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May 27, 2016

Via Electronic Mail & Federal Express

Ms. Luly Massaro
Division Clerk
Division of Public Utilities and Carriers
89 Jefferson Boulevard
Warwick, RI 02888

Re: Invenergy, PUC Advisory Opinion, Docket No. 4609

Dear Luly:

On behalf of Invenergy Thermal Development LLC ("Invenergy"), enclosed please find:

1. An original and 7 copies of Invenergy's Redacted Responses to the DPUC's 3rd Set of Data Requests;

2. An original and one copy of the confidential version of Invenergy's Responses to the DPUC's 3'd Set of Data Requests, filed under seal; and

3. A Motion for Protective Order

Please let me know if you have any questions.

Very truly yours,

ALAN M. SHOER
ashoer@apslaw.com

Enclosures

cc: Service List *(via e-mail)*

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

In re: Invenergy Thermal Development LLC	:	**Docket No. 4609**
Application to Construct the Clear River	:	
Energy Center in Burrillville, R.I.	:	

MOTION OF INVENERGY THERMAL DEVELOPMENT LLC FOR PROTECTIVE TREATMENT OF CONFIDENTIAL INFORMATION

Now comes Invenergy Thermal Development LLC ("Invenergy") and hereby requests that the Public Utilities Commission ("PUC") grant protection from public disclosure certain confidential information contained in a September 22, 2015 Memorandum of Understanding ("MOU"), confidential information contained in Invenergy's data response No. 3 submitted in response to the Division of Public Utilities and Carriers ("DPUC") Third Set of Data Requests and confidential information contained in an attachment to Invenergy's responses to the DPUC's Third Set of Data requests. The reasons for the need to protect this information are summarized below.

I. LEGAL STANDARD

Rhode Island's Access to Public Records Act ("APRA"), R.I. Gen. Laws § 38-2-1 *et. seq.*, sets forth the parameters for public access to documents in the possession of state and local government agencies. Under APRA, all documents and materials submitted in connection with the transaction of official business by an agency are deemed to be a "public record," unless the information contained in such documents and materials falls within one of the exceptions specifically identified in R.I. Gen. Laws § 38-2-2. Therefore, to the extent that information provided to the PUC falls within one of the designated exceptions to APRA, the PUC has the authority under the terms of APRA to deem such information to be confidential and to protect that information from public disclosure.

In that regard, R.I. Gen. Laws § 38-2-2(4)(B) provides that the following records shall not be deemed public:

> Trade secrets and commercial or financial information obtained from a person, firm, or corporation which is of a privileged or confidential nature.

When interpreting APRA, the Rhode Island Supreme Court has held that the agencies making determinations as to the disclosure of information under APRA may apply the balancing test established by the Court in *Providence Journal v. Kane,* 577 A.2d 661 (R.I. 1990). Under this balancing test, the PUC may protect information from public disclosure if the benefit of such protection outweighs the public interest inherent in disclosure of information pending before regulatory agencies. Further, where the release of information or data to a competitor will "cause substantial harm to the competitive position of the person from whom the information was obtained[,]" the PUC should grant a request to protect the information from public disclosure. *Providence Journal Company v. Convention Center Authority*, 774 A.2d 40 (R.I. 2001).

Moreover, the Rhode Island Supreme Court has held that the agencies applying the balancing test established in *Providence Journal v. Kane*, 577 A.2d 661 (R.I.1990) may grant protection of the information even if the requested document does not fall within one of the twenty-five (25) enumerated exceptions in APRA, where the requested document may be subject to redaction upon an appropriate balancing test weighing the public interests in disclosure against the privacy interests of the affected individual. *See Direct Action for Rights and Equality v. Gannon (DARE I)*, 713 A.2d 218 (R.I. 1998) (*see also* DARE (II), 819 A.2d 651 (R.I. 2003)); *Providence Journal Company v. Kane,* 577 A.2d 661 (R.I. 1990).

II. BASIS FOR CONFIDENTIALITY REQUEST

Memorandum of Understanding: Invenergy has engaged in commercially sensitive discussions with gas suppliers in order to secure the required natural gas supply for the fuel requirements of the project. These discussions have advanced to a MOU with one company. This document is highly sensitive as it contains terms and conditions that are commercially sensitive to both counter parties. Both companies entered into this document by representing that the terms are to be treated as confidential and not subject to public disclosure. The release of this information would harm both companies in a competitive market. This document is routinely treated as a confidential commercially sensitive document in the industry.

Response to Request No. 3 and Attachment: The data and responses to Request No. 3 and the Attachment similarly contain highly sensitive commercial information regarding the gas turbine. The attachment contains confidential performance data specific to a specific gas turbine company with data supplied by that company. The company treats this information as confidential and proprietary, and Invenergy is similarly required to keep this data confidential. The questions in Request No. 3 seek data specific to the MOU referenced above. For the same reasons as explained above the specific terms and conditions in the MOU should be protected as commercially sensitive confidential information.

For the reasons stated above, this information should be exempt from the definition of a public record under APRA as ". . . commercial or financial information obtained from a person, firm, or corporation which is of a privileged or confidential nature." R.I. Gen. Laws § 38-2-2(4)(B). The PUC should determine that the redacted data and supporting materials provided in regards to these documents are confidential and provide protective treatment for this information by granting this Motion for a Protective Order, pursuant to R.I. Gen. Laws § 38-2-2. Invenergy

respectfully requests that the documents identified herein and supporting data and information used in the confidential version of Invenergy's Responses to the DPUC's Third Set of Data Requests (i) be kept confidential indefinitely, (ii) not be placed in the public docket, and (iii) be disclosed only to the PUC, its attorneys and expert consultants that have executed a non-disclosure agreement with Invenergy and as necessary to this proceeding and in accordance with the protections ordered or agreed upon.

WHEREFORE, the Invenergy respectfully requests that the PUC grant this Motion for Protective Treatment as stated herein.

Respectfully submitted,
Invenergy Thermal Development LLC
By its attorneys,

Alan M. Shoer (#3248)
Richard R. Beretta (#4313)
Nicole M. Verdi (#9370)
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Dated: May 27, 2016

CERTIFICATE OF SERVICE

I hereby certify that on May 27, 2016, I delivered a true copy of the foregoing Motion via electronic mail to the parties on the attached service list.

/s/ Alan M. Shoer

REDACTED

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
BEFORE THE PUBIC UTILITIES COMMISSION

IN RE: INVENERGY THERMAL DEVELOPMENT APPLICATION TO CONSTRUCT AND OPERATE THE CLEAR RIVER ENERGY CENTER, PUBLIC UTILITIES COMMISSION ADVISORY OPINION

DOCKET NO. 4609

INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO THE DIVISION OF PUBLIC UTILITIES AND CARRIERS THIRD SET OF DATA REQUESTS

(May 26, 2016)

DR 3-1
Section 3.1 of the Application claims each unit of the Facility "…will consist of an advanced class (G, H, or J class) gas turbine…"

a) What gas turbine model. e.g. Siemens SGT6-5000F or SGT6-8000H, GE 7FA.05 or 7HA.02., was assumed for the following studies:
   - ESS Major Source Permit Application of June 26, 2015 (Application Appendix B)
   - PA's capacity price memo of April 22, 2016 (Exhibit RH-2)

   Response: The GE 7HA.02 was used for both studies.

b) If performance data for a specific gas turbine model was not assumed, describe how the combined cycle unit performance data were derived and provide supporting documents.

   Response: The GE 7HA.02 performance data was used and a summary of the data is provided in the attached table, Confidential Exhibit 1.

c) Confirm that PA's energy margin memo of April 22, 2016 (Exhibit RH-3) assumed two 7HA.02 gas turbines.

   Response: Yes, it does. However, the second 7HA.02 turbine does not begin operation until June 1, 2020.

d) If Invenergy has committed to a specific gas turbine model, provide the following information for a CREC combined cycle unit based on that model. If Invenergy has <u>not</u> committed to a specific gas turbine model, provide the following information for a CREC combined cycle unit for <u>each</u> model utilized in the three studies identified above. In either case, the information should assume (i) new and clean condition, (ii) values at ISO, summer, and winter temperatures, and (iii) operating on gas and fuel oil:

- Gross capacity rating
- Net capacity rating
- Gross heat rate
- Net heat rate
- Hourly and daily gas and fuel oil consumption, with and without duct firing

Response: Invenergy has committed to a contract for supply of 7HA.02 combustion turbines and the balance of the power island equipment from General Electric. The attached table presents the predicted new and clean unit performance as a function of ambient operating conditions on natural gas and ultra low sulfur diesel fuel oil. Note that performance at ISO-NE conditions is not available at this time; however, the predicted performance at the average annual operating conditions for the Clear River Energy Center (CREC) site is provided in the Confidential Exhibit 1.

- Unit average lifecycle capacity degradation, average lifecycle heat rate degradation, and average lifecycle availability.

Response: Output and heat rate degradation occur as the unit is operated and is generally restored to close to their original values (within 1%) during the annual maintenance activities and almost fully restored during major maintenance cycles which occur approximately once every 3 years. Major maintenance cycles are performed depending upon the number of hours the unit has operated. Average lifecycle availability, could be defined as the outage rate that the unit could see, which is typically less than 4% across the fleet of operating combined cycle units.

- Start-up times for cold, warm, and hot starts on gas and fuel oil to achieve minimum load and full output; define cold, warm, and hot starts

Response: The expected start-up times on both natural gas and fuel oil from initial start to minimum emissions compliance load for the unit is 13 minutes, for cold, warm, and hot starts. The expected start-up times from initial start to full load on both natural gas and fuel oil are 210 minutes, 150 minutes, and 90 minutes, respectively for cold, warm and hot starts.

The start conditions are defined as follows:

- Cold starts occur 72 hours or more after a shutdown.
- Warm starts occur between 8 and 72 hours after a shutdown.
- Hot starts occur within 8 hours of a shutdown.

- Output that can be achieved in 10 minutes for cold, warm, and hot starts on gas and fuel oil?

Response: The minimum continuous operating load of the combustion turbines is approximately 103 MW at average ambient conditions on natural gas, and 156 MW at winter conditions on fuel oil. These loads are attained roughly 13 minutes after the initiation of a unit start.

- Up and down ramp rates

Response: The 7HA.02 combustion turbine ramp rate when firing natural gas is up to 50 MW/min.

e) Provide any evidence that the turbine vendor will guarantee these start-up, 10 minute performance, and ramp rates.

Response: Invenergy has secured guarantees from General Electric for the start-up time from initial start to minimum emissions compliant load and unit ramp rate.

RESPONDENT: John Niland, Invenergy Thermal Development, LLC

DR 3-2

a) Explain and quantify (if possible) the "flexibility," "fast start," and "high ramp rate" claims made for the CREC in the Application compared to other gas-fired combined cycle generation in New England.

Response: The Invenergy Clear River combined-cycle power plant is designed around the latest gas turbine technology that has been designated the "H" class by GE. Clear River has selected the Power Island, which consists of a gas turbine, steam turbine and heat recovery steam generator ("HRSG") from GE which utilizes the GE 7HA.02 gas turbine integrated with state-of-the art steam turbine and HRSG technologies.

Clear River is able to provide a high efficiency gas turbine that delivers the lowest combined cycle plant heat rate and best-in-class operational flexibility. The 7HA.02 technology is the heart of the Clear River power plant, and any response to load or frequency starts with the gas turbine governor and control system. The control system has the ability for faster responding and more flexible plant response to market demands and has the ability to meet the needs of the ISO-NE as it experiences higher levels of renewable penetration. The Clear River plant is a dispatchable resource that provides high rates of load change, fast response to frequency and voltage variation and is able to do all of this while providing efficient and reliable generation.

The H technology gas turbine utilized in the Clear River project has the ability to respond rapidly to the system operator's command signals. The gas turbine is capable of ramping load, increasing or decreasing, at a rate of 50 MW/minute per gas turbine. This corresponds to the equivalent of a typical 50 MW peaking plant coming online in 1 minute – a capability which is not technically feasible with today's technology (average start times are 10 minutes or longer for a small peaking combustion turbine). The Clear River plant will be able to provide a constant bi-directional regulation service to the ISO-NE while maintaining emissions compliance and reliable, efficient active power control. In the case of Clear River, with a 2 unit configuration, the plant would be able to provide double the amount of regulation capacity explained herein.

The typical operating range of the Clear River plant will be from approximately 45% to 100% of plant base load. This wide operating range is made possible by the gas turbine turndown capability (ability to operate at part loads while maintaining emissions compliance). The gas turbine, as previously noted, is capable of ramping from minimum load to base load at 50 MW/minute. The steam turbine output will lag behind the ramping rate of the gas turbine due to the thermal lag in steam generation. Considering the gas turbine contribution only, the ramping response range is equivalent to approximately 200 MW of output range per unit. The ISO-NE could utilize either or both

of the Clear River units to meet +/- 100 MW of regulation capability by targeting the dispatch point of the plant at the mid-point of its regulation range on any given day. To put this into perspective, the Clear River plant (both unit contribution) could provide roughly 200 MW of load variability response within 2 minutes of receiving a dispatch response signal, and provide this continuous loading or unloading regulation service at a rate of 100 MW/minute around the setpoint. This capacity is more than enough to meet the entire current ISO-NE regulation requirement. This regulation response is delivered while maintaining stringent emission requirements from a resource that will have the lowest heat rate in the ISO-NE system.

GE has conducted testing to determine the capability of the 7HA gas turbine with regards to the FERC Order 755 regulation performance requirements. While ISO-NE and PJM's implementation of FERC Order 755 differ slightly in the way they control dynamic regulation resources, PJM's control signal is the most stringent for a gas turbine to comply with due to the speed of the command to change direction and magnitude. Both systems use a performance scoring mechanism. GE tested the 7HA's capability to follow the more stringent PJM Reg-D fast frequency regulation signal and was consistently able to produce performance scores >90% using the PJM ranking system. While the ISO-NE need for fast regulation resources, so called energy neutral resources, may be relatively low at the present time the requirement will increase with higher levels of renewable penetration. A 2010 GE Energy Consulting study of the ISO-NE's renewable penetration capability, with varying levels of renewable penetration, projected the need for regulation to approximately double from the 2010 levels for a 20% renewable energy scenario.

In addition to regulation service, the Clear River project will provide additional benefits to the ISO-NE system. Historically, combined-cycle power plants have been capable of relatively short startup times, when compared to coal or oil fired rankine-cycle plants, but the technology applied at Clear River takes the capability to an enhanced level that is much more beneficial to the system operator. GE's Rapid Response technology provides for faster, more efficient, and lower emission startup profiles when compared to plants built just 5 or more years ago. For a conventional start plant, the gas turbine must hold at low loads and extend the start to control thermal stresses within the steam cycle equipment. The Rapid Response system thermally decouples the gas turbine and steam cycle equipment, thereby allowing the gas turbine to quickly start and ramp to minimum emissions compliance load while controlling the steam conditions to the steam-cycle equipment. This translates to approximately 100 MW of capacity (per gas turbine) coming online within 15 minutes of the start command; the equivalent of an average sized peaking plant with similar response times. Another benefit to the ISO-NE from this technology is that the startup time has very little variability. A conventional combined-cycle plant, without Rapid Response, can have a significant startup time deviation from

one start to the next. This uncertainty in start time is due to the thermal variability of the system when attempting a start. When a plant fails to meet its load target for a dispatch hour it causes the system operator to temporarily dispatch a higher cost resource to meet the generation shortage until the plant reaches the dispatch level. The Rapid Response design provides highly predictable start durations by eliminating these system variations by allowing the gas turbine to load to a known level in a fixed time without the influences of the thermal condition of the balance of the plant.

Currently the FERC is reviewing the concept of implementing a primary frequency response requirement to the ISO-NE's (FERC NOI Docket No. RM16-6-000). This inquiry is in response to the fact that the actual frequency response in the Eastern Interconnection has declined during the last two decades and increasing levels of variable generating resources threaten to worsen primary frequency and inertial response of the bulk electric system. This type of requirement is already in place in some other parts of the world with high levels of renewable penetration, such as many areas in Europe. This proposed concept would require generators to offer their unit capability for primary frequency response (droop control) into a competitive market. Today the droop requirement for generators >10 MW in the ISO-NE system is a 4-5% droop response. However, in a 2014 ISO-NE Reliability Committee Study, the ISO-NE found that some generator control systems are not responsive to frequency events, or were loaded to the point that the control system could not increase load. The Clear River project is ideally configured to provide compliant primary frequency response to the ISO-NE both in its current tariff construct as well as potential future requirements that may be implemented through the FERC NOI. The Clear River control system design includes advanced control algorithms which use a predictive approach to frequency control, essentially pre-positioning the control system to respond rapidly to frequency excursions. This function dynamically adjusts the machine response rate for rapid frequency or load transients by using a transient fuel-air control to stabilize the combustion system and reduce risk of Lean-Blow Out (LBO) trips during grid excursions (NERC advisory A-2008-06-26-02). In addition, the system prevents preselected load control from counteracting the droop response by dynamically revising the droop setting.

The unique ability of the 7HA.02 technology implemented at the Clear River project to operate over a wide range of load profiles, combined with the fast rate of load change ability, ability to provide fast frequency response, and accurately and efficiently meet startup instructions ensures that the Clear River plant will play a vital role in fulfilling ISO-NE's current and future reliability obligations, especially as more renewable generation is brought on line.

b) Will the CREC contain non-standard equipment to achieve greater flexibility, faster starts, or higher ramp rates compared to each vendor's standard combined cycle designs? If so, specify such non-standard equipment and quantify the improvement over standard designs.

Response: As described in the response to 3-2a above the CREC will utilize "Rapid Response" technology which could be considered as non-standard as compared to other combined cycle plants in the region. The improvements are as described in the response to 3-2a above.

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

DR 3-3

In regard to the statement on page 119, section 7.2.2.1 of the Application: "…the CREC is projected to provide enhanced reliability to the SENE capacity zone (and, by proxy, Rhode Island ratepayers) through its planned used of firm natural gas transport for a portion of its natural gas needs" please:

a) Provide a copy of the Precedent Agreement or equivalent that sets out the commitment to build and the capacity of the gas spur to the CREC in a timely fashion.

Response: [redacted]

b) Provide a copy of the agreement(s) for firm gas supply and firm gas transportation upstream of the new gas spur. If the agreement(s) are not yet in place, describe the process for identifying a supplier and the desired terms of the firm gas agreement.

Response: [redacted]

1. [redacted]
2. [redacted]

[redacted]

[redacted]

c) Specify the firm gas quantity and any provisions that could interfere with such gas deliveries. How did Invenergy determine the firm gas quantity? Will the firm gas quantity be sufficient to operate one of the CREC units at full load for 24 hours?

Response: [redacted]

d) Specify the number of days that the interruptible portion of the gas supply can be interrupted, e.g. 30 days per year. Provide any documentation to support that service.

Response: [redacted]

1. [redacted]
2. [redacted]
3. [redacted]

e) What portion of the CREC's daily and annual needs will be met with firm gas transport versus non-firm gas or fuel oil?

Response: [redacted]

RESPONDENT: John Niland, Invenergy Thermal Development, LLC

DR 3-4

Invenergy intends to construct two 1 million gallon fuel oil storage tanks.

a) How did Invenergy calculate the amount of fuel oil storage for the CREC?

Response: The fuel oil storage tanks are sized to provide 72 hours of operation of one combustion turbine on fuel oil.

c) How much fuel oil storage will be constructed for the first CREC unit?

Response: Both one million gallon fuel oil storage tanks will be installed with the first unit.

d) Provide any conditions in the Air Permit or any other permit that restricts the use of fuel oil.

Response: Fuel oil is used as a back-up fuel and Invenergy has requested that each generating unit be limited to no more than 720 hours per year of operation on fuel oil.

e) Given any permit restrictions and the proposed fuel arrangements, does Invenergy anticipate that the CREC will have sufficient gas and fuel oil to be dispatched at full load in all hours of the year?

Response: Yes.

f) How long will both CREC units be able to operate at full load on fuel oil assuming the two storage tanks are full?

Response: The fuel oil storage tanks are sized to provide 72 hours of operation of one combustion turbine on fuel oil.

g) What arrangements have been made to replenish the storage tanks if necessary? Which fuel oil supplier will provide those replenishment services?

Response: The fuel oil system includes truck unloading stations for receipt of tanker trucks. Fuel oil operation is a contingency for a curtailment of the natural gas fuel supply. Truck deliveries will be scheduled to replenish the fuel oil supply and extend fuel oil operation based on the anticipated duration of the gas curtailment and dispatch of the units. Invenergy has had discussions with local suppliers of oil storage and transportation services, (like Sprague) and expects that a supply contract with an oil supplier would be entered into prior to commercial operation.

h) If the CREC operates on fuel oil, can Invenergy sell its firm gas entitlements to other parties?

Response: CREC could sell its firm gas entitlements to other parties, however given the cost of oil is significantly higher than natural gas, even with the firm transportation costs, Invenergy does not envision that it would ever sell its firm gas entitlements to other parties, unless it was not operating due to an outage.

i) Confirm that arrangements have been made for sufficient water supplies for combustion injection when operating on fuel oil.

Response: A well water pumping and treatment system, and associated pipeline will be installed to supply raw water to the CREC. The pumping capacity of this system will be sufficient to sustain the operation of one combustion turbine on fuel oil. The well water will be pumped into a 750,000 gallon service water storage tank that includes a 300,000 gallon fire water reserve. A demineralized water treatment system will be installed to treat the service water and store it in a 1.8 million gallon demineralized water storage tank. Demineralized water used by the combustion turbines will be supplied from the demineralized storage tank. For periods of extended fuel oil operation, the CREC water treatment system will have provisions to connect trailer mounted portable fixed bed demineralizers to provide additional water treatment capacity.

RESPONDENT: John Niland, Invenergy Thermal Development, LLC

DR 3-5

Page 119, section 7.2.2.1 of the Application states: "The election of this fuel transport service, from a reliability standpoint, should advantageously position the facility vis-à-vis other generators that rely on interruptible transport service and, to a lesser extent, those facilities that rely on fuel oil as a back-up fuel source during extreme events (e.g., the Polar Vortices of Winter 2013/2014)."

a) Explain and quantify (if possible) the fuel advantage of the CREC to other gas-fired facilities that rely on fuel oil as a back-up fuel source.

Response: CREC has the advantage of being on the main Algonquin Gas Transmission (AGT) line and will connect to both the 24" and 30" diameter pipelines that comprises the AGT system so from a locational standpoint it has advantages as compared to other gas fired facilities that are located on laterals connecting to the main AGT system. The primary advantage is that lateral connections are more likely to be constrained first which could result in any gas fired facilities connected to the lateral to run on oil more frequently than facilities connected directly to the AGT system. To the extent that gas delivery service must be curtailed on a natural gas pipeline, service is not simply curtailed on a pro rata basis across all users. Instead, those users with only interruptible transport ("IT") service are typically curtailed first, and then only followed by firm transport ("FT") users to the extent that IT curtailments do not prove sufficient on the pipeline (local distribution companies, serving residential customers, are generally only curtailed if absolutely necessary). Firm transportation service is generally less available on laterals portions of the pipeline system as compared to eth main AGT system. What this means is that facilities with IT-only service will have to rely on fuel oil back-up before a facility like CREC with FT service (i.e., in a gas shortage event, CREC would be able to utilize natural gas longer than a facility with only IT service).

RESPONDENT: John Niland, Invenergy Thermal Development, LLC

DR 3-6

On page 13 lines 17-18 of Ryan Hardy's Pre-Filed Testimony, he claimed the wholesale energy and capacity price savings of approximately $210 million assumes that the CREC will come "…online in two stages: 2019 (485 MW) and 2020 (an additional 485 MW)…."

a) Are the 485 MW figures gross or net output value? What other conditions are assumed, e.g. new and clean condition or average degradation, ISO or other temperature, gas or fuel oil?

Response: The 485 MW figures are net output value. They are based on ISO-NE summer conditions and incorporate average degradation and running on natural gas with fuel oil as backup.

b) Confirm that the $210 million savings is based on a total CREC capacity of 970 MW.

Response: It is based on a total CREC capacity in the capacity market of 970 MW, and a total CREC capacity in the wholesale energy markets of 1,022 MW during the summer months (June through September) and 1,080 MW during the non-summer months. For the avoidance of doubt, the second 485 MW in the capacity market and the second 511/540 MW in the energy market is assumed to come online June 1, 2020.

c) Why does Mr. Hardy's 485 MW value differ from the 511 MW summer capacity value in the PA analysis in Exhibit RH-3?

Response: The 485 MW applies to what CREC clears in the ISO-NE capacity market. The 511 MW capacity is the capacity used in the energy markets during the summer months (see previous question). The 485 MW value is lower because it accounts for the lower output when running on oil instead of natural gas, which will only happen in very rare circumstances.

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

DR 3-7

On page 28 line 16 - page 29 line 13 of Ryan Hardy's Pre-Filed Testimony, he explained that "…there have been changes to the planned capacity…" of the CREC.

a) Will this change affect the results of the ESS Major Source Permit Application?

Response: No, the major source permit application was prepared assuming both units are operating and it is our expectation that the second unit will clear in FCA 11.

b) Confirm that the PA memos in Exhibits RH-2 and RH-3 are based on the current 970 MW capacity estimate.

Response: Exhibit RH-2 is based on the 970 MW capacity, although the second 485 MW comes online June 1, 2020. Exhibit RH-3 is based on the 970 MW capacity in the capacity market and the 1,022 MW during the summer (June through September) and 1,080 MW during the non-summer months in the energy markets. Again, the second 485 MW in the capacity market and the second 511/540 MW in the energy markets come online June 1, 2020.

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

DR 3-8

In the response to DPUC data request 2-2.1 "Overview of Methodology used by PA" that "In the long-term (i.e., the first year new generic capacity is added to the system to meet the target reserve margin), capacity prices are based on the Net CONE of the marginal capacity resource, typically a natural gas-fired combined cycle."

a) Specify "the target reserve margin" that has to be met by ISO-NE

Response: The target reserve margin that has to be met by ISO-NE is 17.63%.

b) Specify the year in the PA capacity market model when new generic capacity is added to meet the target reserve margin

Response: In the post-FCA 10 analysis, it is 2021 for the Without Clear River case and 2025 for the with Clear River case.

c) Explain how the concept of the target reserve margin correlates with the net ICR and the sloped demand curve construct

Response: They are closely related. Target reserve margin is equal to the ICR (Installed Capacity Requirement) divided by the ISO-NE's peak demand forecast. ICR is equal to net ICR plus the capacity from HQICC (Hydro Quebec Interconnection Capability Credits), which is assumed to stay constant at 975 MW. The net ICR is an input parameter to the sloped demand curve. Therefore, by inference, the ICR is an input as well. These parameters are designed to ensure ISO-NE has sufficient capacity for reliability purposes.

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

DR 3-9
Considering that FCA 10 cleared 35,567 MW of total capacity, with a surplus of 1,416 MW over the Net ICR (34,151 MW), explain whether and, if so, why the first CREC unit that cleared FCA 10 is needed for reliability starting from June 1, 2019.

Response: The Net Installed Capacity Requirement ("NICR") is intended to reflect the minimum quantity of capacity that ISO-NE would need to achieve a 1-in-10 LOLE reliability standard. However, the NICR is only one component of the broader Forward Capacity Market ("FCM") mechanism. The FCM process is designed—and continually vetted by FERC and ISO-NE stakeholders—to ensure that the New England power system will have sufficient resources needed to meet the future demand for electricity. In other words, system need is determined by the fulsome FCM process and not by simply procuring capacity at, or above, the NICR. In clearing FCA 10, by definition, the CREC was determined to be part of the most cost effective solution to meet ISO-NE's system needs. As such, it is not feasible to isolate any particular unit from the larger basket of resources that cleared the FCA for system reliability.

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

REDACTED

CONFIDENTIAL - EXHIBIT 1

REDACTED

CONFIDENTIAL

MEMORANDUM OF UNDERSTANDING (MOU)