 30, 2016 refers to a “Preliminary Stormwater Management Plan for Clear River Energy Center.” This Plan was not included in the Addendum submittal. Please provide a copy of this document.

RESPONSE 18-1 The draft Stormwater Management Plan referred to in this request was filed with the Board on September 27, 2016. A paper copy of this draft plan, along with the draft Soil and Erosion Control Plan (also filed with the Board on September 27, 2016), is also being mailed to the Town’s attorney via Federal Express.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: October 4, 2016

WASTE WATER

4-16 It appears that the set of plans includes nothing about waste water being transported off of the site by means of a sewer ejection force main line to a point of gravity flow (somewhere in the village of Pascoag) to the Town of Burrillville Sewage Treatment Plant. It appears that this waste water is going to have more concentrated amounts of contaminates than what is pumped out of the ground from the existing contaminated aquifer. Is this correct? This contaminated wastewater will run through the Town of Burrillville Sewer Lines. What is being done to insure that the wastewater will not leach into the soils surrounding the lines that it flows through?

RESPONSE 4-16: The well water drawn for plant use will first be treated with granulated carbon at the well head to remove organic contaminants to levels below drinking water standards. The treated water will be pumped to the plant and stored in an onsite storage tank and then pumped to different systems of the plant as needed. As the organic contaminants will be removed prior to use at the plant, the wastewater discharged from the plant will only concentrate any contaminants that are present in the water as its received from the treatment system. The CREC will meet the limits required to discharge to the sanitary sewer system.

The wastewater from the CREC which will be sent to the Burrillville Wastewater Treatment Facility ("BWWTF") and will comply with the EPA Categorical Effluent Standards for a Steam Electric Generating Facility without the need for additional pre-treatment. Invenergy will apply for an Industrial Wastewater Discharge Permit from the BWWTF, which includes effluent discharge limits to ensure that the CREC wastewaters will not adversely impact the BWWTF or the receiving water body. Initially and on an ongoing basis, sampling of the CREC wastewater discharge is necessary to ensure that the effluent limits established in the permit are being met.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

4-17 Does the Burrillville Sewage Treatment Plant have the technology to properly treat this waste water or is it going to be dumping contaminants into the river? If it will be dumping without treatment, will this further contaminate the land all the way to Narragansett Bay? Please explain.

RESPONSE 4-17: The BWWTF has the technology to properly treat the CREC wastewater stream. Invenenergy will apply for an Industrial Wastewater Discharge Permit from the BWWTF, which includes effluent discharge limits to ensure that the CREC wastewaters will not adversely impact the BWWTF or the receiving water body. Both initially and on an ongoing basis, sampling of the CREC wastewater discharge is necessary to ensure that the effluent limits established in the permit are being met.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

4-18 Will Invenergy agree to install a waste water pretreatment plant of its own? If not, why not?

RESPONSE 4-18: The range of wastewater quality generated by CREC will be within the acceptable quality limits of the Town of Burrillville Sewage Treatment Plant. No pre-treatment of our wastewater is anticipated. The project will comply with the limits imposed by BWWTF.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

4-19 What is the quality of the water post condensers and pre-discharge into the system?

RESPONSE 4-19: See Table 6.2-2 of Invenergy's Energy Facility Siting Board ("EFSB") Application for the estimated wastewater quality.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

4-20 What, if any, treatment of the discharged water will be required prior to releasing the water back into the environment?

RESPONSE 4-20: Other than stormwater, all other wastewater streams generated by the CREC will be routed to the Town of Burrillville Sewage Treatment Plant.

An oil/water separator will be installed to treat the wastewater before discharge to the sewage treatment plant.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

4-22 It appears that the discharge of the used water to the waste water treatment facility will remove the water from the aquifer cycle and then after treatment by the sewer plant send it down stream on the other side of town. Is this correct?

RESPONSE 4-22: The wastewater discharged from the CREC facility will be conveyed to the existing Town of Burrillville sanitary sewer system and through that system to the Town of Burrillville Wastewater Treatment Facility, located at 141 Clear River Drive. The wastewater will then be discharged to the Clear River in the vicinity of the BWWTF. This is the same transport route used for anyone who receives water from the Pascoag Utility District (“PUD”) and sends wastewater to the BWWTF.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 27, 2016

WASTE WATER

5-9 Please provide details regarding the amount of all contaminants that would be going into the Clear River, together with any studies to support your response.

RESPONSE 5-9: The CREC will not discharge any contaminants directly into the Clear River. The CREC wastewater will be conveyed by the sewer system to the Burrillville Wastewater Treatment Facility (“BWWTF”). The CREC will apply for an Industrial Wastewater Discharge Permit from the Town of Burrillville Wastewater Treatment Facility for its wastewater discharge. The permit will specify CREC wastewater discharge limits which assure that the BWWTF will maintain compliance with its permitted discharge limits and be fully protective of the Clear River. CREC will be responsible for ongoing sampling of its wastewater discharge to ensure that it is operating in full compliance with its Industrial Wastewater Discharge Permit.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

WASTE WATER

6-12 What is the second option for water discharge if the Burrillville Sewer Department can't handle, treat, or discharge the contaminated water?

RESPONSE 6-12 The waste water discharged to the sewer system will meet the permissible limits that will be laid out in the RIDEM waste water discharge permit. In the event that the water is deemed unsuitable for discharge, Invenergy will evaluate the option of installing a Zero Liquid Discharge System ("ZLD"). There are several means and methods, and sub systems within the ZLD system that can be employed to eliminate the need to discharge any water to the Burrillville Sewer Department.

Based on our evaluation plan of pre-treating the water prior to being transported to the site and further treatment and polishing at the plant to obtain the desired water quality level, Invenergy does not feel the need to explore the option of a ZLD at this point of time.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development, LLC

DATE: May 11, 2016

WASTE WATER

8-2 Compositional Analysis of Wastewater Streams – Page 46 of the October 2015 application states that wastewater from the plant will be from four primary sources - wastewater from the high purity water treatment processes (reverse osmosis and EDI systems), blowdown from the steam generator (HRSG) needed to control chemistry in the steam generator, blowdown from the evaporative coolers used to control chemistry (summer use only) and sanitary wastewater from the operating staff. In Table 6.2-2 of the October 2015 application, it seems that the application may be combining the 3 types of process water (WW from high purity water treatment, and the two blowdown sources) into a single process water stream. Please provide a compositional analysis for all of the waste streams that may be discharged from the proposed plant to the Burrillville WWTP.

RESPONSE 8-2: The wastewater characteristics in the Projected Clear River Energy (“CREC”) Wastewater Discharge (Max) column in Table 6.2-2 of the Rhode Island Energy Facility Siting Board (“EFSB”) application represents the combined characteristics from the water treatment and two blowdown water sources from the plant. The fourth column of Table 6.2-2 shows the expected average characteristics of the sanitary wastewater. The two streams will be combined prior to discharge into the sewer. For comparison, the average day process wastewater flow is estimated to be 32 gpm; the average sanitary wastewater flow is 1 gpm.

RESPONDENT: Amit Nadkarni, Invenergy Thermal Development LLC

DATE: May 16, 2016

WASTE WATER

22-4 Under the water plan, is it correct that you now propose an Onsite Wastewater Treatment System (“OWTS”) to treat wastewater from the office and domestic spaces? Do you agree that this will require an OWTS permit through RIDEM? Is there any potential for treated process wastewater to be introduced to this system? Please explain the details.

RESPONSE 22-4 Yes, Invenergy now proposes an Onsite Wastewater Treatment System (OWTS) to treat wastewater from the office and domestic spaces, and a new OWTS permit is required from the Rhode Island Department of Environmental Management (RIDEM). No process water will be sent to this system as all other plant systems are physically separated and not connected to the OWTS.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WASTE WATER

22-30 Please provide the identity and location of all power plants Invenergy or its subsidiaries (or other operators) operate with the newly proposed water/sewer saving technology to be incorporated into the CREC plant.

RESPONSE 22-30 Invenergy utilizes the mobile demineralizer trailers at their Cannon Falls, MN, Spindle Hill, CO and Ector County, TX facilities and has used them on a temporary basis at other facilities, such as Invenergy's facilities in St. Clair Ontario, Nelson, Illinois and Grays Harbor, Washington State.

The water savings technologies identified under the Water Supply Plan are conventional water treatment technologies that have been employed at many power plants and industrial facilities in one form or another for many years. In this application, the water saving technologies are not unique nor are they new. The water saving technology that will provide the most significant benefit to the reduction in water use and wastewater reduction at CREC is the use of Ion Exchange Resins in the form of mobile demineralization trailers and some simple industrial filtration systems.

Ion Exchange Resins have been employed for many years at many electric utility generating facilities and at many industrial facilities to produce high purity demineralized water from local water supplies. The Ion Exchange Resins once depleted by the removal of dissolved salts in the water supply must be regenerated by use of acid and caustic solutions. Mobile Demineralizer Trailers are simply ion exchange resin vessels and piping mounted on mobile trailers so the regeneration of the ion exchange resins can be conducted at the mobile trailer vendor's facility where the ion exchange resins are regenerated avoiding a need to chemically regenerate the ion exchange resins at the user's facility.

The use of mobile demineralization trailers employing ion exchange resins significantly reduced water use and wastewater generation at the CREC facility over the previously proposed on-site water treatment system albeit at an increased cost for the trailer demineralizer service. The mobile demineralizer trailers contain only ion exchange resins stored in demineralizer vessels and do not transport any chemicals.

To reduce water use and recycle wastewater at CREC other industrial filtration systems will also be employed. These filtration systems are industrial size filters that in a smaller form are used by many homeowners as swimming pool filters. Cartridge, sand and pre-coat type filters are commonly used by many home owners to filter swimming pool water to remove suspended dirt, hair and oil from swimming pool water. These same filtration systems at an industrial size will be

employed at CREC to remove particulates, dirt and potentially low levels of oil from floor and equipment drains and from boiler blowdown within the facility. The filtered water will be recycled to the Service Water Storage Tank for processing by the mobile demineralizer trailers for the removal of dissolved salts.

GE Mobile Water Inc. is one of the vendors that supplies mobile demineralizer services and attached as **Exhibit 2** is a letter from GE Mobile Water that provides additional information on the breadth of their services.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Amit Nadkarni, Invenergy Thermal Development LLC

DATE: February 14, 2017

WASTE WATER

22-38 Do you have agreements with a treatment facility to take the wastewater? If so, please provide copies. If not, please explain why not.

RESPONSE 22-38 There is no agreement with any facility to treat the wastewater at this time. This will be completed before the operational phase of the Project.

Preliminary discussions with licensed entities such as Clean Harbors, Tradebe, and Mass Tank Disposal confirms that the quality of wastewater generated by the CREC is well within the permissible limits that their treatment facilities would be able to process.

For more information on the wastewater and wastewater quality, please refer to Section 3.2 and Table 3.1(projected wastewater quality) of the Water Supply Plan.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

WASTE WATER

23-4 Have you ever constructed a natural gas/oil fired electric generating facility of the size and magnitude of the CREC whose miscellaneous low volume plant services such as general housekeeping, floor/equipment drains and general maintenance was supplied from the same process water, drained separately to a waste disposal tank, until removed from the property so as not to intermingle with the sanitary wastewater system? If not, are you aware of any similar existing facilities? Please explain in detail.

RESPONSE 23-4 Invenergy has not constructed a natural gas/oil fired electric generating facility with the same exact design features as proposed for CREC as posed by this question. Water treatment processes are unique features of nearly every electric generating facility. Invenergy has constructed a number of facilities with similar design features for the collection of miscellaneous plant wastewaters.

Our Hardee, FL, Grays Harbor, WA, St. Clair, Ontario, Nelson, IL and Ector County, TX facilities all have septic systems for sanitary wastewater and accordingly segregate it from the miscellaneous plant service water and low volume plant services such as general housekeeping, floor/equipment drains and general maintenance. These systems are drained separately to a waste disposal tank.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 22, 2017

WASTE WATER

Request 36-2 **Please provide the details of all testing that has been performed for the installation of an onsite septic system and related appurtenances and provide the results of all drilling, soil sampling, or other testing performed in connection with the same, including, but not limited to, percolation tests, if any.**

Response 36-2 A program of test holes was performed in areas considered for the siting of the onsite wastewater treatment system ("OWTS") leach field, with a number of locations selected for further evaluation. Soil evaluations were then conducted at the site and witnessed by the Rhode Island Department of Environmental Management ("RIDEM"). The RIDEM-witnessed test holes were first performed on February 7, 2017 and leach field siting and design was performed as part of an OWTS Application submission. Since then, design modifications required that the leach field be relocated; as such, additional test holes were performed and witnessed by RIDEM on August 2, 2017 and September 14, 2017 to evaluate subsurface conditions at potential alternative leach field locations.

Site evaluation forms documenting the soil evaluations were submitted to RIDEM under OWTS Application No. 1703-0050. Copies of these forms are attached as **Exhibit A**. Note that in accordance with the RIDEM OWTS Regulations, dry weather soil evaluations were used to determine the seasonal high groundwater table and soil conditions for leach field sizing and design. Percolation testing was not performed, as allowed in the RIDEM OWTS Regulations.

SUPPLEMENTAL RESPONSE The results of the soil evaluations performed on September 14, 2017 were used in the siting and design of a bottomless sand filter ("BSF") for the onsite wastewater treatment system ("OWTS") proposed for the Clear River Energy Center. A revised OWTS permit application package incorporating this BSF was submitted to the RIDEM on October 13, 2017 and is attached hereto.

RESPONDENT: Brandon M. Blanchard, P.E., Pare Corporation

DATE: November 3, 2017

OPERATIONS

4-24 What polluting materials are expected to be maintained on hand at the facility? Are there Material Safety Data Sheets available for these items? If so, please provide them.

RESPONSE 4-24: The following commodities will be stored at the site in relatively large quantities:

- A. Ultra-Low Sulfur Diesel fuel oil for plant operation
- B. 19% Aqueous Ammonia for the HRSG SCR

The following chemicals will be stored in relatively small quantities (e.g. 400 gallon totes).

- A. Amine/Ammonia product(s) for cycle chemistry control
- B. Acid, caustic, anti-scalant, and sodium bisulfite for water treatment (reverse osmosis system)

Other products include: lube oil, glycol.

Representative Material Safety Data Sheets for these products are provided as **Exhibit 1**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-26 What Hazmat capabilities will be in place at the plant?

RESPONSE 4-26: Please see 4-24 for a list of commodities and chemicals that will be stored at the plant. The Hazmat plans are as follows:

- A. Diesel Oil - dike around the storage tank, double wall underground pipe and lined membrane around the oil delivery truck unloading station. These design features will contain oil spills. The area around the fuel oil storage tanks will also have a foam-based fire suppression systems designed to protect the fuel oil-based hazards and meet applicable NFPA codes and standards.
- B. Aqueous ammonia - the tank will be contained in a concrete containment area sized to hold the contents of the tank.
- C. Chemicals - all chemical totes will be placed in a concrete containment curb with a corner sump. The associated chemical feed pumps will also be stored in the containment area. This design feature will contain any chemical spills. Any potential spill will be collected in the corner sump and pumped out for disposal.

CREC facility personnel will receive training and certification from the Occupational Safety & Health Administration (“OSHA”) pertaining to their specific job responsibilities. In accordance with OSHA guidelines, facility personnel with the responsibility to handle chemicals on-site will be trained in the areas of safe storage and handling. These individuals will also receive OSHA training for applicable appropriate emergency responses. All visitors to the facility will be required to undergo a safety orientation to ensure a basic understanding of the facility and its safety and emergency response procedures. Invenergy will also work with local emergency responders to ensure that the proper Hazmat procedures are in place at all times at the facility and that all local, state and federal safety regulations and guidance are adhered to at all times.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-27 At production, will a constant replenishment of the bump strip be necessary?

RESPONSE 4-27: We are not certain what is meant by a “bump strip,” please clarify.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-31 Will the pumping or compressor stations on the pipe line have a condensate knock out system that separates the condensate from the gas? If not, why not?

RESPONSE 4-31: Yes, the fuel gas will be processed to remove entrained condensate and moisture.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-32 Will the plant itself have a knock out system? If not, why not?

RESPONSE 4-32: Yes, equipment will be installed to remove entrained condensate and moisture from the fuel gas.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-33 What will happen to any of the condensates that are separated from the gas? Please explain.

RESPONSE 4-33: The condensate that is removed from the fuel gas will be collected in storage tanks. The liquid in these tanks will be periodically pumped into trucks for off-site disposal.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-34 Will the condensate be treated at the plant or returned to the gas pumping station in double walled pipe systems? Please explain.

RESPONSE 4-34: The condensate removed from fuel gas and collected in the storage tank will be removed periodically by a vacuum truck and disposed of by a qualified contractor to an off-site location.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-37 Please explain your proposal for what will be done if the plant is in violation of Town Ordinances, especially as it relates to noise, water, air, and property devaluation.

RESPONSE 4-37: In the unlikely event that it is determined that the facility is in violation of any Burrillville Town Ordinances, Invenergy will work with the Town to resolve and correct the violation as expeditiously as possible. Invenergy does not believe that there will be any property devaluation. That being said, Invenergy is prepared to offer abutters a property value guarantee agreement should property devaluation result from building the CREC project.

RESPONDENT: John Niland, Invenergy Thermal Development LCC

DATE: April 27, 2016

OPERATIONS

4-38 Please provide the contingency plans for catastrophic or emergency events.

RESPONSE 4-38: As required by OSHA and other local, state and federal regulatory agencies, CREC emergency response procedures will be established. Invenergy will coordinate the development of these emergency response procedures with local authorities such as EMT, Police and Fire Department services so these organizations can provide local experience and input to the final emergency response procedures employed at the CREC facility.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-39 Please provide the disaster recovery plans.

RESPONSE 4-39: As required by local, state, and federal regulations, CREC emergency response plans will be established. Invenergy will coordinate the development of these disaster recovery plans with local authorities to provide local experience and input to the final emergency response plans employed at the CREC facility.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

4-41 What can the company do, or has it done in the past in regards to its energy projects, to mitigate noise, sight, and air disturbances?

RESPONSE 4-41: All Invenergy projects are designed to meet all applicable ordinances and regulations related to noise, sight and air. The CREC has been designed with extensive noise mitigation to meet the A-weighted noise limit in the Burrillville Town Ordinance at the nearest residences. The CREC has been sited to minimize visual impacts by maintaining surrounding wooded buffer areas. As detailed in Section 6.12 of Invenergy's EFSB Application, less than one percent of the five-mile area surrounding the facility will be able to see it. The CREC has been designed with state-of-the-art emission controls and will comply with all applicable local, state and federal air pollution control regulations and air quality standards during its operation.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

OPERATIONS

5-8 Please provide detailed information regarding the impacts on biodiversity of noise, the towers, the diesel fuel tanks, the air cooled condensers, the construction site, the new overhead transmission line right of way, the connection to the existing 345 kV line, the construction of the switch yard, the new gas line connection to the newly reconstructed compressor station, the new facility access road, the construction of an underground pipe to a sewer main to the Burrillville sewage treatment plant, and the construction of a 6.8 mile new 345 kV line.

RESPONSE 5-8: The CREC has been designed to minimize impacts to vegetation and wildlife habitats, as detailed in Sections 6.5 and 6.6 of the EFSB Application. Although there will be impacts to vegetation and wildlife species resulting of the clearing of forested areas, the site is zoned F-5 which allows power generation through a special use permit. Section 6.5.2 describes the expected impacts of project construction on vegetation. Section 6.6.2.2 details the expected impacts of project construction on wildlife and ecology.

Invenergy will restore vegetated and habitat areas temporarily impacted during construction wherever feasible. Invenergy will also limit tree clearing activities during the breeding season of any threatened species identified in the areas to be cleared, and will work with local, state and federal authorities to implement practical measures to minimize impacts to vegetation and wildlife species during CREC construction and operation.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

OPERATIONS

15-2 Are you aware of any databases that identify natural gas shortages that have occurred in our region over approximately the last 5 years? If so, please furnish copies and/or electronic links

RESPONSE 15-2: There is little data publicly available on natural gas (NG) shortages requiring power plants in ISO-NE to switch to diesel. However, Invenergy can see from publicly available EPA emissions records when dual fuel plants have fired with diesel fuel, (<https://ampd.epa.gov/ampd/>), and Invenergy can infer that these instances may have been due to possible NG shortages.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 19, 2016

OPERATIONS

17-1 Is there any possibility, no matter how small, that there could be an explosion at the Spectra/Algonquin compressor station which could cause an explosion at the Invenergy plant? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE 17-1 Invenergy Thermal Development LLC (“Invenergy”) does not believe there is a possibility that an explosion at Spectra’s Burrillville Compressor Station (“BCS”) could cause an explosion at Clear River Energy Center (“CREC”). As discussed in our response to questions 17-2, 3# and 17-4 Invenergy engaged Exponent as an expert consultant who has ample experience in evaluating the types of events that are being postulated in the question. Exponent estimated the area that could be impacted by an event at either location is really a function of the size of the enclosed area (e.g. building) where gas could accumulate and given that the powerhouse building at CREC is larger and has more volume than the building at Spectra’s site, an event at CREC would be governing. Please refer to the response to question 17-2 for the results of this event.

As it relates to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC, Invenergy contacted Spectra with regard to this question, and Spectra provided the attached letter that highlights the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In the attached response Spectra indicates that their Integrity Management Program has determined the Potential Impact Radius (“PIR”) of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the CREC in the remotely possible event of a fire or explosion.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

OPERATIONS

17-2 Is it at all possible that a problem at the Invenergy plant could cause an explosion at the Spectra/Algonquin compressor station? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE:

We do not believe it is possible that a problem at the Clear River Energy Center (CREC) could cause an explosion at the Spectra/Algonquin compressor station. The codes and standards incorporated into the design and construction of the CREC and the physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the Spectra/Algonquin compressor station in the remotely possible event of a fire or explosion at CREC.

The design of the CREC incorporates the requirements of dozens of industry standards including but not limited to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, National Fire Protection Association (NFPA), National Electric Code (NEC), American Petroleum Institute (API). Adherence to these standards minimize the likelihood that there would ever be a fire or explosion at the CREC.

In order to determine potential scenarios that should be examined, Invenergy examined the systems and associated design features at CREC. These systems and features are typical to gas fired power plants, and as such, the Project design will also include design features to mitigate consequential damage to other portions of the CREC facility and keep any impact area within the confines of the CREC property. The key systems that could have a potential to cause a fire or explosion are listed below and their associated specific design features include:

1. Natural gas: The natural gas piping systems and components are separated from the other sections of the Project (to the extent possible) and all areas where natural gas systems and components are located are designated with an area classification that requires special design features that include explosion proof electrical components, gas detectors that are linked to automatic isolation systems and fire detection and suppression systems. Should a leak occur, the gas detection sensors are set to detect the gas before a concentration level is reached that would be capable of creating an explosion that could impact a larger area of the plant. For these reasons, the amount of any gas that could leak is limited such that it would not spread to an ignition source.

The CREC fuel gas system will be equipped with automatic detection and emergency shutdown systems, including the following:

- The natural gas will be odorized for detection.
- A network of low concentration natural gas detectors will be installed to monitor

for fuel gas leaks in the gas yard and within all areas where fuel gas equipment is located, both indoors and outdoors. The detectors will be set to alarm in the facility main control system (“DCS”). The custom-designed fire alarm and detection system will be in accordance with NFPA 72.

- In accordance with NFPA 850 the plant will include emergency shutdown systems to isolate the gas piping, stop equipment and safely vent station gas. The natural gas supply pipeline will include an emergency shutoff valve (ESV) at the outlet of the metering yard and the ESV will automatically close in the event that a fire is detected.
- Individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component.
- Main line isolation valves will be fire safe, as defined by API 607.
- Nitrogen hose connections and vent lines will be provided between all isolatable sections of the fuel gas piping to allow nitrogen purges and inerting for maintenance activities.
- The fuel gas piping will be cleaned and purged in accordance with NFPA 56.
- Pressure control devices to maintain the operating pressure at or below the maximum allowable operating pressure. In addition, overpressure protection devices with sufficient capacity and sensitivity will be installed to ensure that the maximum allowable operating pressure of the station piping and equipment will not be exceeded by more than 10 percent (10%) in the case of a malfunction of the pressure control equipment.
- All electrical equipment will be explosion proof.
- System design to accommodate changes in gas quality, periodic maintenance (e.g., filter change-out), redundancy, separation of ignition sources (e.g., National Electric Code compliance), combustion controls and hardened to resist impacts.
- Prevent damage to pipe by as-built mapping, below-grade flagging (above grade) and clear labeling of gas-bearing components.
- Flame detection that uses ultraviolet sensors.

Safe operating practices will include the following at a minimum:

- Periodic walk-through surveys of pipeline systems with hand-held gas detectors at all flanges, valves and other fittings; this is particularly important in the Gas Yard at filter, dewpoint heater equipment, pressure control valves and metering runs where many fittings and gas state changes occur that may contribute to leakage events.
- Strong operating and maintenance procedures, including use of inert gas purging, maintenance of coating and cathodic protection systems, dewpoint heating, filtration and verification of valve and instrument functionality.

The gas system design features include, controls utilizing gas detection, fire detection and suppression and when combined with regular inspections and proper maintenance of gas system equipment, limits this type of event to be confined within a smaller area thereby virtually eliminating the potential for undetected gas leaks that could lead to a fire or explosion.

2. Hydrogen: Modern utility generators larger than about 300 MW are hydrogen or hydrogen and water cooled. Hydrogen has safely been used as the coolant medium in utility generators for over 70 years. General Electric (“GE”) estimates that there are more than 2,400 hydrogen cooled GE designed generators in service today. The generator and associated hydrogen cooling system include a number of features to ensure the safe operation of the equipment:

The generator applied to CREC is hydrogen cooled, and as with the potential for a natural gas leak, there will be hydrogen leak detection sensors located on the generator which stringently monitor for potential leaks. These detectors will be set to monitor, alarm and take protective actions when hydrogen is detected at a level that is below the lower explosive limit.

The generator is equipped with end shields on each end, designed to support the rotor/bearings, to prevent gas from escaping, and to be able to withstand a hydrogen explosion in the unlikely event of such a mishap. In order to provide the required strength and stiffness, the end shields are constructed from steel plate and are reinforced. Horizontally split inner and outer oil deflectors are bolted into the end shield and provide sealing of the oil along the shaft.

Furthermore, the hydrogen systems and components will be located in areas that are designated with an area classification that requires special design features including explosion-proof electrical components, gas detectors that are linked to automatic isolation of systems and integrated with the fire detection and suppression systems.

The generator will have an internal volume of hydrogen that will be maintained in a sealed condition using multiple redundant seals. The seals will include mechanical seals and a seal oil system that uses pressurized oil barrier between the mechanical seals and the rotating shaft. The seal oil maintains an air-side seal and a hydrogen-side seal by forcing oil in both directions. The oil is monitored to detect any hydrogen that may get entrained into the oil and provide a means to scrub the hydrogen from the oil.

Hydrogen, like all flammable gases, is only reactive when it is present in concentration levels between the lower explosion limit and the upper explosive limit. That is, when there is sufficient oxygen present to sustain combustion. The generator will be equipped with a purity monitoring system that measures the quality of hydrogen in the generator. If the purity level begins to decrease toward the upper explosive limit, this system adds hydrogen to maintain purity.

The generator will also be equipped with an inert gas (one that does not react with hydrogen) purge system to purge the generator of hydrogen should generator maintenance be necessary. This system will also be used to purge and dilute the hydrogen to below the lower explosive limit if there is a leak. These systems are used throughout the power industry and have successfully controlled and prevented hydrogen explosions. Daily inspections and proper maintenance of equipment help to reduce this hazard

3. Main Transformer: The potential for an explosion is remote, its causes include lightning strike or transformer fault. The design features fire detection and suppression systems, location within a three sided concrete wall structure to protect immediately adjacent equipment systems and buildings and such that the open side has adequate space separation for protection for adjacent transformers and other equipment. Given the small impact area and the three sided walled enclosure, this scenario was ruled out as having any potential to impact Spectra's Burrillville station.

While we believe that the impact of any conceivable event at CREC will not migrate to the Algonquin compressor station, in order to address the question on the likelihood of an explosion occurring, we contacted Exponent, Inc., who is an industry recognized expert in conducting the type of analysis that was requested and asked that they conduct an evaluation of the probability of either a natural gas explosion or a hydrogen explosion event and to determine the maximum impact radius of the worst case scenario, no matter how unlikely. Exponent performed the evaluation which is included as an attachment.

As can be seen in the attached study provided by Exponent, the likelihood of either the Algonquin Station or the CREC facility suffering a gas explosion event as described in the question is anticipated to be on the order of 10^{-5} to 10^{-6} /yr, or once every 100,000 to 1 million years.

We also requested Exponent to describe what conditions, along with any assumptions and associated reasoning, would be necessary, no matter how unlikely, in order for such an event to occur and to determine the size of the impact radius that could result from such an event. Their inputs, assumptions and analysis are included in the attached report which concludes that even with postulating physically impossible scenarios like having the maximum possible volume of gas be released instantaneously and fill the largest contained area (the power block building) with a "stoichiometric natural gas/air mixture in order to maximize the confined volume of fuel involved in the explosion," the resulting impact area does not impact the Spectra compressor station.

Also, as addressed in the response to question 17-4, Exponent determined the distance away from the source of a worst case hypothetical explosion, where the blast wave pressure threshold of 1 pound per square inch gauge could reach. This threshold is the lowest pressure criterion for damaging explosion effects described in the ALOHA technical documentation and the EPA Risk Management Program Offsite Consequence Analysis. At 1 psig of pressure, a blast wave could shatter glass windows, however much higher pressures are necessary to damage the buildings or equipment at the compressor station. The calculated distance to the 1 psig pressure threshold for the maximum postulated scenario (no matter how improbable) was found to be no more than 884 feet from the source on the CREC site which does not create any damage to equipment at the Spectra/Algonquin compressor station, please refer to the attached Exponent letter response for the details of this analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC – November 1, 2016

OPERATIONS

17-3 Please explain/calculate the probability of a certain blast events occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

17-3 Please explain/calculate the probability of a certain blast events [sic] occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

RESPONSE 17-3: Please refer to the response to question 17-2 and the attached Exponent Report that calculated the probability of a certain blast events occurring.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

OPERATIONS

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

RESPONSE 17-4: Please refer to the response to question 17-2 and the attached Exponent report for the response to this question.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

OPERATIONS

Request 27-8 **Will the proposed power plant be a peaker plant or a base plant? Please explain.**

RESPONSE 27-8 The plant will be dispatched by ISO NE based on a merit order (i.e. lowest cost), and given CREC's high efficiency, it will be part of ISO NE's base load supply. That being said, CREC will also have fast start and high ramp rate capabilities and, as such, will also be capable of providing services normally provided by peaking plants.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2017

OPERATIONS

Request 27-19 **What chemicals will be used to clean the boilers? Please supply MSDS sheets.**

RESPONSE 27-19 During the construction phase, the HRSGs, once assembled, will be cleaned using a surfactant flush to remove any oil, dirt and mill scale. No chemical cleaning of the HRSGs is planned once the plant is operational.

Exhibit 27-19 includes the MSDS sheets for typical chemicals used to perform the surfactant flush of HRSGs during construction. The selection of the actual chemicals to be used for the CREC will be by the engineer procurement and construction (“EPC”) Contractor. The actual chemicals and procedures used for cleaning the HRSG and the power cycle piping systems will vary depending on the methods of the installation contractor selected to build the project. At the current stage of project development, no specific method of boiler cleaning has been identified.

RESPONDENT: George Bacon, ESS Group, Inc.

DATE: July 18, 2017

OPERATIONS

Request 27-20 **What other chemicals (liquid, gas, or solid) (hazardous or non-hazardous) not listed in the original application submitted to the EFSB, supplements, data request responses, or other written materials will be on site? Please provide the approximate storage quantities of each (gallons, liters, pounds, tons, scf, etc.) on site.**

RESPONSE 27-20 The list of chemicals and products that may be used during construction, operation and maintenance of the Facility are included below. The quantities identified in the list below are typical for the type and scale of the power generation facility proposed for this Project.

- Surfactant (~1,000 gallons) – This product is the same as that identified in response 19 of this data request (used during construction);
- Amine (~ 1,000 gallons) (used during operations);
- Lubrication oil (~10,000-15,000 gallons) (used during operations);
- Hydraulic oil (~ 500-1,000 gallons) (used during operations);
- Propylene Glycol / water mixture (~ 20,000 gallons) (used during operations for closed cooling water system);
- Reagents for analyzers such as citric acid, amino acid reagent, potassium persulfate, sulfuric acid, chlorine reagent (~ 1 gallon each), these are stored in the Facilities laboratory. (used during operations);
- Corrosion Inhibitor's such as Cortec's vapor phase corrosion inhibitor (~ 20 lbs) and sodium molybdate (650 gallons) or other equivalent products (used during construction);
- Solvents, cleaners, degreasers such as simple green, denatured alcohol, paint thinners, mineral spirits, and lubricant (~ 10-15 gallons each) (used during construction);
- Motor oil, hydraulic oil (~ 50-100 gallons each) (used during construction) and
- Equipment fuel (~ 5,000 gallons) (used during construction).

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

OPERATIONS

Request 27-22

- (a) Out of the 26 listed dual fired power plants how many are peaker plants? Please list by name, MW, and location.
- (b) How many power plants on the list are firing natural gas directly from a main pipeline? Please list by name, MW, and location.
- (c) How many power plants on the list have MW capacity of 100 MW or below? Please list by name, MW, and location.
- (d) How many power plants on the list are owned by towns or cities and actually use electricity generated by them? Please list by name, MW, and location.
- (e) How many (if any) power plants on this list are considered “at risk” by ISO-NE? Please list by name, MW, and location.
- (f) Why weren’t power plants (and corresponding data) which only fire distillate oil (as they also are called upon by ISO-NE during times when natural gas is in short supply) included in this list? Please explain.

RESPONSE 27-22

- (a) The table previously provided in response to the Town’s Data Request No. 18-2 was developed by ISO New England, and it does not designate units by type and as such we are not in a position to identify which plants are peaking plants. This list was just for plants that have dual fuel capability.
- (b) There are two main pipelines that provide natural gas into the New England region, Algonquin (“AGT”) and Tennessee Gas (“TGP”). Of the plants that were included in the list of 26 facilities (the list of dual fuel plants originally provided), only two can be considered to be located on the main gas pipeline, Ocean State Power and Bellingham Cogeneration Facility. Invenergy has included a map in **Exhibit 27-22(a)** which show the location of the power plants with respect to the main gas pipelines in CT, RI and MA.
- (c) Invenergy has provided a revised list, (in response to question f below) which includes all oil and dual fuel plants and it includes their MW capacity. This list is included as **Exhibit 27-22(b)**.
- (d) Invenergy does not have the specific ownership data for all of the plants on the list of 26 plants.
- (e) The “At Risk Units” are listed by ISO-NE on page 28 of the 2017 Regional Electricity Outlook Report (over 5,500 MW

excerpted below) and the plants included in the **Exhibit 27-22(b)** that are deemed at risk have been identified in that table.



(f) The original list of 26 was for dual fuel plants only. The updated list (**Exhibit 27-22(b)**) includes all oil and dual fuel units.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2017

OPERATIONS

Request 27-23 **Concerning Data Request Response #18-2:**

a. Please provide the “publicly available spreadsheet” supposed to be found at https://www.iso-ne.com/static-assets/documents/2015/12/rcpf_event_data_from_may_2015.xlsx. This link cannot be accessed.

RESPONSE 27-23 Below is the updated link:

a

https://www.iso-ne.com/static-assets/documents/2017/01/rcpf_activation_data_2006_10_thru_present.zip

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2017

OPERATIONS

Request 27-35 **Will Invenergy/CREC redo the application “Application for Approval of Plans to Construct, Install, or Modify Fuel Burning Equipment” (specifically, for Gas Turbine #1/HRSG #1, Gas Turbine #2/HRSG #2) as the total number of days that Invenergy/CREC/”Facility” will fire ULSD has changed from 60 to 30?**

RESPONSE 27-35 The CREC Major Source Application Addendum, dated September 15, 2016, filed with the Board on May 26, 2017, stated that total gas turbine ULSD usage will be limited to the equivalent usage of 30 days per year at base load (15 days per turbine). Invenergy will submit revised versions of the RIDEM Air Permit Application Forms if requested to do so by RIDEM.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

OPERATIONS

Request 27-36 Questions on smoke stacks:

- (a) Are the two main stacks still 200 feet above grade? If not, please provide heights.
- (b) What equipment will be releasing emissions to the 35-foot stack(s)? How many 35-foot stacks will there be?
- (c) What equipment will be releasing emissions to the 50-foot stack(s)? How many 50-foot stacks will there be?

RESPONSE 27- (a) The two main stacks will now be 195 feet above grade and not 200
36 feet. However, the elevation of the emission point has remained the same as the grade has been elevated by five feet.

(b) There will be no equipment which releases emissions to 35-foot stacks anymore. In the original air permit application, the emergency diesel generator, fire pump house, and the fuel gas dew point heater had stacks with 35' height. The revised air permit application from September 2016 represents a stack height of 16 feet, 12 feet, and 26 feet respectively for those same pieces of equipment.

(c) The Auxiliary Boiler will have just one stack with a height of 50 feet.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

OPERATIONS

Request 27-37

Retention Pond questions:

- (a) What are the dimensions of the retention pond (which will collect precipitation)?
- (b) How many gallons will the retention pond hold?
- (c) Where is the “outfall” of the retention pond?
- (d) Will the water in the retention pond be tested prior to allowing the water to flow to the “outfall”?

RESPONSE 27-37

- (a) The pond is irregular in shape to fit the available space. It is approximately 150’x 200’ or 0.7 acres at the top of bank.
- (b) The pond is designed to meet RIDEM stormwater facility codes and standards and meets the water quality, channel protection and overbank flood protection criteria volumes and flows. If the pond was completely full of water with the outfall plugged, it would hold approximately 7 million gallons of water.
- (c) The outfall for the pond is located to the northeast of the pond. The outfall will discharge to the adjacent wetlands in an up flow level spreader to dissipate energy.
- (d) The stormwater collection system will not receive water from areas that are considered potential contaminant sources such as secondary containment areas, therefore the water will not require testing.

RESPONDENT:

Chad Jacobs, HDR

DATE:

July 18, 2017

OPERATIONS

Request 27-38 **Please revise the “Annual Emissions Summaries” Table (Exhibit 4 from Data Request Response #22) to include a “Filling of All Liquid Tanks Prior to Operations”. Also, please provide calculations of the data.**

RESPONSE 27-38 No revision is necessary or required. The Annual Emissions Summaries Table included as Exhibit 4 from Invenergy’s Response to the Town’s Data Request No. 22-45 provided a conservative estimate of the expected emissions from all project truck traffic during construction. **Exhibit 27-24** provides the data calculations for the trucks associated with filling all liquid tanks prior to operations.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

OPERATIONS

Request 34-5 **Please identify which turbines you considered in addition to the GE 7HA.02 and explain why each was rejected. Please explain why you feel that the GE HA.02 is the most efficient combustion turbine available in the market and provide comparative details.**

Response 34-5 Invenergy considered advanced class combustion turbine technologies available in the United States market at the time of the equipment procurement which consisted of equipment manufactured by General Electric, Mitsubishi Hitachi Power Systems and Siemens Energy. The combined cycle efficiency of the three technologies at ISO Standard conditions (59 °F, 60% relative humidity, sea level) are summarized below based on data published in the industry benchmarking resource Gas Turbine World 2017 Performance Specs included in **Exhibit 34-5**.

GTW Combined Cycle Specs – Advanced Class Units (60 Hertz) One-on-One Configuration (Unfired) ISO Conditions Performance Summary Comparison				
Manufacturer	Model	Net Output	Net Heat Rate (LHV)	Net Efficiency
General Electric	7HA.02	560,000 kW	5408 BTU/kWh	63.1%
Mitsubishi Hitachi	501JAC	540,000 kW	5408 BTU/kWh	63.1%
Siesmens Energy	SCC5-8000H	460,000 kW	5611 BTU/kWh	61.0%

The GE 7HA.02 was determined through the evaluation process to provide the highest efficiency across the ambient temperature range and also provided superior operability benefits including lower minimum load and higher ramp rate capability than the alternatives.

Invenergy additionally compared the commercial terms and GE's was superior and we should note that from a fleet perspective the 7HA.02 will have more operating hours than the other bidders by the time CREC will be operational which is important when considering all of the bids were for new models.

RESPONDENT: Mark Wiitanen, HDR, Inc.
John Niland, Invenergy Thermal Development LLC

DATE: September 12, 2017

OPERATIONS

Request 39-1 **During a weather or other emergency event whereby the power plant loses its electric or primary power source, what measures are in place to keep the plant running, to insure general safety for plant employees and the general public, and to insure that hazardous materials and supplies on site will be contained? How long will these measures keep the plant running and/or maintain safety protocols?**

Response 39-1 The source of primary power to the Clear River Energy Center (“CREC” or “Facility”) is the electrical interconnection to National Grid, through which power is also exported from the Facility. CREC will be equipped with automated systems to ensure safe shutdown and protection of the plant equipment in the event of a loss of this connection. This includes battery powered back-up electrical systems for maintaining power to the plant control systems and an emergency diesel generator to power other critical plant equipment. The systems will be designed to maintain the function and integrity of all plant safety and protection systems during shutdown events. All plant systems will be designed so that a safe standby condition is achieved and maintained once a shutdown is completed and no hazards or loss of containment of hazardous materials result from a shutdown.

The emergency diesel generator and battery back-up systems will be able to operate significantly longer than the time required to safely shutdown the CREC generating units. The emergency diesel generator will continue to operate to provide power to the Facility, as needed. The design of the diesel generator will support refueling during operation and thus allow the diesel generator to operate for an indefinite period of time.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: October 13, 2017

OPERATIONS

Request 39-8

Please detail the fire suppression system(s) to be utilized at the facility and the scope of its coverage. Will different types of fire suppression systems be installed and, if yes, what does each protect? If any part of the facility is not protected or does not need to be protected, please provide details and explain.

Response 39-8

CREC will be equipped with a variety of fire detection and suppression systems to address the hazards that may develop in particular areas of the Facility. In general, the fire protection systems of the CREC will comply with the applicable codes and standards adopted by the Rhode Island Fire Safety Code ("RIFSC") and the pertinent recommendations of the National Fire Protection Association ("NFPA"). There are many NFPA standards that apply to the design of a power generation facility, many of which are adopted by reference via the RIFSC. Some of the more notable standards include but are not limited to the following:

- NFPA 1 Fire Prevention Code
- NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 24 Standard for the Installation of Private Fire Service Mains and their Appurtenances
- NFPA 30 Flammable and Combustible Liquids Code
- NFPA 54 National Fuel Gas 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 101 Life Safety Code
- NFPA 850 Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations

The following table provides a summary of typical suppression and detection systems that may be installed in the various areas of the CREC to satisfy the requirements of applicable codes and other design criteria. Note that there are many alternative methods of fire protection that could be used in lieu of the methods listed below. During detailed engineering of CREC, the type of detection or suppression system ultimately used may be different as the design

requirements and project-specific factors are more closely addressed.

Area or Equipment	Suppression System	Detection
All Plant Areas	Looped fire water supply with hydrants (300 foot spacing). Standpipe and hose stations.	None
Combustion Turbine Enclosures	Clean Agent Or Water Mist	Cross Zoned Heat Detectors
Steam Turbine Bearings	Double Interlock Pre-Action Water Spray	Rate Compensated Heat Detectors
Steam Turbine Lube Oil Systems (reservoir, coolers, filtration, conditioner, piping, etc.)	Pre-Action Water Spray	Heat detectors
Steam Turbine Building: Ground Floor, Mezzanine, and Platforms Subject to Oil Flow, Oil Spray, or Oil Accumulation	Wet Pipe Sprinkler	Frangible bulb
STG Building - above the operating floor	Portable Extinguishers	Smoke and/or Heat Detectors
Fuel Oil Storage Tanks	Proportioning Type Foam Deluge System	Smoke and/or Heat Detectors
Fuel Oil Treatment and Forwarding Skids	Proportioning Type Foam Deluge System	Smoke and/or Heat Detectors
Fuel Oil Unloading Pumps	Proportioning Type Foam Deluge System	Smoke and/or Heat Detectors
Fuel Oil Truck Unloading Area	Proportioning Type Foam Deluge System	Smoke and/or Heat Detectors
Generator Step-Up and Auxiliary Transformers	Passive Fire Protection and/or Deluge Suppression System	Linear Heat Detector or Dry Pilot

Electrical Rooms	Portable Extinguishers	Aspirating Smoke Detector
Power Distribution Enclosures	Portable Extinguishers	Aspirating Smoke Detector
Cable spreading rooms or underground spreading vaults	Wet or Dry Pipe Sprinkler	Frangible Bulb
Main DCS equipment room (processors, etc) and telecommunications room	Portable Extinguishers	Aspirating Smoke Detector
DCS remote I/O cabinet rooms	Portable Extinguishers	Aspirating Smoke Detector
CEMS enclosure, Sample Panel Room	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 or Dry Pipe Sprinkler	Frangible Bulb
Warehouse	Portable Extinguishers	Smoke Detection and Frangible Bulb
Water Treatment building	Portable Extinguishers	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

For the natural gas systems of the CREC, a network of natural gas detectors to monitor for natural gas leaks in the gas yard and within all areas where fuel gas equipment is located both indoors and outdoors will be installed. The detectors will be set to alarm in the CREC control system.

Buildings and enclosures of the CREC that contain equipment that generate or use hydrogen (such as battery rooms and generator enclosures) or otherwise could be at risk for the collection of hydrogen gas will have hydrogen monitors that will alarm in the plant control systems in the event that hydrogen is detected.

The signals from the various monitors and detectors of the fire detection system will be monitored by a fire protection system control unit located in the main control room of the CREC. The control unit processes the signals to determine the appropriate response such as initiating an alarm or activation of a suppression system. In some instances, the plant control systems may automatically shut down the affected generating unit depending on the nature of the hazard detected by the fire protection system.

Fire water to supply the various fire suppression systems will be stored on the CREC site in a fire water storage tank. For reliability, an electric motor-driven fire pump, diesel-driven fire pump and a motor-driven jockey pump will be installed to pump water to the fire service main (yard loop). The fire loop will provide water to fire hydrants and to the various fixed water-based fire suppression systems around CREC.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: October 13, 2017

RENEWABLES

4-28 With Invenergy being committed to renewable power production, would Invenergy be willing to repair existing dams and construct a mini power producing facility utilizing a water wheel versus a water turbine so as to maintain the cultural heritage of the town? (Burrillville is an old mill town and water wheel power was the mainstay of its founding.)

RESPONSE 4-28: Invenergy does not have any experience with hydro-electric facilities. Our understanding is that the town conducted a study examining the possibility of putting a small hydro-electric plant adjacent to the dam in the center of town and that study concluded that the hydro-electric unit would not produce significant power. The decreased water flow would cause the dam to be dry (i.e. less water over the dam) for longer periods of time which was not acceptable.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

RENEWABLES

4-29 Both solar and wind power production are variable or of limited production use. However, the streams flow 24 hours per day and only slow down during the dry season. The old water wheel system was strong enough to power a full size textile mill. A water wheel should be able to turn a 15 to 20 Kw generator. Do you agree?

RESPONSE 4-29: As stated in the previous response, Invenergy's understanding is that the Town of Burrillville has already studied the feasibility of putting a small hydro-electric plant in the Town and determined that it was not cost effective.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

MITIGATION

4-42 What, if any, community based programs has the company instituted regarding energy use/consumption/incentives to mitigate local impacts?

RESPONSE 4-42: Invenergy is an Electric Wholesale Generator (“EWG”) and the sale of the project’s electricity is governed by the Federal Energy Regulatory Commission (“FERC”). Invenergy is prohibited from selling power on a retail basis to consumers and cannot participate in retail or consumer level programs as suggested in the question. Due to the project’s very high efficiency, power can be produced at a lower cost than any other plant in New England.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 27, 2016

MITIGATION

4-43 Has the company extended solar or wind applications to public areas such as schools or other municipal buildings to mitigate local impacts?

RESPONSE 4-43: We are exploring other locations for utility scale solar projects in Rhode Island (projects that are 3 MW in size and up). Invenenergy does not develop roof top solar projects and cannot provide power to retail customers because providing power to retail customers would violate its EWG status with FERC.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: April 27, 2016

MITIGATION

5-1 Is Invenergy proposing in any supplemental environmental projects that would be in addition to the typical regulatory requirements, such as enhanced wetlands and wildlife habitat restoration/replication in the vicinity of the proposed development?

RESPONSE 5-1: Invenergy Thermal Development LLC (“Invenergy”), in coordination with Rhode Island Department of Environmental Management (“RIDEM”) and the United States Army Corp of Engineering (“ACOE”), will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the Clear River Energy Center (“CREC”), as is required by the ACOE. The Plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- preservation measures.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

MITIGATION

5-6 With regard to wetlands and species, please identify measures that Invenergy is proposing to reduce impact and to provide mitigation for impacts that cannot be avoided.

RESPONSE 5-6: The CREC is designed to minimize impacts to wetlands and wildlife habitats. Invenergy will restore vegetated and habitat areas temporarily impacted during construction wherever feasible. CREC will also limit tree clearing activities during the breeding season of any threatened species identified in the areas to be cleared. Invenergy, in coordination with RIDEM and the ACOE, will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the CREC, as is required by the ACOE. The plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- preservation measures.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

MITIGATION

5-7 Is Invenergy proposing to acquire conservation land? If so, please provide details.

RESPONSE 5-7: Invenergy, in coordination with RIDEM and the ACOE, will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the CREC, as is required by the ACOE. The plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- additional land procurement for preservation.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

MITIGATION

5-21 Will the 4 to 5 acres of permanent wetlands that will be filled and altered be restored elsewhere or replicated? Please explain.

RESPONSE 5-21: Invenergy does not anticipate that there will be 4 to 5 acres of permanent wetlands that will need to be filled or altered. There will be some perimeter wetland impacts on the project site and some biological wetland impacts (i.e. permanent wetlands). The current estimate for these impacts is approximately one acre in total. There will be no filling of permanent wetlands on the National Grid ROW. Invenergy, in coordination with RIDEM and the ACOE, will develop a Wetlands Mitigation Plan to compensate for all unavoidable direct, indirect and secondary wetland impacts from the CREC, as is required by the ACOE. The plan will include one or more of the following within the affected watershed in the required compensatory mitigation ratios:

- proposed wetland restoration,
- creation,
- enhancement, and/or
- preservation measures.

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: April 28, 2016

MITIGATION

5-22 Is Invenergy willing to fund local educational programs aimed at locally conserved lands, including those acquired by Invenergy, if any, under an agreement?

RESPONSE 5-22: Invenergy is willing to provide funds that could be used for educational programs or programs that could provide funds for a scholarship program for Burrillville High School graduates. Invenergy would need more details on which conservation lands the Town of Burrillville is referring to.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: April 28, 2016

MITIGATION

8-10 It appears that wetland mitigation and planning may not have been incorporated into the document. Please explain/clarify.

RESPONSE 8-10: CREC project wetland mitigation is discussed in Section 6.3.4 of the EFSB Application. A compensatory mitigation strategy for the proposed permanent project impacts is being developed and a complete mitigation plan which details the specific mitigation measures to be implemented will be included in the RIDEM and USACE wetlands permit applications to be filed by June of 2016.

SUPPLEMENTAL RESPONSE: In pre-application meetings, the Rhode Island Department of Environmental Management (“RIDEM”) and the USACE informed Invenergy that the wetlands applications submitted for CREC would need to include the proposed impacts associated with all project elements, including CREC, the transmission line and all water and/or sewer treatment and conveyance systems. Due to design delays associated with the National Grid transmission line, Invenergy was unable to submit the permit application by June 2016, as indicated in the original response.

Pending the transmission line and further water line system developments, the wetlands impacts to the construction of CREC have been determined. See “Clear River Energy Center – Rhode Island Energy Facility Siting Board Application – Addendum – Wetlands,” prepared by ESS Group, Inc., dated August 30, 2016.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: August 30, 2016

MITIGATION

Request 34-3 **Please provide a copy of Invenergy’s mitigation package, as referenced on page 9 of Mr. Ringler’s testimony.**

Response 34-3 A Compensatory Wetland Mitigation Plan following the New England District Compensatory Mitigation Guidance in cooperation with resource agencies will be developed. Invenergy Thermal Development LLC (“Invenergy”) intends to work with RIDEM and the United States Army Corps of Engineers (“USACE”) to determine which potentially available parcel(s) appear best suited to offset project-related wetland and other impacts. It is anticipated that the Compensatory Wetland Mitigation Plan will include a description of project impacts, objectives, mitigation site selection procedures, site protection information and monitoring standards in addition to all required graphics and information. It is anticipated that the final mitigation package will primarily consist of land preservation and possibly some restoration should a viable project be identified.

RESPONDENT: Jason Ringler, ESS Group, Inc.

DATE: September 12, 2017

MITIGATION

Request 34-4 **Please provide a copy of the written responses provided by RIDEM on July 16, 2016, as referenced on pages 11-12 in Mr. Ringler's testimony.**

Response 34-4 Please see **Exhibit 34-4**, which includes the July 15, 2016 written response from RIDEM.

RESPONDENT: Jason Ringler, ESS Group, Inc.

DATE: September 12, 2017

ENVIRONMENTAL

8-3 Section 1.6(b)(20) of the RIEFSB Rules states that the applicant must file all necessary NEPA environmental documentation. The October 2015 application does not contain any NEPA documents. Please explain/clarify.

RESPONSE 8-3: The National Environmental Policy Act (“NEPA”) established a broad national framework for protecting the environment that requires all branches of the federal government to give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment. (42 U.S.C. Section 4231 et seq.) It is the responsibility of each federal agency to develop their own NEPA procedures tailored for the specific mission and activities of the agency.

The CREC project will require an Individual Permit from the U.S. Army Corps of Engineers (“USACE”) for its proposed wetland impacts. This federal agency permit application will be filed with the USACE by June of 2016. Once the permit application has been filed, the USACE will be responsible for preparing an Environmental Assessment (“EA”) to determine whether an Environmental Impact Statement (“EIS”) will be required for the project. If required, the preparation of the EIS would be the responsibility of the USACE.

40 CFR 325 Appendix B sets forth implementing procedures for the USACE regulatory program. In cases where the specific activity requiring an USACE permit is merely one component of a larger project, the district engineer is required to establish the scope of the NEPA document (EA or EIS) to address the specific activity requiring an USACE permit and those portions of the entire project over which the district engineer has control and responsibility to warrant Federal review. The district engineer is considered to have control and responsibility for portions of the project beyond USACE jurisdiction only in cases where the environmental consequences of the larger project are essentially products of the USACE permit action.

Invenergy Thermal Development LLC’s (“Invenergy”) Application with the RI Energy Facility Siting Board (“EFSB”) and the numerous environmental permit applications which will be filed for the CREC project fully detail the environmental impacts of the project and include all of the elements which would be required for an EIS. The USACE did not notify Invenergy in the project pre-application meeting that an EIS would be required for the project. For the USACE to require an EIS for the project, the district engineer would need to conclude that the environmental consequences of the project have not been properly considered through the EFSB and other permitting processes, such as

RIDEM. If required, the scope of such an EIS would be limited to the aspects of the project for which the USACE has control and responsibility.

The other air and water permits are under the responsibility of the RIDEM, as the delegated agency from U.S. EPA for these federal air and water permits. Rhode Island (unlike Massachusetts), does not have a separate state NEPA equivalent requirement, at the state level. Nonetheless, Invenergy understands that the RI EFSB has the responsibility to evaluate all individual and cumulative environmental impacts of the application. And RIDEM will be conducting its independence evaluation of the air, water and other natural resource impacts of the project also.

SUPPLEMENTAL RESPONSE: In pre-application meetings, the Rhode Island Department of Environmental Management (“RIDEM”) and the USACE informed Invenergy that the wetlands applications submitted for CREC would need to include the proposed impacts associated with all project elements, including CREC, the transmission line and all water and/or sewer treatment and conveyance systems. Due to design delays associated with the National Grid transmission line, Invenergy was unable to submit the permit application by June 2016, as indicated in the original response. Pending the transmission line and further water line system developments, the wetlands impacts to the construction of CREC have been determined. See “Clear River Energy Center – Rhode Island Energy Facility Siting Board Application – Addendum – Wetlands,” prepared by ESS Group, Inc., dated August 30, 2016.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: August 30, 2016

ENVIRONMENTAL

8-4 NEPA as defined by CEQ may not have been adequately addressed in the ESS application for CERC. Specifically, it appears that the analysis of alternatives for the project have not been clearly analyzed and compared to the preferred alternative. Please explain/clarify.

RESPONSE 8-4: The CREC project's NEPA requirements will be determined by the USACE, as detailed in Response 8-3. Section 10 of the EFSB Application provided a detailed study of project alternatives. Section 3.1.6.1 of the Major Source Permit Application also provided an analysis of project alternatives. Project alternatives will be further detailed in the Wetlands Alteration Permit Application to be submitted to the Rhode Island Department of Environmental Management ("RIDEM") and the Individual Permit Application to be submitted to the USACE, as required.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

8-6 It appears that the project has been segmented, is that correct? Do you agree that the entire build out of the project needs to be considered? Please explain/clarify.

RESPONSE 8-6: The CREC project has not been segmented. The EFSB Application addressed the potential cumulative impacts associated with all aspects of the project. The Wetlands Alteration Permit Application to be submitted to RIDEM and the Individual Permit Application to be submitted to the USACE, will each address the proposed impacts and mitigation measures associated with all aspects of the project, including the generating facility, the electric transmission line, the water treatment facility, the water supply line, the sewer line, the natural gas interconnection line and all areas designated for equipment staging during construction. Invenergy understands that EFSB approval of the project will be contingent on the receipt of all of the required permit approvals associated with all aspects of the project.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

8-7 Under NEPA – Environmental Justice must be addressed. We have found no references to environmental justice in the documents. Please explain/clarify.

RESPONSE 8-7: The CREC project's NEPA requirements will be determined by the USACE, as detailed in Response 8-3. Environmental Justice ("EJ") is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice communities are commonly identified as those whose residents are predominately minorities or low income. Project proponents must demonstrate that project impacts are not disproportionately impacting EJ communities.

The State of Rhode Island classifies EJ communities as areas with percentages in the top 15% of the state for low-income residents and/or non-white populations. A figure showing the mapped EJ areas in Rhode Island can be found on the RIDEM web-site:

<http://www.dem.ri.gov/envequity/graphics/ejareas.jpg>

As shown on the attached figure, there are no EJ communities located within Burrillville, Glocester, Smithfield, or North Smithfield. The nearest RI EJ communities are located in Woonsocket, more than 10 miles away from the project site. The nearest EJ communities in Massachusetts are located in Southbridge, also more than 10 miles away from the project site. The nearest EJ communities in Connecticut are located in Thompson, more than 5 miles away from the project site.

Based on the location of the CREC facility, its projected impacts, and the relative locations of the nearest EJ communities, the proposed impacts from the CREC will not disproportionately impact any EJ communities.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

8-8 Under NEPA – Socioeconomic impacts and analysis - this section does not seem to be clearly identified. Please explain/clarify.

RESPONSE 8-8: The CREC project's NEPA requirements will be determined by the USACE, as detailed in Response 8-3. The economic benefits of the CREC project are detailed extensively in Section 5.1 of the EFSB Application.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

8-9 Cumulative impacts – under NEPA, cumulative impacts need to be addressed. This includes items like “Offsite Storage.” Those areas need to be included in the full analysis of this document. Please explain/clarify.

RESPONSE 8-9: The CREC project’s NEPA requirements will be determined by the USACE, as detailed in Response 8-3. The EFSB Application addressed the potential cumulative impacts associated with all aspects of the project. The Wetlands Alteration Permit Application to be submitted to RIDEM and the Individual Permit Application to be submitted to the USACE, will each address the proposed impacts and mitigation measures associated with all aspects of the project, including the generating facility, the electric transmission line, the water treatment facility, the water supply line, the sewer line, the natural gas interconnection line, and all areas designated for equipment staging during construction. Invenergy understands that EFSB approval of the project will be contingent on the receipt of all of the required permit approvals associated with all aspects of the project.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

8-15 Under the alternatives section – it appears that there is a cut and paste from another document which has nothing to do with Rhode Island nor species of concern in Rhode island. Please explain/clarify.

RESPONSE 8-15: It is unclear which section is being referred to in 8-15.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: May 16, 2016

ENVIRONMENTAL

22-45

Please provide the total estimated truck emissions that will be generated on an annual basis, by type and amount, for all of the trucks coming and going from the facility:

a. During the construction period.

b. During the operating period.

Please explain what impact these emissions will have on the people who live in Burrillville and the wildlife near the plant.

RESPONSE 22-45

Exhibit 4 provides a summary of the total estimated truck emissions that will be generated on an annual basis, by type and amount, for all of the trucks coming and going from the Facility during the construction period and during the operating period.

Any ambient air quality impacts resulting from truck emissions both during the project construction and operating periods would be temporary and transient in nature. Because truck emissions are released at a relatively low velocity and elevation, they do not disperse far from their source. Thus, the areas primarily impacted will be along the roadways themselves and in those areas closest to the roadways to be used. Any people or wildlife who do spend extended time in those areas are already experiencing temporary air quality impacts from existing vehicular traffic on those roadways and may experience only minor increases in those impacts for very short periods of time as a result of the truck traffic associated with the Project.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: February 14, 2017

ENVIRONMENTAL

22-46 Do you agree that diesel exhaust has been categorized as an INRC class 1 carcinogen? If not, please explain.

RESPONSE 22-46 The International Agency for Research on Cancer (IARC) classified diesel engine exhaust as carcinogenic to humans (Group 1) in 2012, based on sufficient evidence that exposure is associated with an increased risk for lung cancer. This classification was based on the results of a large 2012 US National Cancer Institute/National Institute for Occupational Safety and Health study of occupational exposure to diesel exhaust emissions in underground miners, which revealed an increased risk for lung cancer in exposed workers. This study, which was conducted on workers in eight non-metal mining facilities, found a statistically significant positive gradient in lung cancer risk primarily among heavily exposed workers, and concluded that their findings provided further evidence that diesel exhaust exposure may cause lung cancer in humans and may present a potential health burden. This study, which was the primary basis of the IARC's classification of diesel engine exhaust as a carcinogen, did not conclude that temporary, transient exposure to diesel engine exhaust from vehicular traffic along a public roadway is associated with an increased risk for lung cancer.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: February 14, 2017

ENVIRONMENTAL

22-47

Do you agree with the following excerpt from an article written by the Union of Concerned Scientists? Please explain anything you disagree with:

Health Impacts of Diesel Pollution

Diesel-powered vehicles and equipment account for nearly half of all nitrogen oxides (NO_x) and more than two-thirds of all particulate matter (PM) emissions from US transportation sources.

Particulate matter or soot is created during the incomplete combustion of diesel fuel. Its composition often includes hundreds of chemical elements, including sulfates, ammonium, nitrates, elemental carbon, condensed organic compounds, and even carcinogenic compounds and heavy metals such as arsenic, selenium, cadmium and zinc. Though just a fraction of the width of a human hair, particulate matter varies in size from coarse particulates (less than 10 microns in diameter) to fine particulates (less than 2.5 microns) to ultrafine particulates (less than 0.1 microns). Ultrafine particulates, which are small enough to penetrate the cells of the lungs, make up 80-95% of diesel soot pollution.

Particulate matter irritates the eyes, nose, throat, and lungs, contributing to respiratory and cardiovascular illnesses and even premature death. Although everyone is susceptible to diesel soot pollution, children, the elderly, and individuals with preexisting respiratory conditions are the most vulnerable. Researchers estimate that, nationwide, tens of thousands of people die prematurely each year as a result of particulate pollution. Diesel engines contribute to the problem by releasing particulates directly into the air and by emitting nitrogen oxides and sulfur oxides, which transform into “secondary” particulates in the atmosphere.

Diesel emissions of nitrogen oxides contribute to the formation of ground level ozone, which irritates the respiratory system, causing coughing, choking, and reduced lung capacity. Ground level ozone pollution, formed when nitrogen oxides and hydrocarbon emissions combine in the presence of sunlight, presents a hazard for both healthy adults and individuals suffering from respiratory problems. Urban ozone pollution has been linked to increased hospital admissions for respiratory problems such as asthma, even at levels below the federal standards for ozone.

Diesel exhaust has been classified a potential human carcinogen by the U.S. Environmental Protection Agency (EPA) and the International Agency for Research on Cancer. Exposure to high levels of diesel exhaust has been shown to cause lung tumors in rats, and studies of humans routinely exposed to diesel fumes indicate a greater risk of lung cancer. For example, occupational health studies of railroad, dock, trucking, and bus garage workers exposed to high levels of diesel exhaust over many years consistently demonstrate a 20 to 50 percent increase in the risk of lung cancer or mortality.

RESPONSE 22-47 While the Union of Concerned Scientists did conclude the above, they also concluded in the same article excerpted that the federal government and state governments have taken steps to reduce diesel emissions, including the following:

- The EPA has adopted more stringent fuel standards to reduce the allowable sulfur content in diesel fuel, allowing for the use of advanced emission control technologies which can reduce emissions by more than 85 percent.
- The EPA has adopted stricter emission standards for heavy-duty trucks and off-road construction equipment. Advanced emission control devices have been developed to retrofit existing diesel engines to meet the stricter emissions standards adopted by the EPA.

As noted in the excerpted article, diesel technology has advanced rapidly in recent years in response to these regulatory measures. As a result, as more diesel vehicles equipped with advanced emission control enter the marketplace, the potential health impacts detailed in the article would be expected to decrease over time.

The article did not conclude that temporary, transient exposure to diesel engine exhaust from vehicular traffic along a public roadway is associated with an increased risk for lung cancer or other health effects.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: February 14, 2017

ENVIRONMENTAL

24-1

The advisory opinion issued by the Department of Environmental Management (“DEM”) stated that DEM among other things, (1) needed more site specific information regarding biodiversity and conservation value (page 12), and (2) needed a biodiversity survey and analysis of environmental impacts, including wildlife and plant community impacts (page 22).

(a) Please state whether the applicant is in the process of preparing and compiling the referenced site specific information, biodiversity survey/study/analyses of environmental impacts, including wildlife and plant community impacts, or any other similar studies, surveys, analyses, or information.

(b) If so, please explain the status of obtaining these surveys/studies/analyses, (2) state what conclusions, if any, have been reached to date, (3) please provide a copy of any such surveys/studies/analyses, or related information, (4) please identify the organization(s) pursuing this for you, and (5) please state the expected completion date of each phase of the work that is being done.

(c) If you are not currently pursuing these surveys/studies/analyses, please explain why not.

RESPONSE
24-1

(a) As detailed in Section 6.2.2.1 of Invenergy Thermal Development LLC’s (“Invenergy”) Energy Facility Siting Board (“EFSB”) Application, a field evaluation was conducted of each of the streams where they cross the Clear River Energy Center (“CREC”) site in July of 2015. This evaluation included assessments of riparian habitat, macroinvertebrate community, fish community, and other observed wildlife species. Table 6.2-1 of the EFSB Application listed the abundance of each taxa encountered during this survey.

As detailed in Section 6.5.1 of the EFSB Application, the vegetation at the CREC site was characterized in the fall of 2014 and the spring of 2015. Table 6.5-1 of the EFSB Application listed the primary vegetation species found at the site during those surveys.

The predominant ecological communities present at the CREC site were characterized according to the classification system presented in the Rhode Island Ecological Communities Classification (Enser et al. 2011) and were presented in Section 6.6.1 of the EFSB Application.

Table 6.6-1 of the EFSB Application listed the specific wildlife species which have been observed at the CREC site by ESS ecologists and the seasons during which they were observed. Table 6.6-2 of the EFSB

Application listed wildlife species which have not been observed at the CREC site but are expected to occur there based on the habitats present at the site. The list was generated based on habitat preferences of wildlife species given in *New England Wildlife: Habitat, Natural History, and Distribution* (DeGraaf and Rudis, 1986).

Northern long-eared bats (“NLEB”), a federally threatened species, are known or believed to be present in Providence County, according to the US Fish & Wildlife Service (“USFWS”). However there are no known maternity or hibernation occurrences in the county. As detailed in Section 6.6.2.1 of the EFSB Application, an acoustic survey was conducted in the summer of 2015 to determine the presence/absence of any NLEB in accordance with the 2015 USFWS Range-Wide Summer Survey Guidelines. The results of the survey were then vetted by a USFWS qualified bat surveyor. No NLEB were identified at the CREC site during the survey, which was consistent with the results of a previous NLEB survey conducted by Spectra at the CREC site.

As detailed in Section 6.6.2.2 of the EFSB Application, multiple pairs of black-throated blue warblers, a RIDEM listed threatened species in the state, were observed at the CREC site during the 2015 breeding season. Table 6.6-3 of the EFSB Application listed species of Neotropical migratory birds that are considered forest interior breeders and which breed in Rhode Island, which could be present at the CREC site.

Regarding the RIDEM wetlands alteration application, RIDEM does not require that site-specific biodiversity surveys be conducted as a condition for a wetlands alteration application and the wetlands regulations. RIDEM does require applicants to quantify their projected project impacts to wildlife and plant communities. This is typically done in practice by conducting site-specific ecological surveys for any rare or endangered species whose presence is known or suspected by a state or federal agency within the project impact area, and by identifying other species of animals and plants which would be expected to be present on the project site based on searches of public databases. Site-specific surveys of animal and plant species which are not rare or endangered are typically not required by RIDEM for the issuance of a wetlands alteration permit.

Although the wetlands alteration application for CREC has not been filed with RIDEM to date, extensive information about the presence of specific species of animals and plants at the CREC project site has been provided by Invenergy in the EFSB Application and the EFSB Wetlands Addendum.

The EFSB Application and the EFSB Wetlands Addendum provided extensive assessment of the potential direct and indirect impacts of the project on wildlife and wildlife habitat areas, primarily as a result of the tree clearing required. Invenergy also included extensive descriptions of

the mitigation measures which will be employed both during project construction and project operation to minimize project impacts to animal and plant species, including pre-construction surveys to identify areas for potential avoidance or relocation, seasonal tree-clearing restrictions, and providing compensatory mitigation for project resource area impacts.

The information summarized above will be included in the formal wetlands alteration application to be submitted for the project to RIDEM. With this submittal, Invenergy intends to submit to RIDEM information at a level of detail which is consistent with other previous applications which have been submitted to RIDEM for their assessment of the site-specific biodiversity and conservation value and their analyses of project environmental impacts to wildlife and plant communities.

Invenergy intends to meet again with RIDEM in the early spring of 2017 to discuss the additional information suggested by RIDEM in the advisory opinion. Following this meeting, and if deemed necessary to further support the application materials, Invenergy will initiate additional site-specific ecological surveys. Such surveys generally must be conducted in the spring and/or summer seasons; therefore, at this time no additional surveys could have been conducted following RIDEM's September 2016 advisory opinion.

(b) Invenergy intends to initiate any additional site-specific ecological studies if deemed necessary in the early-spring of 2017. As detailed above, Invenergy has previously provided extensive information regarding the project's impacts to ecological resources. Any conclusions resulting from any additional studies conducted at the request of RIDEM will be submitted to RIDEM and the Board upon their completion. Following the completion of any required studies, the results will be submitted to RIDEM as a supplement to the project's Application to Alter submission. Any required studies will be completed under the direction of ESS Group, Inc. It is anticipated that any additional required studies will be completed by the summer of 2017.

(c) The need for any additional site-specific ecological surveys will be determined through direct consultation with RIDEM.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: March 10, 2017

ENVIRONMENTAL

Request 27-1 a What is the blast radius of 3,000 scf of hydrogen gas?

RESPONSE 27-1 a In Invenergy Thermal Development LLC's ("Invenergy's") Responses to the Town of Burrillville ("Town's") 17th Set of Data Requests, Invenergy attached a study, dated October 27, 2016, which was conducted to evaluate the probability of an explosion happening at the Clear River Energy Center ("CREC" or "Project" or "Facility") either due to a natural gas or hydrogen source, and the extent of the potential impact area where a 1 psig overpressure would occur. This study highlights the methodology, assumptions and the potential impact radius. The study assumed approximately 22,000 SCF of hydrogen for the blast radius calculations, which is well above the 3,000 SCF of hydrogen requested in this particular question. The potentially impacted area from a 3,000 SCF hydrogen explosion would be much smaller than that presented in this study. *See Exhibit 27-1.*

RESPONDENT: Harri Kytomaa, Exponent, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-1 b What is the blast radius of 15,000 scf of hydrogen gas?

RESPONSE 27-1 b See response to Request 27-1a. All smaller quantities of hydrogen than those addressed in the subject study would have blast radii smaller than that identified in the study conducted to address the Town's Data Requests, Set 17.

RESPONDENT: Harri Kytomaa, Exponent, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-1 c **What is the blast radius if hydrogen gas and natural gas from the proposed plant exploded?**

RESPONSE 27-1 c Exponent has prepared a supplement to its initial analysis that was issued October 27, 2016 and attached to the Town's 17th Set of Data Requests. See supplemental analysis, attached as **Exhibit 27-1**.

In **Exhibit 27-1**, Exponent evaluated the probability of the simultaneous release of hydrogen and natural gas at CREC and that release leading to an event of an explosion. They determined the likelihood of the occurrence of an explosion involving an accidental and simultaneous release of hydrogen and natural gas is anticipated to be on the order of 10^{-9} to 10^{-10} /yr, or once every 1 billion to 10 billion years.

RESPONDENT: Harri Kytomaa, Exponent, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-1 d What is the blast radius if hydrogen gas and natural gas from the proposed project and Algonquin /Spectra compressor station exploded?

RESPONSE 27-1 d Invenergy contacted Spectra with regard to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC. Spectra provided the letter attached as part of the response to the Town's Data Request No. 17-1. The letter highlighted the diligence associated with safe operation and maintenance of natural gas compressor facilities, and outlines the federal standards Spectra uses for the design and maintenance of their facilities. In its letter, Spectra advises that their Integrity Management Program has determined the Potential Impact Radius ("PIR") of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The blast radius associated with the combined release of hydrogen gas and natural gas from both the CREC facility and the Algonquin /Spectra compressor station was not evaluated. This scenario could not be studied since there is insufficient information regarding the gas inventory present at the Algonquin/Spectra compressor station. However, it should be noted that this hypothetical simultaneous release scenario resulting in a vapor cloud explosion has a probability of occurrence that is orders of magnitude lower than of once every 10 billion years. In addition, since the equipment at the two facilities are more than 750 feet apart, the flammable releases of hydrogen and natural gas generated at each facility would need to be transported by the atmospheric wind and mix together within a congested area while they are still in the flammable range. This would further lower the likelihood of a catastrophic gas explosion involving accidental and simultaneous releases at both facilities.

RESPONDENT: Harri Kytomaa, Exponent, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-2 **What is the evacuation zone for the project? Please explain.**

RESPONSE 27-2 There is no evacuation zone for the Project nor is one required. There are no anticipated Project conditions which would require an evacuation.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-14 How quickly (minutes) will the CREC facility be able to shut down in case of fire? Please explain.

RESPONSE 27-14 Depending on the location and severity of the situation, the plant may be shut down manually by operations staff or automatically by the fire protection systems. A normal shutdown sequence, initiated by the operations staff, would shut down the unit in 12 minutes from initiation. If the fire is in a location that is critical to the integrity of the main equipment, the protection system can take the unit off-line immediately. This action is called an emergency trip. Operations staff also have the option to instantly remove the unit from service through a manual trip button. Either of these trip events will shut the unit down in a few seconds.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-15 **Will the emergency shutdown procedure time-frame be different when firing 2 turbines on natural gas vs 1 turbine firing natural gas and 1 turbine firing ULSD? Please explain.**

RESPONSE 27-15 No. The shutdown procedure applies to each unit and is independent of the other unit whether it operates on natural gas or ULSD.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-16 **Spectra has provided an “evacuation zone” and an “incineration zone” for all of its compressor stations (already built and in process of acquiring permits from FERC). Please provide a map showing both the CREC and Algonquin/Spectra compressor station “evacuation zone” and “incineration zone”.**

RESPONSE 27-16 Spectra has no “evacuation zone” or “incineration zone” for of its compressor station. Likewise, CREC does not have an “evacuation zone” or “incineration zone.” Invenergy contacted Spectra with regard to this question, and Spectra provided the letter attached as part of the response to the Town’s Data Request No. 17-1 that highlighted the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In their response, Spectra indicates that their Integrity Management Program has determined the PIR of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

RESPONDENT: Mike Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

- Request 27-21**
- (a) What would be the blast radius of the total volume of hydrogen stored in a hydrogen tube trailer?**
 - (b) What would be the blast radius of a pipeline explosion?**
 - (c) What would be the blast radius of a natural gas explosion from the compressor station?**
 - (d) What would be the blast radius of (a) & (b) together?**
 - (e) What would be the blast radius of (a) & (c) together?**
 - (f) What would be the blast radius of (a), (b) & (c) together?**

RESPONSE 27-21 Exponent has conducted a study for CREC to define the zone that could be affected by the highly unlikely event of an explosion occurring simultaneously due to hydrogen and natural gas releases. Please see **Exhibit 27-1** for the study conducted by Exponent.

Invenergy is not responsible for the design of the gas compressor station and does not have the design parameters of the compressor station. These have not been factored for calculating of the zone impacted. However, in the response to the Town's Data Request No. 17-1, a letter from Spectra Energy has been provided that defines their position on Potential Impact Radius and their position on mischaracterization of blast radius.

- (a) See **Exhibit 27-1**; it is 943 feet from the trailer concrete pad parking location.
- (b) See **Exhibit 27-1**; it is 884 feet from the power block building. In **Exhibit 27-1**, Exponent evaluated the probability of the simultaneous release of hydrogen and natural gas at CREC and that release leading to an event of an explosion. Exponent determined the likelihood of the occurrence of an explosion involving an accidental and simultaneous release of hydrogen and natural gas is anticipated to be on the order of 10^{-9} to 10^{-10} /yr, or once every 1 billion to 10 billion years.
- (c) Invenergy does not have the information pertaining to the design of the compressor station to conduct this study. Spectra has advised their PIR is limited to within their fence line.
- (d) See **Exhibit 27-1**; it is up to 1,420 feet. As discussed in Exponent's October 27, 2016 report, and in **Exhibit 27-1**, the probability of having an accidental release from gas piping or

process equipment that could lead to a catastrophic explosion is on the order of 10^{-4} /yr, or once every 10,000 years. Furthermore, the probability of an explosion is most often found to be 1-2 orders of magnitude lower than the probability of the accidental release occurring. Thus, the likelihood of CREC facility suffering a catastrophic gas explosion involving an accidental and simultaneous release of hydrogen and natural gas is anticipated to be on the order of 10^{-9} to 10^{-10} /yr, or once every 1 billion to 10 billion years.

- (e) Invenenergy does not have the information pertaining to the design of this compressor station to conduct this study.
- (f) The blast radius associated with the combined release of hydrogen gas and natural gas from the CREC facility and the Algonquin/Spectra compressor station was not evaluated. This scenario could not be studied since there is insufficient information regarding the gas inventory present at the Algonquin/Spectra compressor station. However, it should be noted that this hypothetical simultaneous release scenario resulting in a vapor cloud explosion has a probability of occurrence that is orders of magnitude lower than of once every 10 billion years. In addition, since the equipment at the two facilities are more than 750 feet apart, the flammable releases generated at each facility would need to be transported by the atmospheric wind and mix together within a congested area while they are still in the flammable range. This would further lower the likelihood of a catastrophic gas explosion involving accidental and simultaneous releases at both facilities

RESPONDENT: Harri Kytomaa, Exponent, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-26 **Please revise the “Annual Emissions Summaries” Table (Exhibit 4 from Data Request Response #22) to include a “Filling of All Liquid Tanks Prior to Operations”. Also, please provide calculations of the data.**

RESPONSE 27-26 No revision is necessary or required. The Annual Emissions Summaries Table included as Exhibit 4 to Invenergy’s Responses to the Town’s Data Request No. 22-45 provided a conservative estimate of the expected emissions from all project truck traffic during construction. **Exhibit 27-24** provides the data calculations for the trucks associated with filling all liquid tanks prior to operations.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-32 **During a Facility Emergency Shutdown, will there be any “blow-off” of natural gas? Please explain and please include the estimated scf of natural gas released during the “blow-off”.**

RESPONSE 27-32 During emergency shutdown, the natural gas supply to the combustion turbines will be isolated to stop flow to the equipment. For the combustion turbines, there will be a small release of natural gas from the pipe cavity between the main control valve for this system and the main shut-off to the combustors that will purge during an emergency shutdown. The purge vent will be piped to a safe distance outside and above all structures/platforms. The gas volume that is vented is ~ 6 cu ft. It is not expected that the design of the balance of the natural gas system will require “blow-off” of natural gas as a result of an emergency shutdown.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-34 **Do the emissions (tons/year) listed in the Appendix 4 (Data Request Response #22) “Annual Emissions Summaries” include the trucks arriving at the Facility and the trucks leaving the facility?**

RESPONSE 27-34 The emissions listed in the Annual Emissions Summaries are based on round trips to and from the facility for each truck, so they do include the trucks arriving and the trucks leaving the Facility.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-43 What are the Particulate Matter negative health impacts of diesel tankers'/trucks' emissions on human beings or wildlife?

RESPONSE 27-43 Diesel engines emit a mixture of pollutants, including particulate matter. The negative health impacts associated with particulate matter emissions can include cardiovascular and respiratory ailments, which can impact humans and wildlife when subjected to prolonged high levels of exposure to diesel exhaust, such as in a densely populated urban area or when in proximity to a major highway with near continuous diesel truck traffic. These potential health impacts would not be expected to be significant in the area surrounding a rural roadway with only intermittent diesel truck traffic.

The EPA has adopted more stringent diesel fuel standards and stricter emission standards for heavy-duty trucks in recent years. Diesel fuel quality and diesel engine technology have advanced rapidly in response to these regulatory measures. As more diesel vehicles equipped with cleaner fuels and advanced emission controls designed to meet these stricter emission standards enter the marketplace, the potential health impacts from diesel truck emissions are expected to decrease over time.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 27-44 **Will Invenergy/CREC guarantee that no trees will be cut down during all bird breeding (including egg hatching and feeding infant birds) and migratory seasons? If not, why not?**

RESPONSE 27-44 As detailed in the CREC Application to Alter Freshwater Wetlands, tree clearing will be avoided during the June-July timeframe to avoid potential impacts during maternity nesting season. Additional tree clearing seasonal restrictions may be considered for the project as the potential benefits of additional seasonal restrictions are identified through consultations with RIDEM and/or the USACE.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

ENVIRONMENTAL

Request 34-2 **We understand that RIDEM tendered a letter on June 13, 2017 regarding site-specific flora and fauna survey protocols. Please provide a copy.**

Response 34-2 Please see **Exhibit 34-2**, which includes RIDEM letter dated June 13, 2017 regarding survey protocols.

RESPONDENT: Jason Ringler, ESS Group, Inc.

DATE: September 12, 2017

HYDROGEN

- 9-1 Please see the article attached hereto, especially the highlighted sections, and provide more information regarding the proposed hydrogen tube trailer/generation, and all related safety issues, including responses to the claims set forth in the attached article and whether Invenergy has considered any alternatives in addition to utilizing truck trailer mounted hydrogen tube racks or a hydrogen generator.**

RESPONSE: 9-1 Hydrogen cooling of electric generators is a well-established technology that has been in use in the power industry for decades. The electric generators to be installed at the Clear River Energy Center (“CREC”) will utilize hydrogen gas for cooling the generator rotor and windings. The hydrogen gas is circulated through an internal heat exchanger in the generator where the heat in the hydrogen is transferred to a cooling water system. A small amount of hydrogen will leak through the shaft seals of the generator over time, requiring that additional hydrogen gas be fed to the generator. The hydrogen gas will be supplied from a bank of compressed gas cylinders or, alternately, larger tube cylinders mounted on a truck trailer.

It is important to note that the CREC is a new power generation facility and will be constructed in accordance with all current codes and National Fire Protection Agency (“NFPA”) recommendations regarding the storage and handling of hydrogen gases and the avoidance of hazardous conditions in the equipment, systems, and applicable areas of the plant. The referenced article (published in 2008) accurately discusses the hazards associated with the use hydrogen for generator cooling and also describes appropriate safety measures and standards to address these hazards. These safety measures and standards are incorporated into the design of new power generation facilities.

Of the alternates for supply of hydrogen (i.e. use of hydrogen generators or compressed storage of hydrogen gas delivered to the site), the CREC will not utilize hydrogen generators. Given the volume of hydrogen to be used and the frequency of delivery, the use of compressed gas cylinders or tube trailers is more economical. Hydrogen generators require additional operation and maintenance requirements and also increase the possibility of hazards by introducing another process step within the hydrogen system.

Fire and explosion hazards are controlled by appropriate design and operating procedures. These include prevention of the formation of combustible fuel-oxidant mixtures and removing potential sources of ignition (electric spark, static electricity, open flames, etc.) in areas where the hydrogen will be used. Designing enclosures and buildings contain

hydrogen with adequate ventilation will reduce the possible formation of flammable mixtures in the event of a hydrogen leak.

To prevent the formation of flammable mixtures, the generator will be purged of hydrogen before opening the system to atmosphere, and purged of air, oxygen, or other oxidizers prior to admitting hydrogen into the system. The hydrogen control system will automatically purge the generator using carbon dioxide gas (a non-oxidant inert gas) to remove the hydrogen. When the generator is in operation, the hydrogen storage and supply system is designed to automatically maintain the correct hydrogen pressure and purity of hydrogen. The hydrogen purity will be controlled to a level where an explosive mixture is not present, (i.e. 99.99 percent pure) which is greater than the explosive mixture range of hydrogen and oxygen, thus providing a measure of safety.

Pressure relief devices (“PRDs”) are employed in the compressed gas storage system to reduce the likelihood of cylinder and tube failures during the unlikely event of a fire. These devices often include frangible disks, fusible metal plugs or pressure relief valves to relieve the pressure in a controlled manner through a vent system to avoid a rupture of the container and release of the hydrogen.

As recommended by codes, the hydrogen cylinders will be located away from high traffic areas and normally occupied spaces. A dedicated concrete pad will be constructed next to the cylinders for a tube trailer (hydrogen delivery truck) as a back-up source of hydrogen. Protective bollards will be installed around the cylinders and the tube trailer pad for protection from vehicular traffic. Hazard signage will be placed around the hydrogen storage containers to emphasize safe practices in these areas.

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

9-2 In particular, please provide all safety plans and designs concerning possible problems that could arise with the hydrogen. For example, the attached article claims:

- a. A typical tube trailer has the equivalent of 5,585 pounds of TNT;**
- b. Hydrogen is especially dangerous because the explosive range of hydrogen in the air is from 4% to 74%;**
- c. Hydrogen has a wide flammability range;**
- d. Ignition of the hydrogen takes little energy;**
- e. All hydrogen cooled generators leak;**
- f. There is no shortage of ways to cause a hydrogen fire; and**
- g. It is estimated that perhaps five hydrogen fires a year occur at power plants with hydrogen cooled generators.**

RESPONSE: 9-2 The following is a list of design features and safety measures that will be incorporated into the design of the CREC systems to mitigate the hazard potential of hydrogen:

- a. In accordance with NFPA requirements, the systems will be designed and installed to prevent sources of ignition such as sparks from electrical equipment, static electricity, open flames, or extremely hot objects. This will include use of properly rated equipment in the hydrogen storage and handling systems to limit potential ignition sources.
- b. The hydrogen purity will be controlled to a level where an explosive mixture is not present, (i.e.99.99 percent pure) which is greater than the explosive mixture range of hydrogen and oxygen, thus providing a measure of safety. To prevent mixing of hydrogen with oxygen in air that would create explosive mixtures, a control system is provided that purges the generator with an inert gas such as carbon dioxide before filling the generator with hydrogen. Similarly, when hydrogen is removed from the generator, it is once again purged with carbon dioxide. This control system allows safe and efficient filling and purging of hydrogen to avoid an explosive mixture in the generator.
- c. The generator is equipped with end shields that are designed to withstand a hydrogen explosion in the unlikely event of such a mishap and direct the blast away from possible occupied spaces around the perimeter of the generator.

- d. Enclosed spaces such as the generator neutral terminal enclosure will be furnished with hydrogen sensors to monitor the enclosure for hydrogen leaks.
- e. To remove hydrogen that is absorbed or entrained in the generator seal oil, a hydrogen detaining tank is provided in the seal oil system to remove hydrogen. The seal oil system control is automated.
- f. The generator hydrogen seal oil system is equipped with emergency pumps that are powered by the plant emergency power system to maintain the hydrogen seal in the generator in the event of a loss of the normal power supply.
- g. The hydrogen system is furnished with a dedicated control panel that monitors hydrogen purity to ensure maximum efficiency and safety. To maintain hydrogen purity in the generator casing, a small quantity of hydrogen is continuously scavenged from the seal oil drain and discharged to atmosphere. The function of the hydrogen control panel is to control the rate of scavenging, analyze the purity of the hydrogen gas and to monitor the gas composition during a generator purge cycle. The electrical feed to the hydrogen control system is backed up by the plant uninterruptible power supply so that operation is maintained in the event of a power loss.
- h. Hydrogen is supplied to the generator casing through a hydrogen gas manifold. The hydrogen gas manifold includes a gas control valve assembly and instrumentation that ensure safe operation and control of the hydrogen supply to the generator. The system monitors generator hydrogen gas pressure for alarm, trip, and safety functions, as well as the hydrogen supply pressure.
- i. The following design features will be incorporated to prevent accumulation of hydrogen in buildings and enclosures:
 - For indoor installations, building design will prevent the accumulation of hydrogen either by natural or forced ventilation of high points. Building ventilation flow will be sufficient to ensure there is no hydrogen gas build-up within the structure at all times of the year and in all weather conditions. Where needed, a forced ventilation system using redundant fans will be used that will prevent the accumulation of hydrogen.

- When hydrogen is purged from the generator, it will be piped and vented to an elevated point outside of the generator building. The low density gas will rise and disperse quickly from the vents.
- A hydrogen sensor will be installed in all battery rooms with an externally mounted alarm and control panel outside of each room (Sensidyne SensAlarm Plus or equal). High hydrogen levels or loss of ventilation will be alarmed on the local panel.

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

9-3 Please explain whether and how you intend to use monitors to make this safer, and which monitors you propose to use.

RESPONSE: 9-3 See Items d) and i) in the response to Question 9-2 for areas of the plant that will use hydrogen monitors.

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

9-4 Please explain the safety measures that will be put in place for the hydrogen being transported by Town roads to the plant.

RESPONSE: 9-4 The hydrogen delivery trucks are expected to follow the Department of Transportation (DOT) guidelines for safe transportation of hydrogen to the CREC facility. Compliance with applicable Dangerous Goods regulations is required for all shipments by motor freight. These regulations describe the marking, labeling, placarding, and the shipping documentation required for these types of shipment.

The hydrogen tubes in the trailer mounted tube racks are designed and manufactured according to DOT-3A or DOT-3AA specifications. The tubes are hydrostatically tested when manufactured and tested periodically thereafter at 5/3 times the service pressure as required by DOT regulations. These safety measures are to ensure safe transportation of hydrogen on roadways

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

9-5 Please confirm whether in this power plant it would be necessary to replace a tube trailer every one or two weeks, and if not, how often the replacements will be required.

RESPONSE 9-5: The frequency of tube truck deliveries will vary throughout the year. The frequency of deliveries when both units are operating is expected to range from four to nine weeks, assuming a 6-tube truck trailer configuration is providing the delivery.

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: June 8, 2016

HYDROGEN

9-6 Please confirm that you are proposing to comply with the supply and siting requirements of the National Fire Protection Association, and provide specifics.

RESPONSE: 9-6 The hydrogen storage and supply system at CREC will be designed to meet requirements of NFPA 55 – Compressed Gases and Cryogenic Fluids Code.

The cylinders and/or tube trailers will be located outdoors and away from normally occupied areas. The location of the storage system will be based on guidelines set forth in NFPA 55 Table 10.4.2.2.1(a), Table 10.4.2.2.1(b), or Table 10.4.2.2.1(c). The exact location will be determined as the plant arrangement is finalized and system specific design parameters are defined including the total volume of gas stored, the pressure at which the gas is stored, and the supply line size.

Guidelines provided in NFPA Table G.2(a) will also be followed e.g. if the size of the hydrogen system is between 3,000 to 15,000 scf, the containers will be located as least 50-feet from occupied areas of the plant.

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

9-7 Please explain how you will have the installation site become a classified area limited in use pursuant to the National Fire Protection Association.

RESPONSE: 9-7 As part of the design of the CREC, a hazards review will be conducted to identify specific hazards in the various areas of the plant which will establish the classification of each area. The classification of an area will establish the criteria to be used in the design of the equipment in each area. The hydrogen storage and supply system at CREC will be designed to meet requirements of NFPA 55 – Compressed Gases and Cryogenic Fluids Code.

Hazard identification signs will be placed at all entrances to locations where the hydrogen cylinders and/or tube trailers are stored and handled. In addition, the area will have signs as follows:

WARNING: HYDROGEN — FLAMMABLE GAS
NO SMOKING — NO OPEN FLAMES

RESPONDENT: Daniel W. Mitas, PE, HDR, Inc.

DATE: May 26, 2016

HYDROGEN

15-1 Are you aware of whether any databases exist for accidents that have occurred at power plant sites, including, but not limited to, accidents that involve chemical spills, hydrogen accidents, fuel oil accidents, and/or ammonia accidents? If so, please provide information regarding any such databases, including, but not limited to, electronic links, if any exist.

RESPONSE 15-1 The United State Environmental Protection Agency (USEPA) maintains a database called "Enforcement and Compliance History Online" (ECHO). The purpose of this database is used for maintaining toxic releases for all facilities in the United States. The URL for the USEPA ECHO database is located here: <https://echo.epa.gov/>.

The Right-to-Know (RTK) Network is a database that provides free access to numerous databases and resources on the environment, including spills and accidents. The URL for the RTK network is located here: <http://www.rtknet.org>.

The only other data bases that we are aware of are:

- The Chemical Safety Board (CSB) has major incidents/spills that typically result in large scale impacts to the environment – website: <http://www.csb.gov/>.
- Accidents that **do not result in employee injury** are not reported to OSHA nor recorded on OSHA forms/recordkeeping (only internal)

Unless requested the **employee injury** reports are internal only – shared with OSHA upon request.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 19, 2016

HYDROGEN

15-4 What onsite resources at the facility will be provided to address onsite accidents, including chemical spills and other possible accidents? Please provide all details.

RESPONSE 15-4: Please refer to Section 13.2.4 (Countermeasures) of Exhibit 1, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the onsite resources which will be provided to address onsite accidents at the Facility.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

HYDROGEN

15-5 What do you expect the Town of Burrillville should do regarding service levels needed to address possible accidents at the facility, including chemical spills?

RESPONSE 15-5: Invenergy will coordinate with the Town of Burrillville with regard to the location and amount of storage of hazardous materials on-site and the associated training, personal protective equipment and emergency procedures which may be required in the event of a release.

Please refer to Section 7.0 (Notifications), Section 13.2.4 (Countermeasures), and Appendix A of **Exhibit 1**, the Preliminary Draft Spill Prevention Control and Countermeasure Plan for details on the emergency response procedures which will be implemented at the Facility and the service levels needed to address possible accidents.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Mike Feinblatt, ESS Group, Inc.

DATE: August 19, 2016

HYDROGEN

17-1 Is there any possibility, no matter how small, that there could be an explosion at the Spectra/Algonquin compressor station which could cause an explosion at the Invenergy plant? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE 17-1 Invenergy Thermal Development LLC (“Invenergy”) does not believe there is a possibility that an explosion at Spectra’s Burrillville Compressor Station (“BCS”) could cause an explosion at Clear River Energy Center (“CREC”). As discussed in our response to questions 17-2, 3# and 17-4 Invenergy engaged Exponent as an expert consultant who has ample experience in evaluating the types of events that are being postulated in the question. Exponent estimated the area that could be impacted by an event at either location is really a function of the size of the enclosed area (e.g. building) where gas could accumulate and given that the powerhouse building at CREC is larger and has more volume than the building at Spectra’s site, an event at CREC would be governing. Please refer to the response to question 17-2 for the results of this event.

As it relates to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC, Invenergy contacted Spectra with regard to this question, and Spectra provided the attached letter that highlights the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In the attached response Spectra indicates that their Integrity Management Program has determined the Potential Impact Radius (“PIR”) of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the CREC in the remotely possible event of a fire or explosion.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

HYDROGEN

17-2 Is it at all possible that a problem at the Invenergy plant could cause an explosion at the Spectra/Algonquin compressor station? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE:

We do not believe it is possible that a problem at the Clear River Energy Center (CREC) could cause an explosion at the Spectra/Algonquin compressor station. The codes and standards incorporated into the design and construction of the CREC and the physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the Spectra/Algonquin compressor station in the remotely possible event of a fire or explosion at CREC.

The design of the CREC incorporates the requirements of dozens of industry standards including but not limited to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, National Fire Protection Association (NFPA), National Electric Code (NEC), American Petroleum Institute (API). Adherence to these standards minimize the likelihood that there would ever be a fire or explosion at the CREC.

In order to determine potential scenarios that should be examined, Invenergy examined the systems and associated design features at CREC. These systems and features are typical to gas fired power plants, and as such, the Project design will also include design features to mitigate consequential damage to other portions of the CREC facility and keep any impact area within the confines of the CREC property. The key systems that could have a potential to cause a fire or explosion are listed below and their associated specific design features include:

1. Natural gas: The natural gas piping systems and components are separated from the other sections of the Project (to the extent possible) and all areas where natural gas systems and components are located are designated with an area classification that requires special design features that include explosion proof electrical components, gas detectors that are linked to automatic isolation systems and fire detection and suppression systems. Should a leak occur, the gas detection sensors are set to detect the gas before a concentration level is reached that would be capable of creating an explosion that could impact a larger area of the plant. For these reasons, the amount of any gas that could leak is limited such that it would not spread to an ignition source.

The CREC fuel gas system will be equipped with automatic detection and emergency shutdown systems, including the following:

- The natural gas will be odorized for detection.
- A network of low concentration natural gas detectors will be installed to monitor

for fuel gas leaks in the gas yard and within all areas where fuel gas equipment is located, both indoors and outdoors. The detectors will be set to alarm in the facility main control system (“DCS”). The custom-designed fire alarm and detection system will be in accordance with NFPA 72.

- In accordance with NFPA 850 the plant will include emergency shutdown systems to isolate the gas piping, stop equipment and safely vent station gas. The natural gas supply pipeline will include an emergency shutoff valve (ESV) at the outlet of the metering yard and the ESV will automatically close in the event that a fire is detected.
- Individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component.
- Main line isolation valves will be fire safe, as defined by API 607.
- Nitrogen hose connections and vent lines will be provided between all isolatable sections of the fuel gas piping to allow nitrogen purges and inerting for maintenance activities.
- The fuel gas piping will be cleaned and purged in accordance with NFPA 56.
- Pressure control devices to maintain the operating pressure at or below the maximum allowable operating pressure. In addition, overpressure protection devices with sufficient capacity and sensitivity will be installed to ensure that the maximum allowable operating pressure of the station piping and equipment will not be exceeded by more than 10 percent (10%) in the case of a malfunction of the pressure control equipment.
- All electrical equipment will be explosion proof.
- System design to accommodate changes in gas quality, periodic maintenance (e.g., filter change-out), redundancy, separation of ignition sources (e.g., National Electric Code compliance), combustion controls and hardened to resist impacts.
- Prevent damage to pipe by as-built mapping, below-grade flagging (above grade) and clear labeling of gas-bearing components.
- Flame detection that uses ultraviolet sensors.

Safe operating practices will include the following at a minimum:

- Periodic walk-through surveys of pipeline systems with hand-held gas detectors at all flanges, valves and other fittings; this is particularly important in the Gas Yard at filter, dewpoint heater equipment, pressure control valves and metering runs where many fittings and gas state changes occur that may contribute to leakage events.
- Strong operating and maintenance procedures, including use of inert gas purging, maintenance of coating and cathodic protection systems, dewpoint heating, filtration and verification of valve and instrument functionality.

The gas system design features include, controls utilizing gas detection, fire detection and suppression and when combined with regular inspections and proper maintenance of gas system equipment, limits this type of event to be confined within a smaller area thereby virtually eliminating the potential for undetected gas leaks that could lead to a fire or explosion.

2. Hydrogen: Modern utility generators larger than about 300 MW are hydrogen or hydrogen and water cooled. Hydrogen has safely been used as the coolant medium in utility generators for over 70 years. General Electric (“GE”) estimates that there are more than 2,400 hydrogen cooled GE designed generators in service today. The generator and associated hydrogen cooling system include a number of features to ensure the safe operation of the equipment:

The generator applied to CREC is hydrogen cooled, and as with the potential for a natural gas leak, there will be hydrogen leak detection sensors located on the generator which stringently monitor for potential leaks. These detectors will be set to monitor, alarm and take protective actions when hydrogen is detected at a level that is below the lower explosive limit.

The generator is equipped with end shields on each end, designed to support the rotor/bearings, to prevent gas from escaping, and to be able to withstand a hydrogen explosion in the unlikely event of such a mishap. In order to provide the required strength and stiffness, the end shields are constructed from steel plate and are reinforced. Horizontally split inner and outer oil deflectors are bolted into the end shield and provide sealing of the oil along the shaft.

Furthermore, the hydrogen systems and components will be located in areas that are designated with an area classification that requires special design features including explosion-proof electrical components, gas detectors that are linked to automatic isolation of systems and integrated with the fire detection and suppression systems.

The generator will have an internal volume of hydrogen that will be maintained in a sealed condition using multiple redundant seals. The seals will include mechanical seals and a seal oil system that uses pressurized oil barrier between the mechanical seals and the rotating shaft. The seal oil maintains an air-side seal and a hydrogen-side seal by forcing oil in both directions. The oil is monitored to detect any hydrogen that may get entrained into the oil and provide a means to scrub the hydrogen from the oil.

Hydrogen, like all flammable gases, is only reactive when it is present in concentration levels between the lower explosion limit and the upper explosive limit. That is, when there is sufficient oxygen present to sustain combustion. The generator will be equipped with a purity monitoring system that measures the quality of hydrogen in the generator. If the purity level begins to decrease toward the upper explosive limit, this system adds hydrogen to maintain purity.

The generator will also be equipped with an inert gas (one that does not react with hydrogen) purge system to purge the generator of hydrogen should generator maintenance be necessary. This system will also be used to purge and dilute the hydrogen to below the lower explosive limit if there is a leak. These systems are used throughout the power industry and have successfully controlled and prevented hydrogen explosions. Daily inspections and proper maintenance of equipment help to reduce this hazard

3. Main Transformer: The potential for an explosion is remote, its causes include lightning strike or transformer fault. The design features fire detection and suppression systems, location within a three sided concrete wall structure to protect immediately adjacent equipment systems and buildings and such that the open side has adequate space separation for protection for adjacent transformers and other equipment. Given the small impact area and the three sided walled enclosure, this scenario was ruled out as having any potential to impact Spectra's Burrillville station.

While we believe that the impact of any conceivable event at CREC will not migrate to the Algonquin compressor station, in order to address the question on the likelihood of an explosion occurring, we contacted Exponent, Inc., who is an industry recognized expert in conducting the type of analysis that was requested and asked that they conduct an evaluation of the probability of either a natural gas explosion or a hydrogen explosion event and to determine the maximum impact radius of the worst case scenario, no matter how unlikely. Exponent performed the evaluation which is included as an attachment.

As can be seen in the attached study provided by Exponent, the likelihood of either the Algonquin Station or the CREC facility suffering a gas explosion event as described in the question is anticipated to be on the order of 10^{-5} to 10^{-6} /yr, or once every 100,000 to 1 million years.

We also requested Exponent to describe what conditions, along with any assumptions and associated reasoning, would be necessary, no matter how unlikely, in order for such an event to occur and to determine the size of the impact radius that could result from such an event. Their inputs, assumptions and analysis are included in the attached report which concludes that even with postulating physically impossible scenarios like having the maximum possible volume of gas be released instantaneously and fill the largest contained area (the power block building) with a "stoichiometric natural gas/air mixture in order to maximize the confined volume of fuel involved in the explosion," the resulting impact area does not impact the Spectra compressor station.

Also, as addressed in the response to question 17-4, Exponent determined the distance away from the source of a worst case hypothetical explosion, where the blast wave pressure threshold of 1 pound per square inch gauge could reach. This threshold is the lowest pressure criterion for damaging explosion effects described in the ALOHA technical documentation and the EPA Risk Management Program Offsite Consequence Analysis. At 1 psig of pressure, a blast wave could shatter glass windows, however much higher pressures are necessary to damage the buildings or equipment at the compressor station. The calculated distance to the 1 psig pressure threshold for the maximum postulated scenario (no matter how improbable) was found to be no more than 884 feet from the source on the CREC site which does not create any damage to equipment at the Spectra/Algonquin compressor station, please refer to the attached Exponent letter response for the details of this analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC – November 1, 2016

HYDROGEN

17-3 Please explain/calculate the probability of a certain blast events occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

17-3 Please explain/calculate the probability of a certain blast events [sic] occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

RESPONSE 17-3: Please refer to the response to question 17-2 and the attached Exponent Report that calculated the probability of a certain blast events occurring.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

HYDROGEN

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

RESPONSE 17-4: Please refer to the response to question 17-2 and the attached Exponent report for the response to this question.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

HYDROGEN

Request 27-3 **Why has Invenergy chosen to use compressed hydrogen gas for its emission reductions instead of Nitrogen gas?**

RESPONSE 27-3 CREC will be using hydrogen gas as a coolant for the generator and not as a medium to reduce emissions.

RESPONDENT: Michael Feinblatt, ESS Group, Inc.

DATE: July 18, 2017

HYDROGEN

Request 27-4

Hydrogen tube trailer(s):

- (a) How many scf (standard cubic feet) of hydrogen will be stored via the tube trailers at the facility?**
- (b) How many “hydrogen tubes” will be contained in one hydrogen tube trailer?**
- (c) How many hydrogen tube trailers will be stored at the facility at one given time?**
- (d) What is the maximum number of hydrogen tube trailers that could be stored at the facility at one time?**
- (e) How many smaller hydrogen cylinders will be stored at the facility at one given time, i.e. hydrogen cylinders not on the hydrogen tube trailer(s)?**

RESPONSE 27-4

- (a) A tube trailer contains approximately 50,000 SCF.
- (b) It can be 6 or 9 tubes, and it depends on the supplier but the total volume will remain about 50,000 SCF.
- (c) Two, one for each train.
- (d) Two. There is a concrete pad associated with each unit to accommodate a hydrogen trailer.
- (e) About 6 per unit.

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

HYDROGEN

Request 27-5 **Will any other pressurized gas be stored on site besides the hydrogen gas? If so, please list the type of gas, total scf stored on site, size of cylinders, and number of cylinders.**

RESPONSE 27-5 Other compressed gases and their approximate expected quantities that would be stored at the Facility include :

- 10 bottles of Oxygen/Acetylene (~2,500 SCF each) for construction support
- 25 bottles of Argon (~6,250 SCF) for welding during construction
- 6 bottles of CO₂/Nitrogen cylinders (~ 1,500 SCF each) for each unit that may be used for purging of systems during the operational phase of the facility
- Gas Chromatograph calibration gas that may be used during the operational phase
 - 1 bottle of Helium (~250 SCF) per unit
 - 1 bottle of Nitrogen (~250 SCF) per unit
 - 1 bottle of Hydrogen (~250 SCF) per unit
- CEMS calibration gas that may be used during the operation phase
 - NO (H) 0-250ppm – 1 bottle per unit
 - NO (L) 0-10ppm – 1 bottle per unit
 - CO(L) 0-20ppm – 1 bottle per unit
 - O₂ 0-25% - 1 bottle per unit
 - Nitrogen – 1 bottle per unit

RESPONDENT: Mark Wiitanen, HDR, Inc.

DATE: July 18, 2017

HYDROGEN

Request 27-6 **What are the companies from which Invenergy/CREC may purchase the following:**

- (a) ULSD?**
- (b) Ammonia?**
- (c) Hydrogen tube trailers?**
- (d) Demineralization trailers?**

RESPONSE 27-6 CREC does not yet have a contractual agreement with any of these suppliers, since such contracts are routinely not entered into until after a facility has received all necessary permits. However, CREC has engaged a few suppliers for preliminary discussion on feasibility, interest and cost. Below is a list of suppliers that have been contacted:

- (a) Sprague Operating Resources
- (b) Borden & Remington Co. and The Chemical Company
- (c) No supplier has been contacted at this point. However Airgas, Air Liquide and Praxair are common suppliers of this particular gas throughout North America and will be contacted at a later date.
- (d) GE Water and Process Technologies and Evoqua Water Technologies LLC

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 18, 2017

SMOKE STACKS

12-1 Would Invenergy be willing to float a sight balloon at the height and locations of the two smoke stacks? If not, please explain why not.

RESPONSE: 12-1 Invenergy Thermal Development LLC (“Invenergy”) would be willing to float a sight balloon at the height and locations of the two smoke stacks. However, the existing tree canopy in that area is too dense for a sight balloon to breach, without clearing trees.

A sight balloon may not be necessary to provide any additional information which is not already available. The Energy Facility Siting Board (“EFSB”) Application for the project included an extensive visual simulation indicating where the stacks would be seen from various surrounding areas. There is also an existing cell phone tower located approximately 400 feet from the proposed stack locations. This cell phone tower is 190 feet tall (or 192.9 feet with appurtenances/antennas), with an absolute height above grade of 769.7 feet, as shown on the FCC Registration for the tower which can be found at:

<http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistration.jsp?regKey=2632611>

The stacks will be 200 feet tall and the site’s finish grade is 575.5 feet, which would make the top of stack 775.5 feet, or 5.8 feet taller than the adjacent cell tower. Because of its nearby location and similar height, the existing cell phone tower serves the same purpose as would be served by a sight balloon in this case. Any areas which currently cannot see the cell tower will almost certainly not be able to see the Clear River Energy Center (“CREC”) exhaust stacks.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: June 13, 2016

SMOKE STACKS

12-2 Please state the exact height of the existing cell phone tower located near the project site.

RESPONSE: 12-2 This cell phone tower is 190 feet tall (or 192.9 feet with appurtenances/antennas), with an absolute height above grade of 769.7 feet, as shown on the FCC Registration for the tower which can be found at:

<http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistration.jsp?regKey=2632611>

According to the web-site of SBA Communications Corporation, the existing cell phone tower located near the project site is 190 feet above ground:

<http://map.sbasite.com/SiteInfo.aspx?SiteCode=RI07827-S>

RESPONDENT: Michael Feinblatt, ESS Group

DATE: June 13, 2016

BLASTS / EXPLOSIONS

17-1 Is there any possibility, no matter how small, that there could be an explosion at the Spectra/Algonquin compressor station which could cause an explosion at the Invenergy plant? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE 17-1 Invenergy Thermal Development LLC (“Invenergy”) does not believe there is a possibility that an explosion at Spectra’s Burrillville Compressor Station (“BCS”) could cause an explosion at Clear River Energy Center (“CREC”). As discussed in our response to questions 17-2, 3# and 17-4 Invenergy engaged Exponent as an expert consultant who has ample experience in evaluating the types of events that are being postulated in the question. Exponent estimated the area that could be impacted by an event at either location is really a function of the size of the enclosed area (e.g. building) where gas could accumulate and given that the powerhouse building at CREC is larger and has more volume than the building at Spectra’s site, an event at CREC would be governing. Please refer to the response to question 17-2 for the results of this event.

As it relates to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC, Invenergy contacted Spectra with regard to this question, and Spectra provided the attached letter that highlights the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In the attached response Spectra indicates that their Integrity Management Program has determined the Potential Impact Radius (“PIR”) of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the CREC in the remotely possible event of a fire or explosion.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

BLASTS / EXPLOSIONS

17-2 Is it at all possible that a problem at the Invenergy plant could cause an explosion at the Spectra/Algonquin compressor station? If it is your opinion that this is impossible, please explain. If it is your opinion that it is in any way possible, please explain the conditions under which this could occur, the likelihood of this occurring and your reasoning. Also, if this is possible, no matter how unlikely, please calculate the size of the blast area that would be affected by such an explosion.

RESPONSE:

We do not believe it is possible that a problem at the Clear River Energy Center (CREC) could cause an explosion at the Spectra/Algonquin compressor station. The codes and standards incorporated into the design and construction of the CREC and the physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the Spectra/Algonquin compressor station in the remotely possible event of a fire or explosion at CREC.

The design of the CREC incorporates the requirements of dozens of industry standards including but not limited to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, National Fire Protection Association (NFPA), National Electric Code (NEC), American Petroleum Institute (API). Adherence to these standards minimize the likelihood that there would ever be a fire or explosion at the CREC.

In order to determine potential scenarios that should be examined, Invenergy examined the systems and associated design features at CREC. These systems and features are typical to gas fired power plants, and as such, the Project design will also include design features to mitigate consequential damage to other portions of the CREC facility and keep any impact area within the confines of the CREC property. The key systems that could have a potential to cause a fire or explosion are listed below and their associated specific design features include:

1. Natural gas: The natural gas piping systems and components are separated from the other sections of the Project (to the extent possible) and all areas where natural gas systems and components are located are designated with an area classification that requires special design features that include explosion proof electrical components, gas detectors that are linked to automatic isolation systems and fire detection and suppression systems. Should a leak occur, the gas detection sensors are set to detect the gas before a concentration level is reached that would be capable of creating an explosion that could impact a larger area of the plant. For these reasons, the amount of any gas that could leak is limited such that it would not spread to an ignition source.

The CREC fuel gas system will be equipped with automatic detection and emergency shutdown systems, including the following:

- The natural gas will be odorized for detection.
- A network of low concentration natural gas detectors will be installed to monitor

for fuel gas leaks in the gas yard and within all areas where fuel gas equipment is located, both indoors and outdoors. The detectors will be set to alarm in the facility main control system (“DCS”). The custom-designed fire alarm and detection system will be in accordance with NFPA 72.

- In accordance with NFPA 850 the plant will include emergency shutdown systems to isolate the gas piping, stop equipment and safely vent station gas. The natural gas supply pipeline will include an emergency shutoff valve (ESV) at the outlet of the metering yard and the ESV will automatically close in the event that a fire is detected.
- Individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component.
- Main line isolation valves will be fire safe, as defined by API 607.
- Nitrogen hose connections and vent lines will be provided between all isolatable sections of the fuel gas piping to allow nitrogen purges and inerting for maintenance activities.
- The fuel gas piping will be cleaned and purged in accordance with NFPA 56.
- Pressure control devices to maintain the operating pressure at or below the maximum allowable operating pressure. In addition, overpressure protection devices with sufficient capacity and sensitivity will be installed to ensure that the maximum allowable operating pressure of the station piping and equipment will not be exceeded by more than 10 percent (10%) in the case of a malfunction of the pressure control equipment.
- All electrical equipment will be explosion proof.
- System design to accommodate changes in gas quality, periodic maintenance (e.g., filter change-out), redundancy, separation of ignition sources (e.g., National Electric Code compliance), combustion controls and hardened to resist impacts.
- Prevent damage to pipe by as-built mapping, below-grade flagging (above grade) and clear labeling of gas-bearing components.
- Flame detection that uses ultraviolet sensors.

Safe operating practices will include the following at a minimum:

- Periodic walk-through surveys of pipeline systems with hand-held gas detectors at all flanges, valves and other fittings; this is particularly important in the Gas Yard at filter, dewpoint heater equipment, pressure control valves and metering runs where many fittings and gas state changes occur that may contribute to leakage events.
- Strong operating and maintenance procedures, including use of inert gas purging, maintenance of coating and cathodic protection systems, dewpoint heating, filtration and verification of valve and instrument functionality.

The gas system design features include, controls utilizing gas detection, fire detection and suppression and when combined with regular inspections and proper maintenance of gas system equipment, limits this type of event to be confined within a smaller area thereby virtually eliminating the potential for undetected gas leaks that could lead to a fire or explosion.

2. Hydrogen: Modern utility generators larger than about 300 MW are hydrogen or hydrogen and water cooled. Hydrogen has safely been used as the coolant medium in utility generators for over 70 years. General Electric (“GE”) estimates that there are more than 2,400 hydrogen cooled GE designed generators in service today. The generator and associated hydrogen cooling system include a number of features to ensure the safe operation of the equipment:

The generator applied to CREC is hydrogen cooled, and as with the potential for a natural gas leak, there will be hydrogen leak detection sensors located on the generator which stringently monitor for potential leaks. These detectors will be set to monitor, alarm and take protective actions when hydrogen is detected at a level that is below the lower explosive limit.

The generator is equipped with end shields on each end, designed to support the rotor/bearings, to prevent gas from escaping, and to be able to withstand a hydrogen explosion in the unlikely event of such a mishap. In order to provide the required strength and stiffness, the end shields are constructed from steel plate and are reinforced. Horizontally split inner and outer oil deflectors are bolted into the end shield and provide sealing of the oil along the shaft.

Furthermore, the hydrogen systems and components will be located in areas that are designated with an area classification that requires special design features including explosion-proof electrical components, gas detectors that are linked to automatic isolation of systems and integrated with the fire detection and suppression systems.

The generator will have an internal volume of hydrogen that will be maintained in a sealed condition using multiple redundant seals. The seals will include mechanical seals and a seal oil system that uses pressurized oil barrier between the mechanical seals and the rotating shaft. The seal oil maintains an air-side seal and a hydrogen-side seal by forcing oil in both directions. The oil is monitored to detect any hydrogen that may get entrained into the oil and provide a means to scrub the hydrogen from the oil.

Hydrogen, like all flammable gases, is only reactive when it is present in concentration levels between the lower explosion limit and the upper explosive limit. That is, when there is sufficient oxygen present to sustain combustion. The generator will be equipped with a purity monitoring system that measures the quality of hydrogen in the generator. If the purity level begins to decrease toward the upper explosive limit, this system adds hydrogen to maintain purity.

The generator will also be equipped with an inert gas (one that does not react with hydrogen) purge system to purge the generator of hydrogen should generator maintenance be necessary. This system will also be used to purge and dilute the hydrogen to below the lower explosive limit if there is a leak. These systems are used throughout the power industry and have successfully controlled and prevented hydrogen explosions. Daily inspections and proper maintenance of equipment help to reduce this hazard

3. Main Transformer: The potential for an explosion is remote, its causes include lightning strike or transformer fault. The design features fire detection and suppression systems, location within a three sided concrete wall structure to protect immediately adjacent equipment systems and buildings and such that the open side has adequate space separation for protection for adjacent transformers and other equipment. Given the small impact area and the three sided walled enclosure, this scenario was ruled out as having any potential to impact Spectra's Burrillville station.

While we believe that the impact of any conceivable event at CREC will not migrate to the Algonquin compressor station, in order to address the question on the likelihood of an explosion occurring, we contacted Exponent, Inc., who is an industry recognized expert in conducting the type of analysis that was requested and asked that they conduct an evaluation of the probability of either a natural gas explosion or a hydrogen explosion event and to determine the maximum impact radius of the worst case scenario, no matter how unlikely. Exponent performed the evaluation which is included as an attachment.

As can be seen in the attached study provided by Exponent, the likelihood of either the Algonquin Station or the CREC facility suffering a gas explosion event as described in the question is anticipated to be on the order of 10^{-5} to 10^{-6} /yr, or once every 100,000 to 1 million years.

We also requested Exponent to describe what conditions, along with any assumptions and associated reasoning, would be necessary, no matter how unlikely, in order for such an event to occur and to determine the size of the impact radius that could result from such an event. Their inputs, assumptions and analysis are included in the attached report which concludes that even with postulating physically impossible scenarios like having the maximum possible volume of gas be released instantaneously and fill the largest contained area (the power block building) with a "stoichiometric natural gas/air mixture in order to maximize the confined volume of fuel involved in the explosion," the resulting impact area does not impact the Spectra compressor station.

Also, as addressed in the response to question 17-4, Exponent determined the distance away from the source of a worst case hypothetical explosion, where the blast wave pressure threshold of 1 pound per square inch gauge could reach. This threshold is the lowest pressure criterion for damaging explosion effects described in the ALOHA technical documentation and the EPA Risk Management Program Offsite Consequence Analysis. At 1 psig of pressure, a blast wave could shatter glass windows, however much higher pressures are necessary to damage the buildings or equipment at the compressor station. The calculated distance to the 1 psig pressure threshold for the maximum postulated scenario (no matter how improbable) was found to be no more than 884 feet from the source on the CREC site which does not create any damage to equipment at the Spectra/Algonquin compressor station, please refer to the attached Exponent letter response for the details of this analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC – November 1, 2016

BLASTS / EXPLOSIONS

17-3 Please explain/calculate the probability of a certain blast events occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

17-3 Please explain/calculate the probability of a certain blast events [sic] occurring, including the Algonquin Station exploding, the hydrogen storage tubes or generator igniting, and/or the proposed CREC facility itself exploding.

RESPONSE 17-3: Please refer to the response to question 17-2 and the attached Exponent Report that calculated the probability of a certain blast events occurring.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

BLASTS / EXPLOSIONS

17-4 Please conduct an ALOHA (Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration) analysis to determine the extent of the impact area of any possible explosion at the Invenergy facility and/or the Spectra/Algonquin facility, no matter how remote the possibility.

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RESPONSE 17-4: Please refer to the response to question 17-2 and the attached Exponent report for the response to this question.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: November 1, 2016

BLASTS / EXPLOSIONS

22-27 Can an industrial accident anywhere on the power plant site trigger a subsequent or chain reaction at the compressor station site? Please explain.

RESPONSE 22-27 This appears to be the same question that was asked and answered in Invenergy's responses to the Town of Burrillville's (Town) Request No. 17-2, including the Exponent letter that was attached to Response No. 17-2.

To repeat, here is Invenergy's Response to No. 17-2 (exhibit not re-attached):

We do not believe it is possible that a problem at the Clear River Energy Center (CREC) could cause an explosion at the Spectra/Algonquin compressor station. The codes and standards incorporated into the design and construction of the CREC and the physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the Spectra/Algonquin compressor station in the remotely possible event of a fire or explosion at CREC.

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is reached that would be capable of creating an explosion that could impact a larger area of the plant. For these reasons, the amount of any gas that could leak is limited such that it would not spread to an ignition source.

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- Prevent damage to pipe by as-built mapping, below-grade flagging (above grade) and clear labeling of gas-bearing components.
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The generator is equipped with end shields on each end, designed to support the rotor/bearings, to prevent gas from escaping, and to be able to withstand a hydrogen explosion in the unlikely event of such a mishap. In order to provide the required strength and stiffness, the

end shields are constructed from steel plate and are reinforced. Horizontally split inner and outer oil deflectors are bolted into the end shield and provide sealing of the oil along the shaft.

Furthermore, the hydrogen systems and components will be located in areas that are designated with an area classification that requires special design features including explosion-proof electrical components, gas detectors that are linked to automatic isolation of systems and integrated with the fire detection and suppression systems.

The generator will have an internal volume of hydrogen that will be maintained in a sealed condition using multiple redundant seals. The seals will include mechanical seals and a seal oil system that uses pressurized oil barrier between the mechanical seals and the rotating shaft. The seal oil maintains an air-side seal and a hydrogen-side seal by forcing oil in both directions. The oil is monitored to detect any hydrogen that may get entrained into the oil and provide a means to scrub the hydrogen from the oil.

Hydrogen, like all flammable gases, is only reactive when it is present in concentration levels between the lower explosion limit and the upper explosive limit. That is, when there is sufficient oxygen present to sustain combustion. The generator will be equipped with a purity monitoring system that measures the quality of hydrogen in the generator. If the purity level begins to decrease toward the upper explosive limit, this system adds hydrogen to maintain purity.

The generator will also be equipped with an inert gas (one that does not react with hydrogen) purge system to purge the generator of hydrogen should generator maintenance be necessary. This system will also be used to purge and dilute the hydrogen to below the lower explosive limit if there is a leak. These systems are used throughout the power industry and have successfully controlled and prevented hydrogen explosions. Daily inspections and proper maintenance of equipment help to reduce this hazard.

3. Main Transformer: The potential for an explosion is remote, its causes include lightning strike or transformer fault. The design features fire detection and suppression systems, location within a three sided concrete wall structure to protect immediately adjacent equipment systems and buildings and such that the open side has adequate space separation for protection for adjacent transformers and other equipment. Given the small impact area and the three sided walled enclosure, this scenario was ruled out as having any potential to impact Spectra's Burrillville station.

While we believe that the impact of any conceivable event at CREC will not migrate to the Algonquin compressor station, in order to address the question on the likelihood of an explosion occurring, we contacted Exponent, Inc., who is an industry recognized expert in conducting the type of analysis that was requested and asked that they conduct an evaluation of the probability of either a natural gas explosion or a hydrogen explosion event and to determine the maximum impact radius of the worst case scenario, no matter how unlikely. Exponent performed the evaluation which is included as an attachment.

As can be seen in the attached study provided by Exponent, the likelihood of either the Algonquin Station or the CREC facility suffering a gas explosion event as described in the question is anticipated to be on the order of 10^{-5} to 10^{-6} /yr, or once every 100,000 to 1 million years.

We also requested Exponent to describe what conditions, along with any assumptions and associated reasoning, would be necessary, no matter how unlikely, in order for such an event to occur and to determine the size of the impact radius that could result from such an event. Their inputs, assumptions and analysis are included in the attached report which concludes that even with postulating physically impossible scenarios like having the maximum possible volume of gas be released instantaneously and fill the largest contained area (the power block building) with a “stoichiometric natural gas/air mixture in order to maximize the confined volume of fuel involved in the explosion,” the resulting impact area does not impact the Spectra compressor station.

Also, as addressed in the response to question 17-4, Exponent determined the distance away from the source of a worst case hypothetical explosion, where the blast wave pressure threshold of 1 pound per square inch gauge could reach. This threshold is the lowest pressure criterion for damaging explosion effects described in the ALOHA technical documentation and the EPA Risk Management Program Offsite Consequence Analysis. At 1 psig of pressure, a blast wave could shatter glass windows, however much higher pressures are necessary to damage the buildings or equipment at the compressor station. The calculated distance to the 1 psig pressure threshold for the maximum postulated scenario (no matter how improbable) was found to be no more than 884 feet from the source on the CREC site which does not create any damage to equipment at the Spectra/Algonquin compressor station, please refer to the attached Exponent letter response for the details of this analysis.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

BLASTS / EXPLOSIONS

22-28 How will the Spectra compressor station and pipeline be protected from an event potentially triggering a larger scale accident at the Spectra site? Has this potential been calculated into the scope of the impact area proximate to the site?

RESPONSE 22-28 Invenergy cannot speak for Spectra or to the details of the Spectra site. However, please see Invenergy's response to Town's Request No. 17-1 and Spectra Letter, attached to Invenergy's response to Town Request No. 17-1.

To repeat, here is Invenergy's Response to No. 17-1 (exhibit not re-attached):

Invenergy Thermal Development LLC ("Invenergy") does not believe there is a possibility that an explosion at Spectra's Burrillville Compressor Station ("BCS") could cause an explosion at Clear River Energy Center ("CREC"). As discussed in our response to questions 17-2, 3 and 17-4 Invenergy engaged Exponent as an expert consultant who has ample experience in evaluating the types of events that are being postulated in the question. Exponent estimated the area that could be impacted by an event at either location is really a function of the size of the enclosed area (e.g. building) where gas could accumulate and given that the powerhouse building at CREC is larger and has more volume than the building at Spectra's site, an event at CREC would be governing. Please refer to the response to question 17-2 for the results of this event.

As it relates to the potential of an explosion at the Spectra/Algonquin compressor station which could cause damage at CREC, Invenergy contacted Spectra with regard to this question, and Spectra provided the attached letter that highlights the diligence associated with safe operation and maintenance of natural gas compressor facilities and outlines the federal standards they use for the design and maintenance of their facilities. In the attached response Spectra indicates that their Integrity Management Program has determined the Potential Impact Radius ("PIR") of a possible event, and the PIR is limited to their site and more specifically the fenced area of their site (as it relates to an event at the BCS itself).

The physical separation of the Algonquin compressor station and the CREC minimizes the possibility of direct impacts to the CREC in the remotely possible event of a fire or explosion.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

LAND OPTION

20-1 Invenergy's legal counsel, Alan Shoer, has verbally confirmed that Invenergy extended its land option with Spectra through December 2017 by the payment of a fee provided for in the option agreement. Please provide all documentation evidencing this extension.

Response 20-1: Invenergy Thermal Development LLC submitted the relevant documentation attached to its status report, filed with the Rhode Island Energy Facility Siting Board on December 12, 2016.

Respondent: John Niland, Invenergy Thermal Development LLC

Date: January 25, 2017

LAND OPTION

29-1 Has Invenergy or any related entity secured land in any other areas outside of the CREC proposed Algonquin/Spectra site to use during or after the construction of CREC? If so, please identify each lot and the intended use of that lot and indicate if the anticipated activity on this property has been taken into consideration in the traffic study.

RESPONSE 29-1 Invenergy Thermal Development LLC (“Invenergy”), including any Invenergy related entities, has secured land in the town of Johnston for the purpose of being a site that will be used as a truck filling station. This site was used in the traffic study. There are no other areas outside of the Clear River Energy Center (“CREC”) proposed Algonquin/Spectra site to use during or after the construction of CREC that have been secured at this time.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 13, 2017

ANE

30-1 On June 29, 2017, Enbridge (formerly Spectra) submitted a letter to FERC withdrawing Algonquin's Access Northeast ("ANE") Project from Pre-Filing Review. (See letter attached as Exhibit A.).

According to FERC filings, if the ANE Project had been built in 2018 as originally proposed, it would have been capable of providing up to 925 million cubic feet per day of natural gas at various delivery points on the existing Algonquin pipeline system. The ANE Project also included an LNG storage facility in Acushnet, MA connected to the pipeline with the capacity to store 84.6 million gallons of natural gas

- a. Describe in detail how the withdrawal of Algonquin's ANE Project will affect the proposed Clear River Energy Center project in Burrillville, including, but not limited to, how this change affects Invenergy's previously submitted application materials, data responses, and written testimony.**
- b. Describe in detail how delivery and storage capacity from the proposed ANE Project were taken into account in calculations related to the CREC Project, including, but not limited to, Invenergy's previously submitted application materials, data responses, and written testimony.**
- c. Describe in detail how the withdrawal of the proposed ANE Project would affect the number of estimated days annually that Clear River Energy Center would need to burn oil.**
- d. Describe in detail any problems Invenergy anticipates in obtaining sufficient natural gas in light of the withdrawal of the proposed ANE Project.**

Response 30-1 (a-d): The withdrawal of Algonquin's ANE Project is not anticipated to affect the Clear River Energy Center ("CREC") Project in any significant way. Invenergy Thermal Development LLC ("Invenergy") was not relying on the ANE project in any way for its gas supply for purposes of this application.

As outlined in our response to the Rhode Island Division of Public Utilities and Carriers, Docket 4609, Data Request, No. 3-3 last year, CREC has a Memorandum of Understanding with Algonquin Pipeline that sets the firm commitment for Algonquin to provide the lateral and firm transportation ("FT") services as needed. The supply options for CREC are:

- 1. Supply and transportation contract with a supplier who holds transportation capacity on Algonquin; or
- 2. A Firm transportation contract with Algonquin combined with a supply contract from a producer who can then use our transportation.

Invenergy has identified and had discussions with several entities who currently have available firm transportation on the Algonquin system that will be available by the time the CREC unit comes on line. Some of these entities hold capacity that is being built under the AIM and Atlantic Bridge (“AB”) expansions that Algonquin is currently constructing. These two projects will add 474,000 Dth/D of new capacity by November of 2017. Additionally, Invenergy has the above mentioned MOU with Algonquin which provides Algonquin’s commitment to provide 75,000 Dth/D of firm capacity, which is sufficient for one unit full time. Invenergy has had discussions with several capacity holders, and based on these discussions there is ample available capacity that should allow CREC to obtain service for at least several years and experience a real time daily and annual dispatch/load profile and then CREC will be able to match its final long term fuel supply and transportation contracting strategy to the Project’s actual daily and annual run profile and have that reflected in the necessary form of agreement for supply.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: July 13, 2017

FINANCING

22-19 Mr. Niland recently publicly stated that the facility will cost approximately \$1 billion to build, not \$700 million. What is the impact of this \$300 million cost increase in Invenergy's financial projections? Has Invenergy revised its financial model based on this \$1 billion cost estimate? If not, why not? If so, please provide a copy.

RESPONSE 22-19 The cost estimate that was provided in Invenergy's Application (Section 4, Project Costs) did not include impact fees payable to the Town of Burrillville, the interconnection costs for the transmission line and electric facility upgrades and did not include financing costs and security requirements. Additionally, the costs that it did include have been updated to incorporate bid estimates and firm quotes for equipment and construction.

Invenergy's financial models and the firm quotes Invenergy has received are highly confidential and proprietary and will not be provided. The Project is being privately financed without ratepayer funds and the power produced will be sold into the competitive ISO-NE market through a competitive bidding process.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

FINANCING

22-20 **Has Invenergy requested PA consulting Group (“PA”) to update its “monthly 20-year forecast (2019 through 2038) of the ISO-NE power market and a 20-year forecast (2019 through 2038) of PEC’s operations and cash flows,”¹ based on the revised Water Supply Plan filed with the EFSB on January 1, 2017? If not, why not? If so, please provide a copy.**

RESPONSE 22-20 No, Invenergy has not requested PA update its forecast. Invenergy does not believe that the Water Supply Plan will have any material impact on the PA forecasts.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

FINANCING

22-21 **When providing a copy of any analysis, please provide a copy of the output of the model in sufficient detail to understand the forecasts.**

RESPONSE 22-21 Please see Invenergy's response to 22-20. Because PA has not updated its forecast, a copy of the output does not exist.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

FINANCING

22-22 **If the PA forecast of future operations has not been updated, provide a copy of the most recent forecasts by Invenergy or any other consultant working for Invenergy relating to the operation of the CREC.**

RESPONSE 22-22 The most recent forecast was prepared by PA and was attached to Ryan Hardy's Pre-Filed PUC Testimony as confidential and redacted versions of Exhibits RH-2 & RH-3. This forecast was filed with the Board on July 20, 2016.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: February 14, 2017

FINANCING

22-23

Provide the following annual data:

- d. Annual number of MWH the CREC is anticipated to produce operated on natural gas between 2019 and 2038 broken down by calendar year;**
- e. Annual number of MWH the CREC is anticipated to produce operated on ultra-low sulfur distillate (“ULSD”) between 2019 and 2038 broken down by calendar year;**
- f. Annual cost of water in \$/MWH added to the variable cost of the unit when firing ULSD.**

RESPONSE 22-23

- d. The MWhs provided below were based on the previously provided confidential PA Consulting, Inc. forecast. The forecasted MWhs listed below are confidential.

[TABLE REDACTED]

- e. Neither Invenergy nor PA has calculated the annual number of MWh CREC is anticipated to produce when operated on ultra-low sulfur distillate between 2018 and 2038 broken down by calendar year. In summary, absent discrete gas shortage events (which are random events which cannot be forecast), PA does not project CREC to utilize ULSD.
- f. Invenergy has not calculated the annual cost of water in \$/MWh added to the variable cost of the unit when firing ULSD.

RESPONDENT:

John Niland, Invenergy Thermal Development LLC
Ryan Hardy, PA Consulting, Inc.

DATE:

February 14, 2017

EXPERTS / WITNESSES

26-1

With regard to (a) each of the expert witnesses previously disclosed by Invenergy as shown below, (b) any additional expert witnesses that have been identified since Invenergy's original expert disclosure, and (c) any additional expert witnesses Invenergy believes it may call at the evidentiary presentation in this matter, please provide separately for each witness the following:

1. Describe in detail the subject matter upon which each expert is expected to testify.
 2. State in detail and provide supporting documentation for the substance of the facts and opinions to which each expert is expected to testify.
 3. State in detail the grounds for each opinion to which each expert is expected to testify.
 4. For each expert witness, please state whether the expert has previously provided testimony on the subject matter to which the expert is expected to testify, and if so, please provide a summary of the testimony previously given, together with a copy of the transcript of such testimony, if available.
- | | |
|---------------------|---------------------|
| • John Niland | • Christopher Donta |
| • Michael Feinblatt | • Maureen Chlebek |
| • Ryan Hardy | • Robert Smith |
| • Edinaldo Tebaldi | • Gordon Perkins |
| • Jeff Hershberger | • Edward Pimentel |
| • Jason Ringler | • Michael Marous |
| • George Bacon | • Richard Lipsitz |
| • Jim Riordan | • John Carter |
| • Michael Hankard | • Chad Jacobs |
| • William Bailey | |

RESPONSE 26-1:

On September 12, 2016, pursuant to the Energy Facility Siting Board ("EFSB" or "Board") schedule, Invenergy submitted a list of the expert witnesses that it expects will be testifying in this matter, and the primary topics they will address. The witnesses described above were included in that filing. That filing was provided in response to the Board's procedural schedule, in anticipation of testimony at the final hearings. Additionally, Invenergy filed with the Board copies of the CVs for the experts identified.

Again, these experts are identified in the list noted above.

EFSB Rule 12.1(c) states that pre-filed direct testimony shall be filed no later than ten (10) days before the commencement date for the final hearing. This data request seeks the information that is required by the Board's Procedural Rules to be produced in the form of pre-filed direct testimony, which Invenergy anticipates it will be filing as the application moves towards final hearing, and in accordance with any further procedural schedule for the filing of Pre-Filed Direct, and Rebuttal Testimony that the Board may establish.

Invenergy's pre-filed testimony will provide the information required by Rule 1.12 ("all direct testimony in writing and copies of all documents and other evidence that the party proposes to introduce at the final hearing"). Invenergy's Pre Filed testimony will also include the grounds and support for each opinion given.

Further, the request that Invenergy provide a summary of the testimony previously given by each expert throughout their careers, on similar and general "subject matters" of expertise, together with a copy of the transcript of such testimony is vague and overbroad and overly burdensome. For example, Edward Pimentel, Invenergy's planning expert, has testified in hundreds of Zoning and Planning Board hearings over the course of his career on the "subject matter" of land use planning and compliance with local zoning codes and ordinances generally and with regard to a particular project. It would be nearly impossible to provide a summary of all the testimony previously given by this expert on all development projects throughout his career or to locate all the transcripts of testimony previously given. The same holds true for other expert witnesses. Invenergy objects to this portion of the data request if that is the intent of the request.

If the scope of the data requests relates to testimony regarding the Invenergy application, and testimony provided thus far on the application by Invenergy's expert witnesses, on information and belief, the Town is in possession of the testimony and transcripts of the Invenergy expert witnesses, identified above, that testified at the Town Planning and Zoning Advisory Opinion process. Similarly, on information and belief, the Town is in possession of the transcripts of the testimony of Invenergy's witnesses, identified above, that testified at the Advisory Opinion process with the Public Utilities Commission, in Docket 4609.

EXPERTS / WITNESSES

Request 38-3 **With regard to all data responses from Invenergy, please identify each witness who will be sponsoring each data response at the EFSB hearings, and making himself or herself available for cross examination with regard to each such data response.**

Response 38-3 Please see the letter attached as **Exhibit 38-3**, which was filed with the Board on September 21, 2017.

DATE: October 4, 2017

EXPERTS / WITNESSES

Request 38-4 **With regard to each section of the Invenergy EFSB application, please identify each witness who will be sponsoring each section of the application and making himself or herself available for cross examination on each section of the application, including any supplemental responses or sections related to the application.**

Response 38-4 **Exhibit 38-4** contains a chart identifying the witnesses that will be available to testify concerning the areas within their expertise described in the corresponding sections of the application.

DATE: October 4, 2017

PA ASSUMPTIONS

Request 32-1 **In the Clear River Economic Impacts: Overall Assumptions, please provide the following:**

- a. Basis for the property tax or other land taxes and the calculations used to arrive at the property tax assumption.**
- b. Calculations and basis for the capacity factor assumption.**

Response 32-1(a) The annual property taxes that PA Consulting Group (“PA”) used in its economic analysis for the Clear River Energy Center (“CREC” or “Facility” or “Project”) were based on the property taxes from the PILOT agreement between Invenergy Thermal Development LLC (“Invenergy”) and the Town of Burrillville and included additional taxes that would be paid to the Pascoag Fire District.

Response 32-1(b) The capacity factor assumptions are an output of PA modeling of the ISO-NE market. PA projects market prices for the RI zone and dispatches the CREC based on operating characteristics provided by Invenergy. PA’s modeling methodology is described in more detail within PA’s June 16, 2015 Memorandum filed with the Rhode Island Energy Facility Siting Board (“EFSB” or “Board”) on November 9, 2015. The market prices and key assumptions underlying the analysis were previously sent to the Town, in Invenergy’s Supplemental Response to the Office of Energy Resources’ Data Request, No. 3-1, Exhibit A.

RESPONDENT: Ryan Hardy, PA Consulting Group

John Niland, Invenergy Thermal Development LLC

DATE: August 9, 2017

PA ASSUMPTIONS

Request 32-2 **In regard to the Supply/Demand assumptions worksheet, please provide the following:**

- a.. Basis for the BTMPV amounts used in calculating Peak Demand — BTMPV:**
- b. Assumptions and/or calculations for change in Supply from 2017 through 2025.**
- c. If not identified above, provide the assumptions and calculations for the reduction in Demand Side Resources.**

Response 32-2(a) The BTMPV assumptions are based on ISO-NE's projections from the 2017 CELT Report, which are adjusted based on PA's internal view of BTMPV growth in ISO-NE. This is the same methodology use in PA's previous analyses of CREC.

32-2(b) PA's supply assumptions are based on a combination of public and proprietary data for new capacity additions and retirements. For the prompt 3 years, PA relies on the cleared FCA results to determine the changes to supply, and from 2021 on, PA relies on research as well as model iterations to determine market entry and exit. PA's assumed changes in supply from 2017 to 2025 were included in Invenergy's Supplemental Response to the Office of Energy Resources' Data Request, No. 3-1, Exhibit A.

32-2(c) N/A

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: August 9, 2017

PA ASSUMPTIONS

Request 32-3 **Are the assumptions for BTMPV consistent with the 2017 report?
Please explain.**

Response 32-3 Please see answer to Data Request, No. 32-2(c).

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: August 9, 2017

PA ASSUMPTIONS

Request 32-4 **In developing its total energy and capacity market savings to Rhode Island ratepayers, please provide the following:**

- a. Assumptions for the new transmission lines being built from Canada to satisfy ISO-NE load.**
- b. Assumptions for the new offshore wind projects being built to satisfy ISO-NE load.**
- c. Cost of energy assumed from the new transmission lines for each year of the economic analysis.**
- d. Cost of energy from offshore wind in each year of the economic analysis.**

Response 32-4(a) PA does not assume new transmission is built from Canada to satisfy ISO-NE load.

32-4(b) PA incorporates the Block Island Offshore Wind project, a 30 MW offshore wind project that is interconnected to the RI zone of ISO-NE. PA does not assume additional offshore wind enters the ISO-NE market as it is prohibitively expensive as compared to other supply options, including both thermal and other renewable.

32-4(c) N/A

32-4(d) Within PA's production cost model, PA assumes a zero variable cost for offshore wind. However, this does not factor in capital costs associated with such plants nor the costs of building underwater transmission lines, which are substantial.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: August 9, 2017

CSO

Request 32-5 **What is the legal name of the entity that was qualified by ISO-NE to participate in ISO's Forward Capacity Auction 10, and which obtained a Capacity Supply Obligation in FCA-10?**

Response 32-5 Invenergy Thermal Development LLC was the original sponsor and Invenergy Energy Management LLC is the registered Lead Market Participant responsible for the CSO associated with the Project.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 9, 2017

CSO

Request 32-6 **With regard to the entity referred to in 32-5, please state the form of entity (e.g., corporation, LLC, LLP, or other) and name the state in which the entity is chartered.**

Response 32-6 Invenergy Thermal Development LLC and Invenergy Energy Management LLC are registered in Delaware, MD.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 9, 2017

CSO

Request 32-7 **With regard to the entity referred to in 32-5, did the same legal entity participate in FCA-11?**

Response 32-7 **Yes.**

RESPONDENT: **John Niland, Invenergy Thermal Development LLC**

DATE: **August 9, 2017**

CSO

Request 32-8 **If the answer to 32-7 is “no,” please name any entity affiliated with the entity named in 32-5 that participated in FCA-11, and state the form of that entity.**

Response 32-8 N/A

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: August 9, 2017

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CSO

Request 41-1 **Provide copies of all documents including the Critical Path Schedule (“CPS”) and cost workbook(s) and supporting documents submitted to the ISO-NE or its agent(s) for any auction in which all or part of the Clear River Energy Center (“CREC”) was offered as capacity.**

Response 41-1 Invenergy filed quarterly progress reports in 2016 and monthly progress reports in 2017, through an online tool/database tracking system. Attached as **Exhibit 41-1 (Confidential)** are screen shots of the reports and any documents submitted as filed.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-2 **Provide copies of the cost workbook(s) and all information submitted to the ISO-NE or its agent(s) relating to the Offer Review Trigger Price (“ORTP”) or Minimum Offer Price Rule (“MOPR”) challenge(s) relative to any Forward Capacity Auction (“FCA”) in which Invenergy bid capacity from the CREC.**

Response 41-2 See **Exhibit 41-2 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-3 **Provide a copy of any document provided to Invenergy by the ISO-NE or its agent(s) relative to its review of CREC Unit 2 participating in FCA-12.**

Response 41-3 Please see the previously provided confidential QDN, filed as a confidential exhibit to the Supplemental Pre-Filed Testimony of John Niland, filed with the Energy Facility Siting Board (“EFSB” or “Board”) on November 20, 2017 and the confidential Appendix filed on November 28, 2017.

 Please also see **Exhibit 41-3 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-4 **Provide a complete copy along with all appendices of the New Capacity Qualification Determination Notification (“QDN”) for the CCP 2021-2022 FCA, including all of the information contained in the Appendix to the QDN, a portion of which was filed as Exhibit JN SUPPLEMENTAL-2 (Confidential) in the November 20, 2017 Pre-Filed Supplemental Testimony of John Niland.**

Response 41-4 Invenergy previously provided the confidential QDN, as a confidential exhibit to the Supplemental Pre-Filed Testimony of John Niland, filed with the EFSB on November 20, 2017. Invenergy also confidentially filed the Appendix on November 28, 2017.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-5 **Provide a summary of all past financial assurances submitted to the ISO-NE or its agent(s) relating to the CREC, along with the calculations or invoices used to determine such amounts.**

Response 41-5 Please see Exhibit 1A of the ISO-NE Tariff, Section VII.B.2.b for the calculations for non-commercial capacity financial assurance amounts. Also attached as **Exhibit 41-5 (Confidential)** is a screenshot of CREC's current financial assurances.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-6 **Identify if Invenergy elected CPS monitoring for the CREC Unit 2.**

Response 41-6 Because Unit 2 was denied qualification for FCA 12, Invenergy does not have the option to elect CPS monitoring for CREC Unit 2. Please also see **Exhibit 41-10 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-7 **Provide copies of each CPS report from Invenergy to the ISO-NE or its agent(s) for the CREC**

Response 41-7 Please see response to Data Request, No. 41-1 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-8 **Provide all communication from the ISO-NE and/or Internal Market Monitor relating to the cost workbook(s) relative to the ORTP or MOPR.**

Response 41-8 Please see response to Data Request, No. 41-2 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-9 **Provide all documentation, memoranda, notes from conversations, and communication with the ISO-NE and/or the Internal Market Monitor relative to CREC Unit 2 participating in FCA-12.**

Response 41-9 Please see response to Data Request, No. 41-2 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-10 **Provide all relevant correspondence and/or confirmatory memoranda pertaining to CREC's possible participation in FCA-13.**

Response 41-10 Please see the previously provided confidential QDN, filed as a confidential exhibit to the Supplemental Pre-Filed Testimony of John Niland, filed with the EFSB on November 20, 2017.

 Please also see **Exhibit 41-10 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-11 **Provide the specific resource(s) and counter party(s) that is satisfying the CREC's Capacity Supply Obligation ("CSO") in FCA 10.**

Response 41-11 Unknown. It is Invenenergy's understanding that only ISO-NE has access to this information.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-12 **Provide any communication between Invenergy and/or the ISO-NE or its agent(s) relating to Invenergy's ability to cover its CSO for any future Capacity Commitment Period ("CCP")**

Response 41-12 Please see **Exhibit 41-12 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-13 **What is the current status of CREC's position in the ISO Interconnection Queue? Has this changed in the past 12 months? If yes, specify how and provide all relevant documents. If CREC has lost its interconnection queue position, provide any supporting documentation.**

Response 41-13 CREC's position in the ISO-NE Interconnection Queue is 489. There has been no change.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-14 **Provide a copy of the Final Notice from the ISO-NE that the Project and/or CREC Unit 2 would not be able to participate in FCA 12.**

Response 41-14 Please see the previously provided confidential QDN, filed as a confidential exhibit to the Supplemental Pre-Filed Testimony of John Niland, filed with the EFSB on November 20, 2017 and the confidential Appendix filed on November 28, 2017.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-15 **Provide any documentation which relates to whether the Project and/or CREC Unit 2 will or will not be able to participate in FCA-13 and beyond.**

Response 41-15 Please see response to Data Request, No. 41-10 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-16 In regard to the statement by the ISO-NE in its QDN issued to Invenergy on September 29, 2017:

“Pursuant to Section 111.13.1.1.2.4 of the Tariff; the ISO has evaluated the information provided by the Project Sponsor and has determined that the CPS with the proposed commercial operation date (“pCOD”) May 31, 2021 is not achievable for the purpose of qualification for this FCA.

The ISO, in consultation with its consultant, has determined that commercial operation for the aforementioned project is unlikely to occur by the start of the 2021-22 CCP beginning June 1, 2021 because of delays in the permitting process and deferrals in the ordering of major equipment.”

Provide copies of any documentation, memoranda, notes, or other forms of communication in Invenergy’s possession that it provided to the ISO-NE for evaluation as referenced in the ISO-NE QDN.

Response 41-16 Please see Invenergy’s responses to CLF’s Data Requests, Nos. 10-1, 10-2, 10-6, 10-7, 10-9 and Invenergy’s responses to the Town’s Data Requests, Nos. 41-3 and 41-5.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-17

In regard to the statement by the ISO-NE in its QDN issued to Invenergy on September 29, 2017:

“Although considerable effort has already been expended by the Project Sponsor in obtaining these permits, the issuance of the permits has been significantly delayed.”

Provide copies of any information provided by Invenergy that would support the ISO-NE’s conclusion that “considerable effort has already been expended by the Project Sponsor.”

Response 41-17

Invenergy has worked on the CREC Project for over four (4) years and has submitted quarterly and then monthly reports to ISO-NE for over a year. Invenergy has retained consultants, hired attorneys, posted credit, secured land, submitted volumes of information to the Energy Facility Siting Board in the form of hundreds of data request responses, pre-filed testimony, reports and informational filings, submitted multiple permits (Freshwater Wetlands Permit and Air Permit) with the Rhode Island Department of Environmental Management, etc. Based on the amount of information that is publicly available regarding this CREC Project, it is clear the Invenergy expended considerable effort since the Project’s conception.

Please also see Invenergy’s responses to CLF’s Data Requests, Nos. 10-1, 10-2, 10-6, 10-7, 10-9 and Invenergy’s responses to the Town’s Data Requests, Nos. 41-1, 41-3 and 41-5.

RESPONDENT:

John Niland, Invenergy Thermal Development LLC

DATE:

January 8, 2018

CSO

Request 41-18 **Provide any documentation, memoranda, notes, or other forms of communication prepared by Invenergy or its agent(s) relating to the qualification of CREC Unit 2 to participate in FCA 12.**

Response 41-18 Please see the information prepared by Invenergy included in Invenergy's responses to CLF's Data Requests, Nos. 10-1, 10-2, 10-6, 10-7, 10-9 and Invenergy's responses to the Town's Data Requests, Nos. 41-3 and 41-5.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-19 **Provide a copy or summary of any additional relevant information provided to the ISO-NE by Invenenergy relating to CREC Unit 2 as required under ISO-NE Market Rule 1, Section 13.3.2.3. summarized as follows:**

“The Project Sponsor must include in the critical path schedule report any other information regarding the status or progress of the project or any of the project milestones that might be relevant to the ISO’s evaluation of the feasibility of the project being built in accordance with the critical path schedule or the feasibility that the project will meet the requirement that the project achieve Commercial Operation no later than the start of the relevant Capacity Commitment Period.” [emphasis added]

Response 41-19 Please see response to Data Request, No. 41-1 above and **Exhibit 41-19 (Confidential)**.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: January 9, 2018

CSO

Request 41-20 **Please provide all documentation related to the statement by the ISO-NE in its QDN issued to Invenergy on September 29, 2017:**

“Finally, there is significant uncertainty with regard to the ability to build the required generator lead and associated transmission upgrades to interconnect the aforementioned project, as further detailed in the Appendix of this QDN, which could also lead to delays in the project meeting its COD of May 31, 2021.”

Response 41-20 Please see the Complaint filed with the Federal Energy Regulatory Commission, available at http://www.iso-ne.com/static-assets/documents/2017/11/public_filing_clear_river_lgia.pdf.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

ARMY CORPS OF ENGINEERS

Request 37-1

Mr. Feinblatt’s rebuttal testimony on pages 12 —13 states that the Army Corps of Engineers is preparing an Environmental Assessment to determine whether an Environmental Impact Statement would be required for the project, and, if required, the Environmental Impact Statement would be the responsibility of the Army Corps of Engineers. Please provide an update on the current status of the Army Corps of Engineers Environmental Assessment and its evaluation of whether an Environmental Impact Statement will be required. Please provide an estimated date with regard to when the Environmental Assessment will be made available.

Response 37-1

33 CFR 325 establishes the National Environmental Protection Act (“NEPA”) Implementation Procedures for the U.S. Army Corps of Engineers (“USACE”) Regulatory Program. According to 33 CFR 325, Appendix B, Section 7a, “The district engineer should complete an [Environmental Assessment (“EA”)] as soon as practicable after all relevant information is available (i.e., after the comment period for the public notice of the permit application has expired) and when the EA is a separate document it must be completed prior to completion of the statement of finding (SOF).”

According to 33 CFR 325.2(d), the public notice will be issued within 15 days of receipt of all information required to be submitted by the applicant. The comment period on the public notice should not be more than 30 days nor less than 15 days from the date of the notice.

Invenergy understands that the USACE is currently reviewing the application and will issue the required public notice of a complete application once that determination has been made. Invenergy Thermal Development LLC (“Invenergy”) has not been given any estimate from the USACE as to the date when the public notice will be issued. The EA should be issued soon after the comment period for the public notice has expired and before the completion of the SOF, in accordance with 33 CFR 325, Appendix B, Section 7a.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: September 27, 2017

ARMY CORPS OF ENGINEERS

Request 37-2

If the Army Corps of Engineers determines that an Environmental Impact Statement is required, would you agree that the Energy Facility Siting Board should, as it did in the Ocean State Power case, wait to render a decision as to whether the plant would cause unacceptable harm to the environment until after the Environmental Impact Statement is prepared and made available to the Energy Facility Siting Board and the parties. If you do not agree, please explain why.

Response 37-2

I do not agree. State and federal environmental regulations and environmental permitting programs have been established specifically to ensure that applicants proposing projects with potential environmental impacts will not cause unacceptable harm to the environment. This was firmly stated by Rhode Island Department of Environmental Management (“RIDEM”) in its Supplemental Advisory Opinion, dated August 15, 2017, in the section responding to the question posed by the Rhode Island Energy Facility Siting Board (“EFSB”) as to whether the Clear River Energy Center (“CREC” or “Facility”) will present an unacceptable harm to the environment.

As stated on pages 14 and 15 of the RIDEM Supplemental Advisory Opinion:

- “If DEM finds that the Applicant has complied with the requirements of the applicable regulations, a permit will be issued for that proposed activity. The issuance of a permit indicates that DEM has determined that the nature and scope of the proposed activities are within standards for acceptable environmental impact established by State and federal laws and regulations.”
- “While final decisions have not been rendered, review processes have not yet been completed (including public notice and comment), and the Applicant must still satisfy its regulatory burden of responding to any comments and deficiencies that may be identified on those applications; based on the information currently available to DEM it appears that it is possible for the Applicant to meet its regulatory burden in each of these programs. Should the Applicant follow through and meet those burdens it would receive permits under each of these program for the Facility.”
- “To be clear, this in no way is meant to prejudge the outcome of the ongoing permitting processes, but rather to indicate that if, upon the completion of the regulatory processes, the requisite

environmental permits are issued, it is a formal declaration that the proposed facility has met the standards and criteria for acceptable harm to the environment as established in State and federal laws and regulations.”

Also, as the Board pointed out in its Preliminary Order, the RIDEM and USACE environmental permitting processes are outside of the jurisdiction of the EFSB. It is my understanding that the Board typically will condition its licensing of major energy facility projects with the applicant being required to secure all required RIDEM and USACE permits. Because the EFSB approval (if granted) would be contingent on the issuance of these required permits, there is no reason for the EFSB to wait for any of the required permitting processes to be completed before rendering its Final Decision.

Finally, although RIDEM and USACE are separately reviewing CREC’s environmental impacts according to their permitting programs, Invenergy has also provided the Board with its environmental analysis, reports, data and information sufficient to allow the Board to evaluate whether the Project will, or will not, cause unacceptable harm to the environment.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: September 27, 2017

ARMY CORPS OF ENGINEERS

Request 38-1

With regard to any and all meetings, conferences, emails, letters, memoranda, notes, or other communications between Invenergy and the U.S. Army Corps of Engineers:

(1) Please summarize what occurred in each of those meetings (i.e., emails, calls, or other exchanges of information).

(2) Please provide copies of all documents related in any way to said meetings, (i.e., emails, calls, or other exchange of information or documentation of any kind), including, but not limited to, minutes of any meetings (formal or informal), notes from any meetings (formal or informal), emails, or correspondence.

Response 38-1

(1) Aside from the application to the U.S. Army Corps of Engineers (“ACOE”), already provided to the Town of Burrillville (“Town”), **Exhibit 38-1** contains summaries of all written communications between Invenergy Thermal Development LLC (“Invenergy”) and the ACOE.

(2) Aside from the application to the ACOE, already provided to the Town, **Exhibit 38-1** includes all documents related to all written communications between Invenergy and the ACOE.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: October 4, 2017

ARMY CORPS OF ENGINEERS

Request 38-2

Has Invenergy asked the U.S. Army Corps of Engineers (formally or informally), whether an environmental assessment and/or environmental impact statement might be required?

If so:

- (1) Please identify and describe each such request (formal or informal).**
- (2) Provide any and all documents related to such request and any response to the same.**
- (3) Please summarize what the U.S. Army Corps of Engineers has told Invenergy (formally or informally), in writing or otherwise, regarding whether an environmental assessment and/or environmental impact statement might be required for the project. Please also provide any and all documents, including correspondence, memoranda, emails, notes, or otherwise with respect to any such request and any such response to the request.**

If you have not made such a request (formally or informally), of the Army Corps of Engineers, please explain why you have not made such a request.

Response 38-2

Invenergy has not asked the ACOE (formally or informally) whether an EA and/or EIS might be required. 33 CFR 325, Appendix B, Section 7a, requires the district engineer to complete an EA as soon as practicable after all relevant information is available. Because an EA is required, there would be no reason to ask the ACOE whether an EA will be completed for this project. The purpose of the EA is to determine whether an EIS will be required. It would be premature to ask the ACOE whether an EIS will be required for this project until it completed its review of the application and have completed the EA for the project.

RESPONDENT: Michael E. Feinblatt, ESS Group, Inc.

DATE: October 4, 2017

NEED

Regarding Ryan Hardy's Pre-Filed Supplemental Testimony dated November 20, 2017:

Request 42-1 **Please provide copies of all communications between Ryan Hardy and Invenergy that relate to his supplemental testimony of November 20, 2017.**

Response 42-1 Please see **Exhibit 42-1 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

NEED

Request 42-2 **Please provide the analysis and all supporting documentation that allegedly supports the statement that “CREC Unit 2 is expected to clear FCA 13 with an online date of June 1, 2022” as referred to on page 2, lines 10-11.**

Response 42-2 See attached **Exhibit 42-2 (Confidential)**, entitled “PA - Clear River - Market Projections - 12-19-2017.xls” containing all of the relevant assumptions and results from PA’s latest analysis supporting Ryan Hardy’s supplemental testimony. In particular, the ‘ISO-NE Supply-Demand’ tab in the attached file outlines PA’s projected supply (including additions and retirements) and demand for FCA-13. The ‘With Clear River’ case has CREC 2 clearing FCA-13 with the resulting capacity prices for FCA-13 presented on the ‘Capacity Prices – DY’ tab. It should be noted that the resulting capacity prices are based on the assumptions of supply entry and retirement, as well as the other key underlying assumptions including natural gas prices (see ‘Fuel Price Projections’ tab), allowance prices (see ‘Allowance Price Projections’ tab), and other key market assumptions. To the extent that any of these key assumptions change, we would likely see changes to the resulting capacity prices. For this reason, PA also ran a scenario that assumed additional retirements in the ISO-NE market.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

NEED

Request 42-3 **Have you reviewed the construction schedule for CREC Unit 2?
a. If yes, provide the schedule.**

Response 42-3 I have not reviewed the construction schedule for CREC Unit 2.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

NEED

Request 42-4

Please provide the following information relating to the claimed capacity cost savings of CREC as cited at page 4, lines 12-14 and 17-19:

- a. Overview of methodology used by PA Consulting Group, Inc. (“PA”)**
- b. Capacity market model**
 - i. Provide a description of the model**
 - ii. Explain how exactly capacity is cleared in the model**
- c. Provide all key assumptions used in the capacity market model**
 - i. Peak demand forecast**
 - ii. Supply curve slope where it crosses the demand curve**
 - iii. Provide the modeled supply and demand curves for FCAs 10, 11, 12, 13, and 14 without CREC and with CREC**
- d. Results in Excel format**
 - i. Provide clearing prices in FCAs 10, 11, 12, 13, and 14 without CREC and with CREC**

Response 42-4

- (a) PA provided two memos outlining its methodology for both energy and capacity price forecasting. Please see attached files labeled **Exhibit 42-4(a) (Confidential)** and **Exhibit 42-4(b) (Confidential)**.**
- (b) Please see **Exhibit 42-4(a)**.**
- (c) Please see **Exhibit 42-2**.**
- (d) Please see **Exhibit 42-2**.**

RESPONDENT:

Ryan Hardy, PA Consulting Group

DATE:

January 9, 2018

NEED

Request 42-5

Please provide the following information relating to the energy savings:

- a. Overview of methodology used by PA**
- b. Version of AURORAxmp and database used**
- c. Study area footprint and topology**
 - i. Modeled control areas**
 - ii. Zones modeled within each control area**
- d. Transmission linkages**
 - i. Zonal transfer limits and the sources of information**
 - ii. Interface transfer limits (i.e., multilinks) and the sources of information**
- e. Planned backbone transmission projects in each of the modeled control areas**
 - i. Transfer limits of each project with the sources of information**
 - ii. Assumed in-service date with the sources of information**
- f. Study region imports and exports**
 - i. Explain the methodology (e.g., using hourly fixed schedules based on historical flows)**
- g. HVDC lines with adjacent modeled control areas**
 - i. Existing lines (e.g., CSC, Neptune)**
 - ii. Any new proposed projects (e.g., Northern Pass, Granite Link, etc.) with timing, capacity, etc.**
- h. Load Forecast**
 - i. Specify the source of the load forecast in all modeled control areas (e.g., ISO-NE, NYISO, PJM)**
- i. Generation addition and attrition:**
 - i. Provide the list of the new and planned for retirement resources for all modelled control areas and the source of the information.**
- j. Fuel price forecast:**
 - i. Specify the sources for natural gas, oil, coal, and nuclear fuel price forecasts and describe any adjustments.**

k. Results in Excel format:

i. Provide the energy market price forecast (monthly, annually, on-peak, off-peak) without CREC and with CREC

Response 42-5

(a) PA developed a market price forecast for the ISO-NE region using AuroraXMP. PA ran a case that included CREC 1 entering operation in June 2020 and CREC 2 entering operation in June 2022. PA also ran a case assuming CREC 1 and 2 never enter operation. The resulting difference in the power price projections for the ISO-NE Rhode Island zone was then used to calculate the ratepayer savings from CREC entering operation. Please see attached file labeled **Exhibit 42-4(b)** for a more detailed description of the energy market modeling and **Exhibit 42-4(a)** for the capacity market modeling.

(b) AURORAxmp version 12.0.1072.

(c) Please see **Exhibit 42-2**.

(d) Please see **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony. PA's transfer limits are derived from ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016. Where the PA model transfer links do not correspond directly with the listed transmission interfaces, power flow analysis including ATC and contingency analysis has been used to determine link values by PA.

(e) New England backbone projects that impact transfer limits are listed in the attached **Exhibit 42-2**. Changes to transfer limits were obtained from the ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016.

New England project in-service dates were obtained from the ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016.

(f) AURORAxmp is a power market simulation tool designed to forecast power prices over both the short and long term. The core of the product is an hourly-dispatch model that simulates the dispatch of power plants in a chronological, multi-zone, transmission constrained system.

(g) The Cross Sound HVDC line (CSC) has been modeled between ISO-NE SWCT and NY Zone K, with a bidirectional capacity of 330 MW. The Neptune HVDC line has been modeled between PJM EMAAC and NY Zone K, with a bidirectional capacity of 660 MW. The Hudson Transmission Project (HTP) HVDC line has been modeled between PJM EMAAC and NY Zone J, with a bidirectional capacity of 660 MW.

While several major HVDC projects are in varying stages of development in the New England and New York areas, none of these projects have

reached the threshold of development to be included in this study.

- (h) The source of the ISO-NE load forecast is the 2017 CELT Load Report.

The source of the NYISO load forecast is the 2017 Load & Capacity Data Report (Gold Book).

- (i) See **Exhibit 42-2**, containing the firm capacity additions and retirements from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (j) See **Exhibit 42-2**, containing the relevant fuel price assumptions from PA's latest analysis supporting Ryan Hardy's supplemental testimony. PA develops its natural gas price assumptions internally using the GPCM model and works in conjunction with HellerWorx to develop coal price assumptions. PA develops its oil price forecast using the EIA Annual Energy Outlook.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

NEED

Request 42-6

Provide the following information from the forecasts that PA made with respect to claimed energy cost savings associated with CREC as referred to at page 4, lines 4, 15, 21, and 22 including the following:

- a. Date of the conclusion**
- b. Estimated energy and capacity services**
- c. Estimated generation output from CREC**
- d. Concluded estimated actual or forecast clearing prices in FCAs 10, 11, 12, 13, and 14 with CREC and without CREC**
- e. Energy market price forecasts (monthly, annually, on-peak, off-peak) with CREC and without CREC**

Response 42-6

- (a) October 26, 2017
- (b) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (c) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (d) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (e) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT:

Ryan Hardy, PA Consulting Group

DATE:

January 9, 2018

NEED

Request 42-7 **Provide each forecast provided by PA for any purpose relating to the future operation of CREC, including the date of each forecast and the outputs of such forecast including, but not limited to, number of megawatt-hours produced by CREC, revenues, expenses, and cash flows, and/or contribution margin.**

Response 42-7 See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

NEED

Request 42-8 **Provide each forecast provided by any market expert for any purpose relating to the future operation of CREC and its revenue, expenses, cash flows, and/or contribution margin.**

Response 42-8 See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT: Ryan Hardy, PA Consulting Group, Inc.

DATE: January 9, 2018

NEED

Request 42-14 **Please provide all communications between Invenergy and GE relating to the major equipment order as referred to at page 3, lines 20-26.**

Response 42-14 Please see **Exhibit 42-14 (Confidential and Redacted)**, which includes copies of all correspondence between Invenergy and GE pertaining to major equipment purchase dates for FCA-12.

(Exhibit 42-14 (Confidential and Redacted) redacts any cost information from the confidential version, as the cost information was not sought in this data request and is highly competitive business sensitive information that, if disclosed, even confidentially, would cause Invenergy and GE substantial harm.)

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

NEED

Request 42-15 Please provide a copy of the schedule associated with the “revised commercial operating date for Unit 1” as referred to at page 3, line 25 that is currently being utilized by Invenergy for internal and external planning purposes.

Response 42-15 Please see **Exhibit 42-15 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

NEED

Request 42-16 **Do the transmission and related facility upgrades associated with CREC require filing for permits or approvals in any state other than Rhode Island? If so, please explain.**

Response 42-16 The transmission line is the subject of a separate EFSB proceeding, SB-2017-01. It is Invenergy's understanding that the transmission and related facility upgrades associated with CREC do not require filing for any permits or approvals in any state other than Rhode Island.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

UNIT 2

Request 42-9 **Please provide any correspondence, recordings, memoranda, or notes that relate to communication between John Niland and the ISO-NE relating to the qualification of CREC Unit 2 in any Forward Capacity Auction (“FCA”).**

Response 42-9 **Please see Exhibits 41-1 (Confidential) and 41-10 (Confidential) to Invenenergy’s responses to the Town’s 41st Set of Data Requests. Please also see Exhibit 42-10 (Confidential).**

RESPONDENT: **John Niland, Invenenergy Thermal Development LLC**

DATE: **January 9, 2018**

UNIT 2

Request 42-10 **Please provide any correspondence, recordings, memoranda, or notes John Niland prepared relating to the qualification of CREC Unit 2 to participate in any FCA.**

Response 42-10 Please see the information prepared by John Niland included in Invenergy's responses to CLF's Data Requests, Nos. 10-1, 10-2, 10-6, 10-7, 10-9 and Invenergy's responses to the Town's Data Requests, Nos. 41-3 and 41-5.

Please also see **Exhibit 42-10 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

UNIT 2

Request 42-11 **Please provide any correspondence, recordings, memoranda, or notes that relate to any communications between John Niland and any transmission owners relating to the interconnection for CREC Unit 2, including the interconnection agreement.**

Response 42-11 Please see **Exhibit 42-11(a) (Confidential)**. This exhibit contains critical energy/electricity infrastructure information (“CEII”) which is protected under federal law. Please see the Motion for Protective Treatment, filed concurrently with these data responses. Invenenergy will file one (1) copy of Exhibit 42-11(a) under seal with the Board. Until the attorneys and expert consultants that will be reviewing this information have signed request forms and non-disclosure agreements and received confirmation from National Grid and ISO-NE, Invenenergy is not at liberty to disclose the CEII information contained in Exhibit 42-11(a).

Please also see **Exhibit 42-11(b) (Confidential)**.

RESPONDENT: John Niland, Invenenergy Thermal Development LLC

DATE: January 9, 2018

UNIT 2

Request 42-12 **Please provide any correspondence, recordings, memoranda, or notes John Niland prepared relating to the interconnection for CREC Unit 2, including the interconnection agreement.**

Response 42-12 See response to Data Request, No. 42-11 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 8, 2018

UNIT 2

Request 42-13 **Please provide all communications between Invenergy and transmission owners as referred to at page 3, lines 9-16.**

Response 42-13 See response to Data Request, No. 42-11 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

FERC COMPLAINT

Request 43-1

In regard to this complaint, CREC estimates it will be required to pay approximately \$4.1 million each year for O&M Costs. Please provide the calculations CREC used to estimate the \$4.1 million.

Response 43-1

On January 23, 2018, CREC filed at FERC a notice of withdrawal of its DAF Complaint in FERC, Docket No. EL18-31-000. Nonetheless, in order to be responsive to this Request, and to provide a better understanding of this issue it concerns, CREC offers the following;

NGrid's DAF charge that CREC would pay does not track the actual O&M Costs associated with the specific existing equipment, nor will it be based on the actual O&M Costs associated with the specific upgraded equipment for which the ratepayers are currently paying.

Instead, the calculation of the DAF charge assumes that the O&M Costs associated with all new equipment (Network Upgrades) will reflect the average O&M Costs that National Grid experiences for its entire transmission system. NGrid performs an annual evaluation to determine the Annual Facilities Charges for Transmission Facilities. The Annual Facilities Charge in 2015 is 6.84% (the "DAF Rate"), and that is the figure that NGrid provided to CREC as an estimate for the DAF Rate that would apply to the cost of Network Upgrades funded by CREC).

The determination of Annual Facilities Charges for Transmission Facilities is calculated in association with Schedule 21-NEP , Attachment DAF of the ISO New England Tariff (http://www.iso-ne.com/static-assets/documents/regulatory/tariff/sect_2/sch21/sch_21_nep.pdf). The DAF Rate is derived by dividing NGrid's total system O&M Costs by NGrid's total system transmission Gross Plant Investment ("Book Value"). The DAF Rate is then applied to the Book Value of the Network. Gross Plant Investment relates to the Interconnecting Transmission Owner's Network Transmission Facilities; i.e., to the facilities and equipment owned, controlled, or operated by National Grid. The calculation of the O&M charge is outlined in the below table:

Network	Total	
Transmission System Upgrade	Costs	DAF
Component		6.84%
S171N-1	\$543,000	\$37,141
T172N-1	\$510,000	\$34,884
175T	\$13,763,000	\$941,389
174T	\$13,763,000	\$941,389
K189	\$901,000	\$61,628
G185N	\$1,485,000	\$101,574
R9	\$6,564,000	\$448,978

H17	\$5,584,000	\$381,946
P11/R9 bus tie	\$485,000	\$33,174
Sherman road station expansion	\$6,203,693.00	\$424,332.60
line 341	\$6,757,447.00	\$462,209.37
line 347	\$3,569,681.00	\$244,166.18
line 328	\$573,107.00	\$39,200.52
Total	\$60,701,928	\$4,152,012

RESPONDENT:

Kris Zadlo, Invenergy Thermal Development LLC

DATE:

February 2, 2018

FERC COMPLAINT

Request 43-2

If CREC is relieved by FERC of paying the O&M Costs, will the ratepayers be required to pay these or similar O&M Costs?

(a) If yes, provide the estimate of the amount ratepayers will be required to pay per year.

Response 43-2

As noted in Response 43-1, a notice of withdrawal of the DAF Complaint was filed at FERC, Docket No. EL18-31-000, on January 23, 2018. Nonetheless, in order to be responsive to this Request, and to provide a better understanding of the issue it concerns, CREC offers the following;

No, Rhode Island ratepayers would not have to pay costs that are similar to those that CREC would be charged under the DAF. The ratepayers are currently paying the O&M costs on the facilities and components that would be upgraded/replaced if CREC goes forward. As we understand it, NGrid determines their overall O&M Costs associated with their Network System and these costs are pooled together with all O&M costs associated with all ISO New England Network Facilities. The total O&M costs for ISO NE are then re-allocated to each transmission owner on the basis of that utility's percentage of total network load. Based on load data posted by ISO-NE for 2016 (available at Regional Network Load Cost Report: <https://www.iso-ne.com/markets-operations/market-performance/load-costs#related-documents>), Narragansett represents about 6.4% of the total RNS load and so the allocation of the O&M costs for the CREC upgrades would be approximately 6.4% of the actual O&M costs incurred.

If FERC had granted the CREC Complaint, O&M Costs associated with Network Upgrades, to be constructed by NGrid, and paid for by CREC pursuant to the CREC Large Generator Interconnection Agreement ("LGIA") would be recovered from all Regional Network Service ("RNS") transmission customers (as they currently are). Almost all of these upgrades, (with the exception of the new switchgear to be located in the Sherman Road substation) involve the relocation or replacement of existing network facilities for which O&M Costs already are being paid by ratepayers. As such, because the upgrades themselves will be funded entirely by CREC, and because ratepayers would continue to pay for the O&M on these facilities as they are already, even if CREC had been successful at FERC, Rhode Island ratepayers would have ended up with new and/or improved equipment and a more reliable electric transmission network, at no appreciable cost.

RESPONDENT:

Kris Zadlo, Invenergy Thermal Development LLC

DATE:

January 23, 2018

FERC COMPLAINT

Request 43-3 **If ratepayers are required to pay higher O&M Costs, provide the impact these additional costs will have on the ratepayer savings CREC estimated in its most recent filing with the RI EFSB.**

Response 43-3 As already noted, CREC has withdrawn the DAF Complaint it filed in FERC Docket No. EL18-31-000. With that said, as also stated above, the ratepayers are currently paying the O&M Costs on the network facilities associated with the Network Upgrades that were the subject of the Complaint proceeding. Invenergy does not know how much is currently being paid for the O&M associated with these specific facilities. However, as pointed out above, the costs going forward would have likely been lower than the costs that ratepayers presently are paying (assuming there would be any), given that the new equipment to be installed would not need the same amount of maintenance.

RESPONDENT: Kris Zadlo, Invenergy Thermal Development LLC

DATE: February 2, 2018

FERC COMPLAINT

Request 43-4 **Provide all the calculations used to determine the additional cost to ratepayers of Invenergy being relieved of its obligation to pay the O&M Costs associated with the CREC network upgrades.**

Response 43-4 A withdrawal of the DAF Complaint was filed at FERC, Docket No. EL18-31-000, on January 23, 2018. That said, when looking solely at O&M, we do not believe there would have been any additional cost to ratepayers if Invenergy had been relieved of its obligation to pay the O&M Costs associated with the CREC network upgrades.

The actual O&M costs that ratepayers are currently paying on the existing equipment could have been reduced because brand new equipment will be installed and the added O&M costs associated with the new switchgear to be located in the Sherman Road substation should be offset by the expected reductions associated with the upgrades.

RESPONDENT: Kris Zadlo, Invenergy Thermal Development LLC

DATE: February 2, 2018

TRANSMISSION LINE

Request 43-5 **Has CREC provided National Grid with a notice to proceed with procurement for long-lead and major material?**

- (a) If so, when was the notice to proceed provided to National Grid?
- (b) If no notice to proceed was provided, provide the anticipated new in-service/commercial operation date for CREC Units 1 and 2.

Response 43-5 Invenergy has not provided National Grid with a notice to proceed with procurement for long-lead and major material.

- (a) based on the decision by the FERC we are working with National Grid to determine when the notice can be provided in order to ensure that the current in-service date is met.
- (b) Our in-service date has not changed – it is June 1, 2021 for CREC Unit 1 and June 1, 2022 for CREC Unit 2. Now that the FERC has issued its decision, the notice to proceed and the schedule milestones that were included in the filing the LGIA unexecuted at the FERC, we are working with National Grid to determine what dates need to be changed in order to ensure that the current in-service date is met.

RESPONDENT: Kris Zadlo, Invenergy Thermal Development LLC

DATE: February 2, 2018

DATA REQUESTS ISSUED TO THE CONSERVATION LAW FOUNDATION

- 1.1 Please explain in detail what you believe will be the impact on the Rhode Island environment and the costs to Rhode Island consumers if the proposed facility is not built and ISO New England continues to rely on older currently operating power plants.**

RESPONSE:

A. Environment

CLF believes that climate change is the greatest threat to the environment of Rhode Island, the United States, and the world today. It is this belief that led CLF to address the climate change implications of the Invenergy proposal with the testimony of expert witness J. Timmons Roberts.

CLF believes that the carbon-emission impacts if the Invenergy facility is not built would be salutary and beneficial. As stated in Dr. Timmons's Pre-Filed Testimony:

My opinion is very simple, and it can be stated in a single sentence: I believe that building a new 900-megawatt combined-cycle gas-fired electricity-generating plant in Rhode Island would make it impossible for the state to achieve the carbon-emission-reduction goals as set forth in the Resilient Rhode Island Act

Dr. Roberts Pre-Filed Testimony, at page 14, lines 6-9.

More specifically, Dr. Roberts testified that building the Invenergy facility would make it impossible for Rhode Island to meet its 2020 goal of reducing carbon emissions by 10% below 1990 level; and its 2035 goal of 45% reduction by 2035; and its 2050 goal of 80% reduction. Dr. Roberts Pre-Filed Testimony, at page 14, lines 10 - 18.

CLF acknowledges that Invenergy has stated that its proposed plant could reduce carbon emissions in the seven-state area of New England and New York by approximately 1% during the period 2019-2022. Ryan Hardy April 22 Pre-Filed Testimony, page 16, lines 11-15. However, CLF believes that this analysis is seriously flawed for several reasons.

First and foremost, even if Invenergy's modelling were correct, it only purports to show a small emission reduction for three years. However, by Invenergy's own estimates, its proposed facility would have a useful life of 20 to 40 years, and would therefore continue emitting carbon into the atmosphere for decades after the period of Invenergy's modelling.

Second, the foregoing paragraph must be viewed in the context of the carbon levels that Invenergy's proposed facility would actually emit. As Invenergy's own witness, Mr. Hardy, testified in the PUC Hearing in Docket # 4609 (Invenergy), Invenergy's projected carbon emissions when it is burning only gas would be higher than the current average of all New England electricity generation; Invenergy's projected carbon emissions when it is burning oil would be much higher than the current average of all New England electricity generation; and

the annual weighted average of Invenergy's projected carbon emissions (accounting for both gas and oil) would be higher than the current average of all New England electricity generation. [PUC Docket # 4609 July 25 Hearing Transcript, page 134, line 18 to page 142, line 4; see also CLF Exhibit 11 (ISO-New England Electric Generator Air Emission Report), at page 20.]

Third, the foregoing two paragraphs must be viewed in the context that the fuel mix used to generate electricity within the six-state footprint of ISO-NE is getting cleaner (i.e., lower carbon emissions) each year. This is happening for multiple reasons, including the retirement of dirty coal and oil plants and the increasingly rapid build-out of renewable energy generation.

Thus, even if Invenergy's modelling were correct that there would be a 1% reduction of carbon emissions over seven states between 2019 and 2022 if its proposed plant were built: (a) the Invenergy plant would make it impossible for Rhode Island to meet its statutory short-, medium-, and long-term carbon emission-reduction goals; (b) the Invenergy plant would emit more carbon than the current New England average when it burns gas; (c) the Invenergy plant would emit more carbon than the current New England average when it burns oil; (d) building a plant with a 20- to 40-year life expectancy would lock Rhode Island into a fossil-fuel future; (e) at precisely the time when the growth of renewables is reducing overall average of carbon emissions from electricity generation.

In short, in terms of carbon emissions and climate change, the overall environmental effects of the Invenergy plant not being built would be beneficial and salutary – for Rhode Island, for the United States, and for the world.

CLF also notes that Invenergy's modelling artificially refers to a seven-state area, while most air-emissions modelling for New England is based upon the six-state ISO-NE footprint, which operates a single, unitary market. Although there are interconnections between ISO-NE and the New York ISO, ISO-NE also has other interconnections, such as the Hydro-Quebec Interconnection.

CLF also notes that in its October 28, 2015 transmittal letter to the EFSB, Invenergy disingenuously suggests that 28% of New England's electricity generating capacity is coal and oil, which are dirtier fuels than natural gas. However, in fact, only 6% of New England's electricity is actually produced from coal and oil. See PUC Docket # 4609 (Invenergy) July 25 Hearing Transcript, page 67, line 15 to page 70, line 14.

B. Costs to Consumers

CLF believes that, if the Invenergy plant were built, there may be some small and short-term benefits to electricity ratepayers; and there would certainly be large, long-term harms to ratepayers. Conversely, if the Invenergy plant were not built, there may be some small, short-term costs but there would certainly be larger long-term benefits. CLF underscores the word "may" in the two preceding sentences to emphasize that the ratepayer benefits are speculative rather than certain.

In PUC Docket # 4609 (Invenergy) there was testimony on the impact of the Invenergy proposal to Rhode Island ratepayers. Specifically, there were three expert witnesses on ratepayer impacts: Ryan Hardy for Invenergy; Christopher T. Stix, for CLF; and Seth Parker for the Division of Public Utilities and Carriers (the Division).

Crucially, for purposes of this Data Response, no witness in the PUC proceeding provided any data at all about ratepayer impacts for more than three years, and all three expert witnesses agreed that the greatest economic impact would be in the first year of operation only.

On capacity, Invenergy's witness, Mr. Hardy, estimated that the capacity savings to Rhode Island ratepayers in the first year of operation (corresponding to ISO-NE FCA-10) would be \$42 million. [Hardy April 22 Testimony, page 13, lines 20-21.] CLF's witness, Mr. Stix, estimated the capacity savings to Rhode Island ratepayers in the first year of operation (corresponding to ISO-NE FCA-10) would be between zero and \$36 million. [Stix Pre-Filed Testimony, page 18, line 14 to page 20, line 14.] The Division's witness, Mr. Parker, substantially agreed with Mr. Stix's estimate. [Parker Pre-Filed Testimony, page 35, lines 2-21.]

On energy, Invenergy told the PUC that it anticipated savings of under \$10 million per year for the first three years of operation. [Ryan Hardy April 22 Pre-Filed Testimony, page 13, line 10.] CLF's expert, Mr. Stix, testified that this estimate was wildly exaggerated. [Stix Pre-Filed Testimony, at page 45 line 16 through page 49, line 13.]

Taking energy and capacity together, Seth Parker, the expert witness of the Division, testified that the ratepayer benefits of the Invenergy plant would be "small but meaningful." [Parker Pre-Filed Testimony, Page 40, line 6.]

Three things must be borne in mind about Mr. Parker's testimony for the Division: (1) Mr. Parker performed no independent analysis of ratepayer impacts [Parker Pre-Filed Testimony, page 26, lines 20-23]. (2) Mr. Parker was unable to verify much of Invenergy's data and calculations on supposed, putative ratepayer benefits [Parker Pre-Filed Testimony, at page 27, lines 14-23; page 30, lines 14-22; page 35, lines 22-24; page 38, lines 18-19]. (3) Mr. Parker found that Invenergy had grossly exaggerated the supposed ratepayer benefits [Parker at page 30, line 6; page 32 line 14 to page 35, line 21].

To sum up the preceding six paragraphs, CLF believes that it is possible, but not certain, that there could be small short-term ratepayer benefits if the Invenergy plant is built.

However, there would also be large and certain ratepayer harms if the Invenergy plant is built. This is true for several reasons. First, renewable energy is being built at an ever-increasing rate. Second, the per-kilowatt-hour cost of renewables is steadily dropping. Third, recent ISO-NE market reforms have introduced negative-increment offers into the real-time energy market. Fourth, negative-increment hourly pricing has happened at the same time that wind and other renewables are being made fully dispatchable in the ISO-NE energy market. Under ISO-NE market rules, these fully dispatchable renewable resources are eligible to set clearing price in the real time energy market. The combination of these factors over time will: (a) drive down the hourly clearing price of electricity for all New England ratepayers; (b) increasingly force fossil-

fuel generation out of the market; while (c) renewables increasingly set hourly prices and benefit ratepayers.

In this context, maximum ratepayer benefit will be a consequence of accelerated build-out of renewable energy resources in New England, and maximum ratepayer detriment will be caused by building additional fossil-fuel generation.

Note that CLF disagrees with a predicate in Burrillville's question: ". . . if the proposed [Invenergy] facility is not built and ISO New England continues to rely on older currently operating power plants." Older currently operating power plants are retiring from the New England market for a variety of reasons, including the fact that they are increasingly uneconomic and because they are approaching the end of their useful life. These dirty, old legacy plants are increasingly being replaced with clean renewable generation. The alternative to the Invenergy plant is not dirty coal and oil plants. The alternative to the fossil-fuel Invenergy plant is clean renewable energy.

DATA REQUESTS ISSUED TO THE CONSERVATION LAW FOUNDATION

1-2 Are any alternative energy projects cost efficient to the consumer in light of the subsidies received by such projects?

RESPONSE. Yes.

For purposes of this Response, CLF interprets “alternative energy projects” as “renewable energy projects.”

All energy production in the United States receives governmental subsidies. Oil companies benefit from subsidies such as the foreign tax credit and favorable treatment for expensing of exploration and development costs. The nuclear industry receives a huge public subsidy in the form of the Price-Anderson Act. Some renewable energy generators receive Out-of-Market (OOM) revenue from state Renewable Portfolio Standard (RPS) statutes and/or from federal Investment Tax Credits.

In all of the examples given in the preceding paragraph, the respective governmental subsidies may fairly be viewed as an expression of public policy as enacted by duly elected legislatures. If one were add the value of public-policy subsidies to the cost of renewable energy, then in order to do a fair apples-to-apples comparison, one would have to add public-policy subsidies to the cost of fossil generation and nuclear power. When this is done, renewable energy is emphatically cost effective when compared to conventional and fossil-fuel generation.

In addition, the foregoing takes no account whatever of the social cost of carbon (SCC) emissions. A federal interagency process developed a value for the SSC in 2010 for purposes of complying with Exec. Order 12,866, which mandates cost-benefit analyses of proposed federal regulations. A federal interagency group used three different integrated assessment computer models (DICE, PAGE, and FUND) to arrive at the social cost of carbon. EPA updates the SCC periodically, and the most recent value for the SCC is \$36 per metric ton. CLF notes that on August 8, 2016, this \$36/ton governmental calculation of the social cost of carbon was upheld in a decision handed down by the U.S. Court of Appeals for the Seventh Circuit. Zero Zone, Inc. v. DOE, --- F.3d --- (2016), 2016 WL 4177217.

To sum up, CLF believes that, in a fair apples-to-apples comparison (that is, accounting for governmental subsidies for renewable and to non-renewable energy) renewable energy is “cost efficient to the consumer” (in the words of the Data Request) today – even before taking into account the social cost of carbon. Renewable energy is even more economical when properly accounting for the social cost of carbon at the \$36/ton value set by the U.S. government.