

September 18, 2006

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

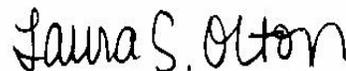
**RE: Docket 3659 – Implementation of the Requirements of the Energy Policy Act of 2005
Comments of National Grid**

Dear Ms. Massaro:

In accordance with the discussion at the pre-hearing conference in the above-captioned proceeding, please find ten (10) copies of comments from National Grid.

Thank you for your attention to this transmittal. If you have any questions regarding this filing, please feel free to contact me at (401) 784-7667.

Very truly yours,



Laura S. Olton

Enclosures

cc: Docket 3759 Service List (Electronically)
Paul Roberti, Esq.
William Lueker, Esq.
Andrew Dzykewicz, Office of Energy Resources

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

Implementation of the Requirements of the Energy Policy Act of 2005))))	Docket No. 3759
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COMMENTS OF NATIONAL GRID

INTRODUCTION

On August 17, 2006, the Public Utilities Commission (“Commission”) held a pre-hearing conference to discuss implementation of certain provisions contained in the federal Energy Policy Act of 2005 (“EPACT”) and any overlapping issues contained in the Rhode Island Comprehensive Energy Conservation, Efficiency and Affordability Act of 2006 (“RI Act”). Specifically, the Commission discussed the topics of generation efficiency, smart metering, distributed generation (“DG”) interconnection, net metering, and fuel diversity as contained in the EPACT. After much discussion on the various topics, the Commission requested that The Narragansett Electric Company, d/b/a National Grid (“National Grid” or the “Company”) file a memorandum on its compliance and applicability of the provisions of the EPACT. The Commission also requested that the Rhode Island Office of Energy Resources (“OER”) provide a memorandum regarding the overlapping issues from the RI Act. This memorandum contains National Grid’s comments.

DISCUSSION

EPACT contains certain standards regarding generation efficiency, fuel sources, net metering, smart metering, and DG interconnection, which are described below.

EPACT requires the Commission to consider each standard and make a determination with respect to each standard. The Commission is not required to consider the EPACT standard, however, if there have been prior state actions regarding the standard.

Specifically, the Commission need not consider the standard if, prior to the enactment of EPACT, (1) the State has implemented the standard concerned (or a comparable standard); (2) the Commission has conducted a proceeding to consider implementation of the standard concerned (or a comparable standard) for the utility; or (3) the State legislature has voted on the implementation of such standard (or a comparable standard) for the utility.¹ Given this provision, National Grid believes that the Commission need not consider the standards of generation efficiency and fuel sources in this docket. National Grid believes that net metering and DG interconnection are addressed by implementation required by the RI Act. Finally, smart metering is not necessary given the manner in which Standard Offer Service is procured through 2009.

I. Generation Efficiency

EPACT states that “Each electric utility shall develop and implement a 10-year plan to increase the efficiency of its fossil fuel generation.”² As was discussed at the prehearing conference, this provision does not apply to National Grid since the Company no longer owns any generation facilities. The Company sold all of its generation as a

¹ EPACT, §§ 1251(b)(3), 1252(i), 1254(b)(3).

² EPACT, § 1251(a)(13), amending § 110(d) of the Public Utility Regulatory Policies Act of 1978 (16 U.S.C. 2621(d) (“PURPA”).

result of implementation of the Utility Restructuring Act (P.L. 1996, ch. 316). R.I.G.L. § 39-1-27. Accordingly, this standard “to increase the efficiency of its fossil fuel generation” cannot apply to the Company, since the Company does not own any fossil fuel generation facilities. Thus, the Commission is not required to consider the EPACT standard on generation efficiency.

II. Fuel Diversity

EPACT states that “each electric utility shall develop a plan to minimize dependence on 1 fuel source and to ensure that the electric energy it sells to consumers is generated using a diverse range of fuels and technologies, including renewable technologies.”³

During the prehearing conference, there was extensive discussion whether this standard applied to National Grid, given that the Company has sold its generation facilities and purchases power in the marketplace and by long term contract. Further, there was discussion regarding Rhode Island’s recently-enacted Renewable Energy Standard, which requires National Grid to obtain at least 3% of the electricity sold at retail to end-use customers from eligible renewable energy resources starting in 2007. R.I.G.L. § 39-26-4. This amount grows by .5% each year.

National Grid believes that the Commission need not consider this standard as it meets the test for prior state action. First, as stated above, National Grid no longer owns generation. Second, the Rhode Island legislature addressed the issue of fuel diversity when it established the Renewable Energy Standard. Among the numerous legislative findings that introduce the Renewable Energy Standard, the General Assembly has

³ EPACT, § 1251(a)(12), amending PURPA §111(d).

declared that, “The people and energy users of Rhode Island have an interest in having electricity supplied in the state come from a diversity of energy sources including renewable resources.” R.I.G.L. §39-26-1(a). Moreover, the Commission has established rules and regulations to implement and enforce the Renewable Energy Standard. Thus, it appears that the Commission need not require National Grid to develop a plan to minimize dependence on one fuel source and to ensure that the electric energy it sells to consumers is generated using a diverse range of fuels and technologies, including renewables.

III. Net Metering

EPACT states that each electric utility shall make available upon request net metering services to any electric consumer that the electric utility serves.⁴ For purposes of the federal act, the term “net metering service” means service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.⁵

Net metering provisions are also contained in the RI Act. The OER is preparing a separate memorandum on the provisions of state law and its interplay with the federal law regarding net metering. National Grid believes that the stakeholder process required under the RI Act, supported and facilitated by the OER, will address the net metering

⁴ EPACT, § 1251(a)(11), amending PURPA §111(d).

⁵ Id.

standard under EPACK and the RI Act, and it will be unnecessary for the Commission to separately consider the standard.

Nevertheless, the Commission has requested information from National Grid regarding its net metering provisions and customers. The Company allows net metering pursuant to Section III.B of R.I.P.U.C No. 1078-A, Qualifying Facilities Power Purchase Rate. Under the terms of this tariff, the policy of net metering is applicable to renewable technologies specified in R.I.G.L. § 39-2-1.2(b), and to individual facilities of less than 25 kVa located on the customer's premises and used to meet the customer's own load. Net metering is limited to charges assessed on a per kilowatt-hour basis. Customers with demand meters must continue to pay charges billed on a kilowatt and/or kVa basis. Net metering is limited, in total, to an overall of one (1) megawatt of installed capacity.

Net metering may encourage the development of innovative generation technologies and smaller customers to consider alternative ways to serve their loads. Customers with net metering pay for usage in one period of a month by generating more kWhs than usage in other periods of the month. For example, a customer with a wind generator could generate more kWhs at night than its use which would roll back the usage from the prior daytime period on the meter if usage exceeded generation during the day. Although beneficial to customers who are eligible, ultimately, net metering is subsidized by all other ratepayers in that the net-metered customer does not pay the full distribution and transmission costs associated with serving the net-metered customer. Thus, previous net metering standards for Rhode Island have limited the amount of capacity eligible for net metering in order to create a positive benefit for the technology and to allow for appropriate review when the opportunities are taken advantage.

For facilities that interconnected with the Company's system after March 31, 1998, the customer's usage and generation is netted for a twelve-month period beginning on the date of the first meter reading after commencement of operation of the qualifying facility. In the event of a negative read for a given month, the amount will accumulate as a "generation credit" to the customer from month to month for a twelve-month period. Generation credits will be used to offset any positive meter reads for subsequent monthly billing periods. At the end of the twelve-month period any unused credits will no longer be available to offset usage and no compensation will be paid for them.

For facilities that were net metered on or before March 31, 1998, the Company pays a rate equal to the arithmetic average of the ISO-NE hourly market clearing prices for the prior calendar month in any month where there is a negative read on the facility's meter.

The Company currently has 78 customers whose facilities are eligible for net metering. The bulk of these customers have installed photovoltaic units as the source of generation.

IV. Smart Metering

With regard to "smart metering" or "time-based metering and communications," EPACT requires each State regulatory authority to conduct an investigation and issue a decision whether or not it is appropriate for electric utilities to provide and install time-based meters and communications devices for each of their customers which enable such customers to participate in time-based pricing rate schedules and other demand response

programs.⁶ As such, the Commission is required to issue a decision whether it is appropriate to implement the standards set forth in subparagraphs (A) and (C) from the EPACT, contained below:⁷

(A) Not later than 18 months after the date of enactment of this paragraph, each electric utility shall offer each of its customer classes, and provide individual customers upon customer request, a time-based rate schedule under which the rate charged by the electric utility varies during different time periods and reflects the variance, if any, in the utility's costs of generating and purchasing electricity at the wholesale level. The time-based rate schedule shall enable the electric consumer to manage energy use and cost through advanced metering and communications technology.

* * *

(C) Each electric utility subject to subparagraph (A) shall provide each customer requesting a time-based rate with a time-based meter capable of enabling the utility and customer to offer and receive such rate, respectively.⁸

Currently, only the Company's large general service rates (Rates G-32 and G-62) contain a time-based component. These rates are mandatory for commercial and industrial customers with demands in excess of 200 kW and optional for customers with demands less than 200 kW. Under the provisions of these tariffs, customers are assessed distribution and transmission demand charges based upon the customer's billing demand, defined as the maximum 15-minute demand occurring within the specified peak hours.

Any non-residential customer is eligible to purchase optional metering services which can provide hourly data to customers. These are described below.

⁶ EPACT, § 1252(b)(3)(i), amending PURPA § 115(i).

⁷ EPACT, § 1252(a)(14)(F), amending PURPA § 111(d)(14)(F).

⁸ EPACT, §§ 1252(a)(14)(A), (C), amending PURPA §§ 111(d)(14)(A)(C).

Optional Enhanced Metering Service

The Company offers Optional Enhanced Metering Service to its non-residential customers receiving metered retail delivery service from the Company pursuant to R.I.P.U.C. No. 1155. There are two service options available under this tariff:

Service Option 1 - Complete Service: Under this service option, the Company will upgrade the existing metering to include a meter equipped with a modem that will collect electricity usage data every 15 minutes. The customer must purchase, install, and maintain a phone line to the meter location. The Company will connect the meter to the phone line and then call the meter daily to provide the facility's interval data. With the appropriate customer-owned software, the customer can access the meter data and perform various analyses on the information.

For this service, the customer has the choice of a single payment of \$267.86 or a monthly fee of \$12.45.

Service Option 2 - Pulse Service: Under this service option, the Company upgrades the existing meter to include a meter equipped with a pulse output for use with a customer's energy management system. The Customer must purchase, install, and maintain a pulse recorder near the meter location. The Company will connect the pulse outputs from the meter to a pulse interface device to which the Customer attaches their energy management system. With the pulse recorder in place, the Customer can collect its facility's energy usage data and review via their own energy management system and/or translation software.

For this service, the customer has the choice of a single payment of \$135.77 or a monthly fee of \$6.31.

Optional Interval Data Service (Energy Profiler Online™)

Pursuant to the Company's Optional Interval Data Service tariff, R.I.P.U.C, No. 1156, non-residential customers taking service on the Company's Optional Enhanced Metering Service tariff or customers who have Company-owned interval data recorders installed at their facilities can utilize a tool that provides them with access to their facility's interval

load data via the Internet. This program allows a customer to understand how electricity is used within its operation over time. A customer can:

- Review load shapes by day, week and month
- Improve budgeting and reporting capabilities
- Decide who can access and review the information through password protection
- Manage energy consumption—identify what is normal and abnormal usage
- View load profiles, usage history and information for multiple sites from previous months or years
- See the results of any energy efficiency and conservation efforts at each site
- Use the information provided to shopping wisely with power suppliers
- Monitor the facility's power factor
- Shift energy usage to lower-cost time periods and move dollars to the bottom line

The fee for this service is \$321 annually for the service at the customer's facility, and \$275 annually for each additional facility requested at the same time.

Currently, 343 customers are employing one or more of these optional services.

Additional Communications Options

The Company is exploring offering other communications options at this time. In order to participate in some of the ISO-NE Load Response programs, the customer must supply five (5) minute interval data to the ISO-NE on a real-time basis. The current enhanced metering options only allow for either a monthly feed to the ISO-NE, or a daily feed to the ISO-NE, provided the customer has installed a phone line at their expense to the meter that is then used to download the meter data by the Company's Meter Data Services department.

In order to supply five-minute data in real-time, the Company is pursuing various wireless communications options. As the need for more frequent downloads occur, the cost of the communications increases. Currently, a landline phone connection can cost the customer \$10 to \$20 per month. The cost of a wireless communications option capable of providing interval data every five minutes can be as high as \$100 per month. Similar to existing cell phone plans, the more data transmitted, the higher the costs.

The discussion above has centered on simply offering time-based meters for customers at their option. In addition to providing time-based meters, there are also so-called 'smart' meters. Smart meters can typically provide other data, i.e., power quality information, outage notification, on-demand reads, by using two-way communication between the customer and the utility. Smart meters have higher communications costs (similar to time-based meters) as well as higher initial purchase and programming costs, and additional data management costs.

Currently, the Company accepts load interval and billing data remotely. The additional information from a smart meter (power quality information, outage notification, on-demand reads) cannot be processed without another or enhanced data management system that would need to be engineered, installed and maintained by the Company.

Smart metering technology is much more expensive than present means of recording customer usage. Although smart metering promises benefits, these benefits, along with associated costs, have not been evaluated in a regulatory forum. Many issues require close examination to reach a determination that smart metering would be a reasonable investment for customers. Some of these issues include customer acceptance,

cost of the technology, savings from use of the technology, and whether implementation should be mandatory or voluntary. As such, EPACT was written to allow such review and does not mandate implementation.

In addition to reviewing various communications options as indicated above, the Company is reviewing the possibility of offering smart meters with various services to its customers.

Analysis

The language in EPACT states that electric utilities “shall offer each of its customer classes, and provide individual customers upon customer request, a time-based rate schedule under which the rate charged by the electric utility varies during different time periods *and reflects the variance, if any, in the utility’s costs of generating and purchasing electricity at the wholesale level.*” (*Emphasis added.*) Since National Grid procures its commodity supply under contracts that do not contain time-based charges, this provision is not appropriate for National Grid’s Standard Offer or Last Resort Service Charges. The supply for Last Resort Service is procured by the Company periodically through competitive solicitation. Historically, prices bid for this service have been per kWh charges that vary monthly and are applicable uniformly to all kWhs delivered. Wholesale Standard Offer Service is procured under several long term contracts that contain a fixed base price that escalates annually and a Fuel Adjustment Provision.⁹ Both the base price and the fuel adjustment are per kWh charges applicable

⁹ The Fuel Adjustment Provision is applicable to contracts serving the former Narragansett service territory only.

to all kWh purchased. Pricing for retail Standard Offer Service has historically been a per kWh charge applicable uniformly to all kWhs delivered.

Since the Standard Offer rate is not time-differentiated through 2009, it would not make sense to require “smart metering” or “time-based metering and communications” because there is no tie between the cost and time of consumption. After 2009, the Commission can revisit this issue when policy decisions are made about how National Grid procures Standard Offer service. In the meantime, non-residential customers may obtain enhanced metering options from the Company at their expense.

After 2009, the Commission could consider the use of a time-differentiated rate for customer classes where net benefits could be estimated. However, tremendous complexity would be created by the offer since the Company would need to track customers by type of offer and request bids for service for the different levels of service. Since the offering would be voluntary, customers could switch between offers or choose to leave the offers altogether for another supplier. This complexity would serve to increase prices as Standard Offer suppliers would view customer switching as an additional risk to factor into their pricing decisions.

V. Interconnection of Distributed Resources

With regard to interconnection of distributed resources, EPACT requires the Commission to consider the standard below and determine whether or not to adopt the standard:

Each utility shall make available upon request, interconnection service to any electric consumer that the electric utility serves. For purposes of this paragraph, the term “interconnection service” means service to an electric consumer under which an on-site generating facility on the consumer’s

premises shall be connected to the local distribution facilities. Interconnection services shall be offered based upon the standards developed by the Institute of Electrical and Electronics Engineers: IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems, as they may be amended from time to time. In addition, agreements and procedures shall be established whereby the services offered shall promote current best practices of interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by associations of state regulatory agencies.¹⁰

The RI Act also contains language regarding DG. Specifically, R.I.G.L. § 42-140.2-2 requires the OER to support and facilitate a stakeholder led study of issues relating to DG and barriers that impede the implementation of DG. Moreover, under the RI Act, the OER shall report the findings and recommendations of the stakeholder's group regarding any necessary statutory changes to reduce barriers to implementation of DG by February 1, 2007. R.I.G.L. § 42-140.2-2(4).

Overall, National Grid believes that the stakeholder process being conducted by OER will address the DG interconnection issues raised in the EPACT. National Grid's current DG interconnection standards are attached hereto and are also available on the Company's web site at:

http://www.nationalgridus.com/narragansett/non_html/interconnection_generation.pdf

Conclusion

National Grid appreciates the opportunity to provide these comments and looks forward to working with the Commission, OER, and other interested parties in this proceeding.

¹⁰ EPACT, §1254(a)(15), amending PURPA Section 111(d)(15).

Narragansett Electric Company

Interconnection Policy

Customer-Owned Generating Facilities

Published: April 2002

Capital District:
280 Melrose Street
Providence, RI 02907

Coastal District:
4145 Quaker Lane
North Kingstown, RI 02852

INTERCONNECTION POLICY CUSTOMER-OWNED GENERATING FACILITIES

Published: April 2002

1.0 Introduction

This “Interconnection Policy” describes the process and requirements of Narragansett Electric for those instances when a Customer desires to connect a customer-owned Generating Facility to the Company’s Distribution System.

Significant damage to the Company’s or the Customer’s facilities can occur if a Generating Facility is interconnected in a manner that does not comply with the Company’s requirements. For that reason, it is very important for any Customer who plans to install any form of Generating Facility and remain connected to the Company’s Distribution System to comply with the Company’s requirements.

This Interconnection Policy addresses Generating Facilities that will be connected electrically to the Company’s Distribution System and operate in synchronism with the voltage and frequency maintained by the Company during normal operating conditions. Under such circumstances, the interconnection of the power source with the Company's Distribution System must meet the technical requirements of this Interconnection Policy and may require an upgrade or other modifications to the Distribution System in order to meet such requirements. Any costs incurred by the Company in making such modifications or upgrades would be reimbursed by Customer. Once the requirements contained in this Interconnection Policy are met, the Company will interconnect the Customer to the Distribution System, subject to the terms of an Interconnection Service Agreement.

This Interconnection Policy is published for the convenience of Customers in order to provide guidance as to what the Company will require. However, Customers should be aware that the procedures and requirements are subject to change from time to time. In addition, depending upon the size of the Generating Facility and the special circumstances faced in any given situation, the Company reserves the right to modify the processes and requirements contained in this publication.

NOTE: This Interconnection Policy uses special capitalized terms throughout the text.

For the convenience of the reader, a “Glossary of Capitalized Terms ” is provided at the end of the descriptive section of the Policy, prior to the Exhibits.

2.0 Transmission System Interconnections and Portable Generators Treated Differently

2.1 *Generation Interconnecting Directly to Transmission System:* This Interconnection Policy does **not** apply to generating units that will be directly interconnected to the transmission system (as opposed to the Company’s Distribution System) for sales or transmission of power into the transmission grid. Any person or business entity contemplating such a generation project must contact the Transmission Department of National Grid USA. A Narragansett Electric representative will refer such generation projects to appropriate National Grid personnel upon request. However, Narragansett Electric would still be involved in the project on other technical issues and the Customer would need to make arrangements with the Company for station service that is back-fed over the transmission facilities when the generating units are not operating.

2.2 *Portable Generators:* The process and requirements contained in this Interconnection Policy are **not** applicable to portable emergency generators. Such generators must be installed in accordance with Article 700 of the *National Electrical Code* and Article 310 of the National Grid USA publication *Information and Requirements for Electric Service Handbook* in such a manner as to ensure that the generator cannot be operated in parallel with the Company’s Distribution System. Attempting to interconnect a generator of this type with the Company’s Distribution System, except as specified in the National Electrical Code and the publication referenced above, can cause significant damage to the Company’s Distribution System and catastrophic damage to the Customer’s generator and premises.

3.0 Process Leading to Execution of Interconnection Service Agreement

The process of interconnecting a Generating Facility with the Company's Distribution System is as follows:

- a. The Customer submits a Notice of Intent to Interconnect ("Notice of Intent") to the Company. The information that is required in the Notice of Intent is provided in Exhibit 1. Such notice should be sent to:

Narragansett Electric:

Capital District

280 Melrose Street

Providence, RI 02907

Attn: Vice President, Business Services

Coastal District

4145 Quaker Lane

North Kingstown, RI 02852

Attn: Vice President, Business Services

- b. After receiving the Notice of Intent, the Company will assign an Account Manager to work with the Customer and serve as the point of contact for all future activities. The Notice of Intent will be reviewed for completeness and to verify that the request is for an interconnection to the Company's Distribution System. In addition, if the Notice of Intent is for an Inverter-based Generating Facility, the Company will determine if the Generating Facility complies with UL Standard 1741. If any of these requirements are not met, the Company will inform the Customer and the application process will be delayed until the Customer has remedied any deficiencies.
- c. The Company will need to perform an engineering review of the project before allowing the interconnection. Depending upon the size, location, and operational characteristics of the project, the Company may need to perform up to two engineering studies. One study is referred to as a "Distribution Facilities Impact Study" (or "Impact Study"). The second is referred to as a "Distribution Facilities

Detailed Study” (or “Detailed Study”). The Impact Study is a first phase engineering study conducted by the Company to determine the required modifications to its Distribution System, resulting in study grade cost estimates (+/- 25%) and an approximate estimate of the time required for such modifications that will be required

to provide the requested interconnection service. The Impact Study is not suitable for finalizing agreements, contracts or commitments. The Detailed Study is a final phase engineering study conducted by the Company to determine the required detailed modifications to its Distribution System, resulting in project grade cost estimates (+/- 10%) and an estimate of the time required for such modifications that will be required to provide the requested interconnection service.

- d. Upon reviewing the Notice of Intent, the Company will determine if an Impact Study is required. In some cases, the Company may determine that an Impact Study is not required and may proceed directly with a Detailed Study. In rare instances, if an Impact Study is not required, the Company may determine that the Generating Facility meets the requirements for immediate interconnection to the Company’s system. In such rare cases, the Company may permit the Customer to immediately interconnect, subject to executing an Interconnection Service Agreement.
- e. If an Impact Study is required, the Company will prepare a cost estimate to perform the study and will submit such estimate to the Customer.
- f. If the Customer elects to proceed with the Impact Study, the Customer and the Company will execute a Distribution Facilities Impact Study Agreement, a sample short form of which is provided in Exhibit 3. However, the Company reserves its right to include additional provisions and use a longer form of agreement to the extent necessary to address any specific circumstances of the project. The Customer will be required to pay the Company for the costs incurred in performing the study.
- g. Upon execution of the Distribution Facilities Impact Study Agreement and receipt of payment in full, the Company will conduct the Impact Study and, upon completion of

the work, issue a Distribution Facilities Impact Study Report to the Customer. The Report will indicate whether a Detailed Study is required.

- h. If a Detailed Study is required and the Customer elects to proceed with the project, the Company will prepare a cost estimate to perform the study and will submit such estimate to the Customer.
- i. If the Customer elects to proceed with the Detailed Study, the Customer and the Company will execute a Distribution Facilities Detailed Study Agreement, a form of which is provided in Exhibit 4. However, the Company reserves its right to change the terms or include additional provisions to address the specific circumstances of the project. The Customer will be required to pay the costs incurred by the Company in performing the study.
- j. Upon execution of the Distribution Facilities Detailed Study Agreement and receipt of payment in full, the Company will conduct the Detailed Study and, upon completion of the work, issue a Distribution Facilities Detailed Study Report to the Customer.
- k. If, after reviewing the Distribution Facilities Detailed Study Report, the Customer elects to proceed with the construction of facilities to interconnect the Generating Facility, the Company may require the Customer to execute an Interconnection Service Agreement.
- l. Upon execution of the Interconnection Service Agreement and receipt of any payments owed, the Company will construct the required facilities.
- m. The terms of the Interconnection Service Agreement will depend upon the size of the Generating Facility, the expected operating characteristics of the Generating Facility, and the configuration of the Company's Distribution System in the area, as well as other factors. The Agreement also will require the Customer to pay for certain costs

incurred by the Company in constructing and/or upgrading facilities (See Section 5 below).

IMPORTANT NOTE: In performing its engineering reviews, the Company will not be reviewing or making recommendations relating to the protection of the Generating Facility or other Customer facilities against possible damage resulting from parallel operation with the Company. The Company's review is designed to determine what must be constructed or installed to protect the Company's Distribution System. The Customer is responsible for installing its own protective relays or other equipment to protect itself against damage that can be caused by the unexpected flow of electricity back fed from the Company's Distribution System into the Generating Facility or other Customer facilities.

4.0 Generating Facility Classification

The interconnection requirements for a Generating Facility or Inverter are dependent on its capacity and the type of power production technology utilized.

To determine the requirements for a given Generating Facility, the following Categories and Types have been established:

Categor y	Maximum Output (kW)
1	≤ 10
2	> 10 and ≤ 60
3	> 60 and ≤ 300
4	> 300 and $\leq 1,000$
5	$> 1,000$

Type	Technology
A-1	Inverter-based, single phase
A-3	Inverter-based, three phase
B-1	Induction generator, single phase
B-3	Induction generator, three phase
C-1	Synchronous generator, single phase
C-3	Synchronous generator, three phase

Tables 1-A and 1-B provide an overview of the applicable interconnection requirements for Category 1, 2, 3 and 4 Facilities. Category 5 Facilities are subject to the full extent of requirements contained in this Interconnection Policy.

**TABLE 1A
OVERVIEW OF INTERCONNECTION REQUIREMENTS**

Category 1 Facilities				
	If Connected to Radial Distribution System*	If Connected to Network Distribution System*		Distribution Facilities Impact Study
Type A-1	Requirement 1	Requirements 1 & 2		Not Required
Type A-3	Requirement 1	Requirements 1 & 2		Not Required
Type B-1	Requirement 3	Requirements 2 & 3		Required **
Type B-3	Requirement 3	Requirements 2 & 3		Required **
Type C-1	Requirement 4	Requirements 2 & 4		Required
Type C-3	Requirement 4	Requirements 2 & 4		Required

Category 2 Facilities				
	If Connected to Radial Distribution System*	If Connected to Network Distribution System		Distribution Facilities Impact Study
Type A-1	Requirement 1	Requirements 1 & 2		Required (Note A)
Type A-3	Requirement 1	Requirements 1 & 2		Required (Notes A & B)
Type B-1	Requirement 3	Requirements 2 & 3		Required (Note A)
Type B-3	Requirement 3	Requirements 2 & 3		Required (Notes A & B)
Type C-1	Requirement 4	Requirements 2 & 4		Required (See Note A)
Type C-3	Requirement 4	Requirements 2 & 4		Required (Notes A & B)

* Most distribution systems are radial in nature; however, network systems are employed in some urban areas. Contact the Company to determine whether the proposed Generating Facility site is served by a Radial Distribution System or Network Distribution System.

** The scope of the study is expected to be minimal.

Requirement. 1: The Inverter must comply with UL Standard 1741.
A photovoltaic system must also comply with IEEE Standard 929-2000.

Requirement. 2: For installations in which the Facility minimum load is less than fifteen (15) times the peak output of the generating system, a reverse power flow relay will be required as part of the protection system. If the Facility minimum load is at least fifteen (15) times the peak output of the generating system, a reverse power flow relay will not be required.

Requirement. 3: The Generating Facility must meet the protection requirements specified for induction generators as shown in Exhibit 2.

Requirement. 4: The Generating Facility must meet the protection requirements specified for synchronous generators as shown in Exhibit 2.

Note A: If the Customer proposes to install a Generating Facility with a capacity greater than 100% of the capacity of the distribution transformer providing site service, a Distribution Facilities Impact Study and Distribution Facilities Detailed Study would be required and an upgrade charge would apply.

Note B: If the Customer receives single-phase electrical service from the Company but desires to install a three-phase power Generating Facility, a Distribution Facilities Impact Study and Distribution Facilities Detailed Study would be required and an upgrade charge would apply.

**TABLE 1B
 OVERVIEW OF INTERCONNECTION REQUIREMENTS**

Category 3 Facilities				
	If Connected to Radial Distribution System*	If Connected to Network Distribution System*		Distribution Facilities Impact Study
Type A-3	Requirement 1	Requirements 1 & 2		Required (Note A)
Type B-3	Requirement 3	Requirements 2 & 3		Required
Type C-3	Requirement 4	Requirements 2 & 4		Required

Category 4 Facilities				
	If Connected to Radial Distribution System*	If Connected to Network Distribution System*		Distribution Facilities Impact Study
Type A-3	Requirement 1	Requirements 1 & 2		Required
Type B-3	Requirement 3	Requirements 2 & 3		Required
Type C-3	Requirement 4	Requirements 2 & 4		Required

* Most distribution systems are radial in nature; however, network systems are employed in some urban areas. Contact the Company to determine whether the proposed Generating Facility site is served by a Radial Distribution System or Network Distribution System.

Requirement. 1: The Inverter must comply with UL Standard 1741.

Requirement. 2: For installations in which the Facility minimum load is less than fifteen (15) times the peak output of the generating system, a reverse power flow relay will be required as part of the protection system. If the Facility minimum load is at least fifteen (15) times the peak output of the generating system, a reverse power flow relay will not be required.

Requirement 3: The Generating Facility must meet the protection requirements specified for induction generators as shown in Exhibit 2.

Requirement 4: The Generating Facility must meet the protection requirements specified for synchronous generators as shown in Exhibit 2.

Note A: If the Customer proposes to install a Generating Facility with a capacity greater than 100% of the capacity of the distribution transformer providing service to the site, a Distribution Facilities Impact Study and Distribution Facilities Detailed Study would be required and an upgrade charge would apply.

5.0 Construction of the Distribution Facilities Upgrades

5.1 General Considerations: The Company will arrange to construct the Distribution Facilities Upgrades at the Customer's expense. The Company will determine a schedule for construction and final interconnection. The Company will use reasonable efforts to meet the schedule in order to permit interconnection with the Generating Facility in a timely manner. However, the Company cannot guarantee the project will be met by the given date in the schedule. The earlier the Company receives the Notice of Intent, the more likely that project schedules desired by the Customer can be met. The Company will use, or specify that the selected contractor use, standard equipment customarily employed by the Company for its own system in accordance with Good Utility Practice in making the final interconnection.

The Customer will be required to pay the Company for all reasonable costs incurred by the Company in constructing a reliable and safe interconnection that has no adverse impacts on the Distribution System. Those costs may include: (i) engineering design, (ii) construction costs, (iii) tax liability (see Section 5.2 below), (iv) the costs and fees of all permits, licenses, franchises or regulatory or other approvals necessary for the construction and operation of the Distribution Facilities Upgrades and (v) any such costs and fees for any ancillary facilities.

5.2 CIAC Tax Liability: Payments to the Company relating to construction or upgrades will be deemed a contribution in aid of construction ("CIAC") under federal tax law and, as a result, are taxable to the Company, unless the Customer meets the requirements for a limited generation project exemption under IRS rules. (See Section 5.3 below regarding the exemption) Customers with non-exempt projects will be required to reimburse the Company for that tax liability as a part of the project costs. The Customer must agree to pay the Company in advance for all taxes owed on the CIAC. Such payment will be made within ten (10) days of notice from the Company of the estimated taxes owed, based on the Company's then effective gross-

up factor times the amount of the CIAC. The Company will refuse final interconnection with the Generating Facility until such payment is made.

5.3 CIAC Exemption: Current IRS rulings have established a limited exemption from CIAC liability for generation projects that are constructed for the primary purpose of selling power into the transmission grid. It is unlikely that a Customer considering a self-generation project designed to serve all or a portion of the Customer's on-site electricity requirements would qualify. If a Customer believes it is eligible, the Customer will be required to provide certified engineering reports of projected power flows to and from the Customer's facilities over specified periods, to determine whether the exemption is met. For example, under current IRS rules, if more than 5% of the power expected to flow over the interconnection flows from the Distribution System into the Customer's facilities, the exemption would not be met. This summary, however, is not intended to set forth a complete explanation of the exemption.

5.4 Land Interests: The Customer recognizes that Distribution Facilities Upgrades may require acquisition of land interests, which may require individual agreements between the Company and third party landowners. The Customer will be required to pay to the Company all reasonable costs incurred associated with these acquisition agreements in advance of their execution. The Company reserves the right to draft any and all documents creating land interests that it will receive to effectuate interconnection service under this Interconnection Policy. In the event the Customer acquires the land, permits, licenses, franchises or regulatory or other approvals necessary for the construction and operation of the Distribution Facilities Upgrades, the Company has the right to approve or reject any terms and conditions related to such acquisition prior to the start of service.

6.0 Distribution Facilities Upgrades Charge

If Distribution Facilities Upgrades are required to accommodate installation of the Generating Facility, the Customer will be required to pay a Distribution Facilities Upgrades Charge that reimburses the Company for its costs. Any such charges will be reflected in the terms of the Interconnection Service Agreement.

7.0 Delivery and Measurement of Electricity

7.1 Voltage Level: All electricity across the Interconnection Point will be in the form of single-phase or three-phase sixty-hertz alternating current at a voltage class determined by mutual agreement of the Company and the Customer.

7.2 Machine Reactive Capability

7.2.1 Category 1, 2, 3 and 4 Facilities: Category 1, 2, 3 or 4 Facilities will not be required to provide reactive capability.

7.2.2 Category 5 Facilities: Each Category 5 Generating Facility interconnected with the Company's Distribution System will be required to provide reactive capability to regulate and maintain system voltage at the Interconnection Point. The Company and NEPOOL will establish a scheduled range of voltages to be maintained by the Generating Facility. The reactive capability requirements will be reviewed as part of the Distribution Facility Impact Study and Distribution Facility Detailed Study.

7.3 Metering, Related Equipment and Billing Options: The Company will furnish, read and maintain all revenue metering equipment. In most cases, the Company will own the meter and the Customer will pay to the Company a monthly charge to cover taxes, meter maintenance, incremental reading and billing costs, the allowable return on the invoice cost of the meter and the depreciation of the meter.

The Customer will provide suitable space within the Generating Facility for installation of the metering, telemetering and communication equipment at no cost to the Company.

The Customer will be responsible for purchasing and installing software, hardware and/or other technology that may be required by the Company to read billing meters.

All metering equipment installed pursuant to this Interconnection Policy and associated with the Generating Facility will be routinely tested by the Company at Customer's expense, in accordance with applicable Company and/or ISO-New England criteria, rules and standards. If, at any time, any metering equipment is found to be inaccurate by a margin greater than that allowed under applicable criteria, rules and standards, the Company will cause such metering equipment to be made accurate or replaced. The cost to repair or replace the meter will be borne by the Company, if the Company owns the meter, or by the Customer if the Customer owns the meter.

If the Metering Point and the Point of Receipt or Point of Delivery are not at the same location, the metering equipment will record delivery of electricity in a manner that accounts for losses occurring between the Metering Point and the Point of Receipt or Point of Delivery. Losses between the Metering Point and Point of Receipt will be reflected pursuant to applicable Company, NEPOOL or ISO-New England criteria, rules or standards.

The type of metering equipment to be installed at a Generating Facility is dependent on the Category (size) of the facility and how and to whom the net Generating Facility output will be sold. One of the following equipment options and associated requirements will apply, depending upon the size of the Generating Facility:

- Net Metering – in which a standard distribution class meter is installed and is enabled to run in a normal direction during periods of net consumption and to run backwards during periods of net generator output. All metering equipment included in this type of installation, including self-contained meters and instrument transformers and meters, shall meet ANSI C12.1

Metering Accuracy Standards and ANSI C57.13 accuracy requirements for instrument transformers.

- Bi-directional, non-interval meter without remote access – in which a distribution class meter with multiple registers is installed. One set of registers will record energy flows from the Company to the Generating Facility during periods when the Generating Facility is a net consumer of energy (the other register will record no flow during these periods) and a second set of registers will flow energy flows from the Generating Facility to the Company during periods when the Generating Facility is a net producer of energy (the other register will record no flow during these periods). Each set of registers will record total flows only and will not record flows during specific intervals. All metering equipment included in this type of installation, including self-contained meters and instrument transformers and meters, shall meet ANSI C12.1 Metering Accuracy Standards and ANSI C57.13 accuracy requirements for instrument transformers.
- Bi-directional, interval meter with remote access – in which a distribution class meter with multiple registers is installed. One set of registers will record energy flows from the Company to the Generating Facility during periods when the Generating Facility is a net consumer of energy (the other register will record no flow during these periods) and a second set of registers will flow energy flows from the Generating Facility to the Company during periods when the Generating Facility is a net producer of energy (the other register will record no flow during these periods). Each set of registers will record total flows as well as flows during hourly intervals. In addition, the meters will be equipped with remote access capability that may include telemetering to the extent required by applicable NEPOOL standards. All metering equipment included in this type of installation will meet the requirements contained in NEPOOL

Operating Procedure No. 18, “Metering and Telemetry Criteria” and
the

Company’s “Policy and Practices for Metering and Telemetry Requirements for New or Modified Interconnections”. Copies of both publications are available from the Company upon request. The Customer will be responsible for providing all necessary leased telephone lines and any necessary protection for leased lines and will furthermore be responsible for all communication required by ISO-New England, or by ISO-New England’s designated satellite. The Customer will maintain all telemetry and transducer equipment at the Generating Facility in accordance with ISO-New England criteria, rules and standards. The Company will purchase, own and maintain all telemetry equipment located on the Customer’s facilities, if the Customer desires, at the Customer’s expense. The Customer will provide, install and own Company-approved or Company-specified test switches in the transducer circuits.

7.3.1 Qualifying Facilities of 25 kVA or Less: Only Qualifying Facilities of 25 kVA or less are entitled to Net Metering. All other Generating Facilities will be equipped with bi-directional metering.

7.3.2 Category 1, 2, 3, and 4 Facilities: Category 1, 2, 3, and 4 Facilities will be equipped with a bi-directional, non-interval meter without remote access; provided, however a bi-directional, interval meter with remote access will be installed if the Customer elects to install such meter at its expense or the sale of energy from the Generating Facility requires such a meter (such as in the case of a sale from the Generating Facility to the NEPOOL markets or to a third party).

7.3.3 Category 5 Facilities: Category 5 Facilities will only be equipped with bi-directional, interval meters with remote access. In addition, Category 5 Facilities which are 5 MW or greater are required by NEPOOL Operating Procedure No. 18 to

provide telemetering equipment and to supply accurate and reliable information to system operators regarding metered values for MW, MVAR, volt, amp, frequency,

breaker status and all other information deemed necessary by ISO-NE and the NEPOOL Satellite (REMVEC).

8.0 Access and Control: Properly accredited representatives of the Company or its Affiliate will at all reasonable times need to have access to the Generating Facility to make reasonable inspections and obtain information required in connection with this Interconnection Policy. Representatives will, of course, make themselves known to the Customer's personnel, state the object of their visit, and conduct themselves in a manner that will not interfere with the construction or operation of the Generating Facility. The Company or its Designated Agent will have control such that it may open or close the circuit breaker or disconnect and place safety grounds at the Point of Receipt, Point of Delivery, or at the station if the Point of Delivery is remote from the station.

9.0 Back Up Rates: To the extent that a Customer will rely upon the Company to deliver electricity to the Customer when the Generating Facility is not self-supplying the Customer, one of the Company's Back Up Service Rates will apply. The Account Manager assigned to the project can provide information to the Customer about these rates, upon request.

10.0 Insurance: For Category 2 Facilities, except Category 2 Facilities that are Net Metered, and all Category 3, 4 and 5 Facilities, the Customer may be required to provide and maintain insurance coverage as described in Exhibit 5, attached hereto and incorporated by reference.

GLOSSARY OF CAPITALIZED TERMS

The following words and terms have the following meanings when used in this Interconnection Policy:

Company: The Narragansett Electric Company.

Designated Agent: Any entity that performs actions or functions on behalf of the Company or the Customer required under this Interconnection Policy and/or the Exhibits.

Detailed Study: See the definition of “Distribution Facilities Detailed Study”.

Distribution Facilities Upgrades: Modifications or additions to distribution-related facilities that are integrated with and support the Company’s Distribution System for the benefit of the Customer.

Distribution Facilities Impact Study: The first phase of engineering study conducted by the Company to determine the required modifications to its Distribution System, resulting in study grade cost estimates (+/- 25%) and an approximate estimate of the time required for such modifications that will be required to provide the requested interconnection service. The Distribution Facilities Impact Study is not suitable for finalizing agreements, contracts or commitments.

Distribution Facilities Detailed Study: The final phase of engineering study conducted by the Company to determine the required detailed modifications to its Distribution System, resulting in project grade cost estimates (+/- 10%) and an estimate of the time required for such modifications that will be required to provide the requested interconnection service.

Distribution Facilities Upgrades Charge: A charge to be paid by the Customer equal to all costs incurred by the Company that are associated with upgrading or modifying the Distribution System to assure a safe and reliable interconnection of the Generating Facility with the Company’s Distribution System that has no adverse impacts on the Distribution System.

Distribution System: The facilities owned, controlled or operated by the Company that are used to provide service to its customers.

Generating Facility: A customer-owned source of electricity, which may be an Inverter or a rotating generator of the synchronous or induction type and all facilities ancillary and appurtenant thereto, which the Customer requests to interconnect to the Distribution System. This term excludes portable generators (See Section 2).

Good Utility Practice: Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

Impact Study: See the definition of “Distribution Facilities Impact Study”.

Customer: A customer desiring to install an independently-operated Generating Facility, which is interconnected with the Company’s Distribution System.

Interconnection Service Agreement: A legally binding agreement for interconnection service entered into between the Customer and the Company that sets forth the obligations and responsibilities of the Customer in operating its Generating Facility while it is interconnected to the Company’s Distribution System. The agreement also will require the Customer to pay for certain costs incurred by the Company in constructing and/or upgrading facilities (See Section 5).

Inverter: An electrical device that accepts direct current as input, and produces alternating current as output.

ISO-New England: The Independent System Operator established in accordance with the New England Power Pool (“NEPOOL”) Agreement, which is responsible for managing the bulk power generation and transmission systems in New England.

Metering Point: For meters that do not utilize instrumentation transformers, the point at which the billing meter is connected. For meters that utilize instrumentation transformers, the point at which the instrumentation transformers are connected.

Network Distribution System: Electrical service where two or more distribution transformers have their secondary windings connected in parallel to form a network of conductors supplying service voltage to customers. Primary voltage to the transformers may come from a number of independent circuits, so that loss of one primary circuit will not generally cause a loss of service voltage to customers.

Notice of Intent to Interconnect: A written notification provided by Customer to the Company, which initiates the interconnection process. The Company may require a Notification of the type found in Exhibit 1 to this Interconnection Policy.

Point of Delivery: A point on the Company's Distribution System where the Customer's Generating Facility delivers electricity into the Company's Distribution System when generation output exceeds the customer's total load. The point of Delivery will be specified in the Interconnection Service Agreement.

Point of Receipt: A point on the Company's Distribution System where the Company delivers electricity to the Customer when the customer's total load exceeds its generation output. The Point of Receipt will be specified in the Interconnection Service Agreement.

Qualifying Facility: A generation facility that has received certification as a Qualifying Facility from the Federal Energy Regulatory Commission in accordance with the Federal Power Act, as amended by the 1978 Public Utilities Regulatory Policies Act.

Radial Distribution System: Electrical service from a system consisting of one or more primary circuits extending from a single substation or transmission supply point arranged such that each primary circuit serves customers in a particular local area.

EXHIBIT 1

NOTICE OF INTENT TO INTERCONNECT

The following information must be provided with the Customer's Notice of Intent to Interconnect:

- a) The name and address of the Customer and location of the generating facility;
- b) A brief description of the generating facility, including a statement indicating whether the generating facility is a small power production facility or cogeneration facility;
- c) The primary energy source used or to be used by the generating facility;
- d) The power production capacity of the generating facility and the maximum net capacity that may be delivered to the Company's system;
- e) The owners of the generating facility, including the percentage ownership by any electric utility or public utility holding company, or by any entity owned by either;
- f) The expected date of installation and the anticipated on-line date;
- g) The anticipated purchaser of the output of excess output of the generating facility (the Company or other third party) and the anticipated form (simultaneous purchase and sale, net purchase and sale, net metering, or other method);
- h) A description of any power conditioning equipment to be located between the generating facility and the Company's system;
- i) A description of the type of generator used in the generating facility installation (synchronous, induction, photovoltaic, or other).
- j) A description of the extent to which the customer will continue to rely upon the Company for delivering electricity to the Customer from sources other than the generating facility.

EXHIBIT 2

Policy and Practices for Protection Requirements For New or Modified Generation Interconnections with the Distribution System

Any Generating Facility desiring to interconnect with the Company's Distribution System or modify an existing interconnection must meet the technical specifications and requirements set forth in this Protection Policy. Once interconnected, the Company, in keeping with Good Utility Practice and in its sole discretion, may disconnect from the Generating Facility if the Generating Facility deviates from the technical specifications and requirements contained in this Protection Policy. The Generating Facility must return to full compliance with this Protection Policy prior to reconnecting with the Company's system.

The specifications and requirements listed in this Interconnection Policy are intended solely to mitigate possible adverse impacts caused by the Generating Facility on the Company's equipment and on other customers of the Company. They are not intended to address protection of the Generating Facility itself or the Customer's internal load. It is the responsibility of the Generating Facility to comply with the requirements of all appropriate standards, codes, statutes and authorities to protect itself and its loads.

To determine the protection requirements for a given Generating Facility, the following Categories have been established:

Category	Maximum Output (kW)
1	≤ 10
2	> 10 and ≤ 60
3	> 60 and ≤ 300
4	> 300 and $\leq 1,000$
5	$> 1,000$

I Protection Requirements

Category 1 Facilities

General Requirements:

If, due to the interconnection of the Generating Facility, when combined with preexisting facilities interconnected to the Company's system, the rating of any of the Company's equipment or the equipment of others connected to the Company's system will be exceeded or its control function will be adversely affected, the Company will have the right to require the Customer to pay for the purchase, installation, replacement or modification of equipment to eliminate the condition. Where such action is deemed necessary by the Company, the Company will, where possible, permit the Customer to choose among two or more options for meeting the Company's requirements as described in this Protection Policy.

Requirements for Inverter-based (Type A) installations:

- a. The Company's distribution circuits generally operate with automatic reclosing following a trip with automatic reclosing times as short as five seconds without regard to whether the Generating Facility is keeping the circuit energized. The Generating Facility is responsible for protecting its equipment from being re-connected out of synchronism with the Company's system by an automatic line reclosure operation.
- b. The following information must be submitted by the Customer for review and acceptance by the Company prior to the Company's approving the Customer's request for interconnection:
 - An electrical one-line diagram or sketch depicting how the inverter will be interconnected relative to the service entrance panel and the electric meter.
 - The make, model and manufacturer's specification sheet for the inverter.
- c. For Facilities that utilize photovoltaic technology, it is required that the system be installed in compliance with IEEE Standard 929-2000, "IEEE Recommended Practice for

Utility Interface of Photovoltaic (PV) Systems”. The inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, AStatic Inverters and Charge Controllers for Use in Photovoltaic Power Systems”. Based on the information supplied by the Customer, if the Company determines the inverter is in compliance with UL 1741, the Customer’s request for interconnection will be approved without the need to conduct a Distribution Facilities Impact Study or a Distribution Facilities Detailed Study.

- d. For Facilities that utilize wind technology or other direct current energy sources and employ inverters for production of alternating current, the inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, “Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems”. Based on the information supplied by the Customer, if the Company determines the inverter is in compliance with UL 1741 the Customer’s request for interconnection will be approved without the need to conduct a Distribution Facilities Impact Study or a Distribution Facilities Detailed Study.

Requirements for Induction Generator (Type B) installations:

- a. The following information must be submitted by the Customer for review and acceptance by the Company prior to the Customer finalizing the Generating Facility’s protection design and the Company’s approving the Customer’s request for interconnection:
 - Three copies of a Generating Facility one-line drawing.
 - Three copies of a one-line drawing showing the relays, if required in this Interconnection Policy, and metering including current transformer (“CT”) and voltage transformer (“VT”) connections and ratios.
 - Three copies of a three-line drawing for three phase units or a two-line drawing for single phase units showing the AC connections to the relays, if required in this Interconnection Policy, and meters.
 - The generator nameplate information including rated voltage, rated current, power factor, HP/kW, rated speed and locked rotor current.
 - If the Generating Facility owns the transformer between the Company and the Generating Facility, the generator step up transformer nameplate information

including rated voltage, rated kVA, proposed winding connections, positive sequence impedance plus zero sequence impedance and zero sequence equivalent circuit.

- A list of protective relay equipment proposed to be furnished to conform to this Protection Policy including relay types, styles, manufacturer's catalog numbers, ranges and descriptive bulletins. Three copies of applicable relay instruction manuals may also be required if the Company does not already possess them.
 - Schematic drawings showing the control circuits for the interconnection breaker(s) or contactor(s).
 - Specifications for CTs and VTs relevant to the interconnection including their make, model, accuracy class, ratio, and available taps.
 - The proposed grounding method for the stator winding of the generator.
 - Other information that may be determined by the Company as required for a specific interconnection.
- b. The Customer must submit to the Company relay settings for all Generating Facility protective relays that affect the interconnection with the Company's system at least four weeks prior to the scheduled date for setting the relays for review and acceptance by the Company.
- c. A Generating Facility using induction generator(s) connected in the vicinity of capacitance sufficient to self-excite the generator(s) must meet the requirements for synchronous machines of the same Category. The capacitors that enable self-excitation may actually be external to the Generating Facility and may belong to the Company or to other customers of the Company. The Company will not restrict the existing or future application of capacitors on its lines nor restrict their use by other customers to accommodate a Generating Facility with induction machines.
- d. As changes occur in the location and size of capacitors, the Generating Facility may be required in the future to upgrade its interface to meet the requirements for synchronous machines if self-excitation becomes possible even if not initially possible.
- e. A circuit breaker or contactor will be installed to isolate the Generating Facility from the Company's system ("Interconnection Breaker" or "Interconnection Contactor"). If there

is more than one Interconnection Breaker or Interconnection Contactor, the requirements of this Protection Policy will apply to each one individually.

- f. The Company will review the relay settings as submitted to assure adequate protection for the Company's facilities. The Company will not be responsible for the protection of the Generating Facility or Customer's other facilities. The Generating Facility will be responsible for protection of its system against possible damage resulting from parallel operation with the Company. If requested by the Customer, the Company will provide system protection information for the line terminal(s) directly related to the interconnection. This protection information is provided exclusively for use by the Customer in evaluating protection of the Generating Facility or Customer's other facilities during parallel operation.
- g. The Company reserves the right to specify the winding connections for the transformer between the Company's voltage and the Generating Facility's voltage ("Step Up Transformer") as well as whether it is to be grounded or ungrounded at the Company's voltage. In the event that the transformer winding connection is grounded-wye/grounded-wye the Company reserves the right to specify whether the generator stator is to be grounded or not grounded. The Customer will be responsible for procuring equipment with a level of insulation and fault withstand capability compatible with the specified grounding method.
- h. In general, across the line starting of rotating machines is not permitted unless it can be demonstrated that the resultant voltage flicker is within the Company's limits for starting of similar sized motors. If an Interconnection Breaker or latching type contactor is to be tripped by protective relays to satisfy this Protection Policy, then the Interconnection Breaker or Interconnection Contactor control circuits will be DC powered from a station battery or Company-approved equivalent.
- i. A control interlock scheme that detects voltage on the Company's line(s) will be used to prevent the Generating Facility from energizing or attempting to energize the Company's line(s). The logic for this scheme should be hardwired to prevent the Interconnection Breaker (or Interconnection Contactor where appropriate) from closing. No interposing computer or programmable logic controller or the like will be used in this logic.

- j. The Generating Facility will provide a disconnect switch at the interconnection point with the Company that is accessible to Company personnel at all times that can be opened for isolation. The Company will have the right to open this disconnect switch during emergency conditions or with reasonable notice to the Customer at other times. The Company will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on the Company side by Company personnel. The switch will be of a manufacture and type generally accepted for use by the Company.
- k. Where protective relays are required by this Protection Policy, their control circuits will be DC powered from a station battery. Solid-state relays will be self-powered or DC powered from a station battery. If the Generating Facility uses a non-latching interconnection contactor, AC powered relaying satisfying the requirements of this Protection Policy may be allowed provided the relay and its method of application is fail safe, meaning that if the relay fails or if the voltage and/or frequency of its AC power source deviate from the relay's design requirements for power, the relay will immediately trip the generator by opening the coil circuit of the Interconnection Contactor.
- l. CT ratios and accuracy classes will be chosen such that secondary current is less than 100 amperes and transformation errors are less than 10% under maximum fault conditions.
- m. If the interconnection voltage requires, a voltage transformer will be provided by the Generating Facility and will be connected to the Company side of the Interconnecting Breaker or Interconnecting Contactor. The voltage from this VT will be used in the interlock as specified above. For three phase applications, a VT for each phase is required.
- n. All protective relays required by this Protection Policy will meet ANSI/IEEE Standard C37.90, C37.90.1 and C37.90.2 and be of a manufacturer and type generally accepted for use by the Company.
- o. Voltage relays will be frequency compensated to provide a uniform response in the range of 40 to 70Hz.
- p. Tripping by protective relays required to satisfy this Protection Policy must be hardwired

to the device they are tripping. No interposing computer or programmable logic controller or the like is permitted in the trip chain between the relay and the device being tripped.

- p. On three phase installations where voltage relaying is required by this Protection Policy, all three phases must be sensed either by three individual relays or by one relay that contains three elements. If the voltage on any of the three phases is outside the bounds specified by the Company, the unit will be tripped.
- q. The Generating Facility will provide an undervoltage relay sensing voltage, preferably on the Company's side of the Interconnection Breaker or Interconnection Contactor, which trips the Interconnection Breaker or Interconnection Contactor; provided, however, for single phase units, an undervoltage relay is not required, provided the generator is interconnected through a non-latching contactor whose coil is held by AC voltage from the Company's side of the contactor such that the contactor drops out and will not close in the absence of Company voltage.

Requirements for Synchronous Generator (Type C) installations:

Category 1 Facilities utilizing synchronous generators will meet all the requirements that are applicable to synchronous generators for Category 2, 3, 4 and 5 Facilities.

Category 2 Facilities

General Requirements: The Generating Facility will provide a disconnect switch at the interconnection point with the Company that can be opened for isolation. The switch will be in a location accessible to Company personnel at all times. The Company will have the right to open this disconnect switch during emergency conditions and with reasonable notice to the Customer at other times. The Company will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on the Company side by Company personnel. The switch will be of a type generally accepted for use by the Company.

Requirements for Inverter-based (Type A) installations:

- a. The Company's distribution circuits generally operate with automatic reclosing following a trip with automatic reclosing times as short as five seconds without regard to whether the Generating Facility is keeping the circuit energized. The Generating Facility is responsible for protecting its equipment from being re-connected out of synchronism with the Company's system by an automatic line reclosure operation.
- b. b. The following information must be submitted by the Customer for review and acceptance by the Company prior to the Company's approving the Customer's request for interconnection:
 - X An electrical one line diagram or sketch depicting how the inverter will be interconnected relative to the service entrance panel and the electric meter.
 - X The make, model and manufacturer's specification sheet for the inverter.

- c. For Facilities that utilize photovoltaic technology, it is required that the system be installed in compliance with IEEE Standard 929-2000, “IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems”. It is required that the inverter meet the Underwriters Laboratories Inc. Standard UL 1741, “Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems”.
- d. For Facilities that utilize wind technology, fuel cell technology or other inverter-based systems, the inverter must meet the Underwriters Laboratories Inc. Standard UL 1741, “Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems”.

Requirements for Induction Generator (Type B) installations:

- a. The following information must be submitted by the Customer for review and acceptance by the Company prior to the Customer finalizing the Generating Facility’s protection design and the Company’s approving the Customer’s request for interconnection:
 - Three copies of a Generating Facility one-line drawing.
 - Three copies of a one-line drawing showing the relays, if required in this Interconnection Policy, and metering including current transformer (“CT”) and voltage transformer (“VT”) connections and ratios.
 - Three copies of a three-line drawing for three phase units or a two-line drawing for single phase units showing the AC connections to the relays, if required in this Interconnection Policy, and meters.
 - The generator nameplate information including rated voltage, rated current, power factor, HP/kW, rated speed and locked rotor current.
 - If the Generating Facility owns the transformer between the Company and the Generating Facility, the generator step up transformer nameplate information including rated voltage, rated kVA, proposed winding connections, positive sequence impedance plus zero sequence impedance and zero sequence equivalent circuit.
 - A list of protective relay equipment proposed to be furnished to conform to this Protection Policy including relay types, styles, manufacturer’s catalog numbers,

- ranges and descriptive bulletins. Three copies of applicable relay instruction manuals may also be required if the Company does not already possess them.
- Schematic drawings showing the control circuits for the interconnection breaker(s) or contactor(s).
 - Specifications for CTs and VTs relevant to the interconnection including their make, model, accuracy class, ratio, and available taps.
 - The proposed grounding method for the stator winding of the generator.
 - Other information that may be determined by the Company as required for a specific interconnection.
- b. Relay settings for all Generating Facility protective relays that affect the interconnection with the Company's system must be submitted at least four weeks prior to the scheduled date for setting the relays for review and acceptance by the Company.
- c. A Generating Facility using induction generator(s) connected in the vicinity of capacitance sufficient to self-excite the generator(s) must meet the requirements for synchronous machines of the same Category. The capacitors that enable self-excitation may actually be external to the Generating Facility and may belong to the Company or to other customers of the Company. The Company will not restrict the existing or future application of capacitors on its lines nor restrict their use by other customers to accommodate a Generating Facility with induction machines.
- d. As changes occur in the location and size of capacitors, the Generating Facility may be required in the future to upgrade its interface to meet the requirements for synchronous machines if self-excitation becomes possible even if not initially possible.
- e. A circuit breaker or contactor will be installed to isolate the Generating Facility from the Company's system ("Interconnection Breaker" or "Interconnection Contactor"). If there is more than one Interconnection Breaker or Interconnection Contactor, the requirements of this Protection Policy will apply to each one individually.
- f. The Company will review the relay settings as submitted by the Customer to assure adequate protection for the Company's facilities. The Company will not be responsible for the protection of the Generating Facility or Customer's other facilities. The Generating Facility will be responsible for protection of its system against possible

damage resulting from parallel operation with the Company. If requested by the Customer, the Company will provide system protection information for the line terminal(s) directly related to the interconnection. This protection information is provided exclusively for use by the Customer in evaluating protection of the Generating Facility or Customer's other facilities during parallel operation.

- g. The Company reserves the right to specify the winding connections for the transformer between the Company's voltage and the Generating Facility's voltage ("Step Up Transformer") as well as whether it is to be grounded or ungrounded at the Company's voltage. In the event that the transformer winding connection is grounded-wye/grounded-wye the Company reserves the right to specify whether the generator stator is to be grounded or not grounded. The Customer will be responsible for procuring equipment with a level of insulation and fault withstand capability compatible with the specified grounding method.
- h. In general, across the line starting of rotating machines is not permitted unless it can be demonstrated that the resultant voltage flicker is within the Company's limits for starting of similar sized motors. If an Interconnection Breaker or latching type contactor is to be tripped by protective relays to satisfy the requirements of this Protection Policy, then the Interconnection Breaker or Interconnection Contactor control circuits will be DC powered from a station battery or Company-approved equivalent.
- i. A control interlock scheme that detects voltage on the Company's line(s) will be used to prevent the Generating Facility from energizing or attempting to energize the Company's line(s). The logic for this scheme should be hardwired to prevent the Interconnection Breaker (or Interconnection Contactor where appropriate) from closing. No interposing computer or programmable logic controller or the like will be used in this logic.
- j. The Generating Facility will provide a disconnect switch at the interconnection point with the Company that is accessible to Company personnel at all times that can be opened for isolation. The Company will have the right to open this disconnect switch during emergency conditions and with reasonable notice to the Customer at other times. The Company will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum

generator output and be capable of being locked open, tagged and grounded on the Company side by Company personnel. The switch will be of a manufacture and type generally accepted for use by the Company.

- k. Where protective relays are required by this Protection Policy, their control circuits will be DC powered from a station battery. Solid-state relays will be self-powered or DC powered from a station battery. If the Generating Facility uses a non-latching interconnection contactor, AC powered relaying satisfying the requirements of this Protection Policy may be allowed provided the relay and its method of application is fail safe, meaning that if the relay fails or if the voltage and/or frequency of its AC power source deviate from the relay's design requirements for power, the relay will immediately trip the generator by opening the coil circuit of the Interconnection Contactor.
- l. CT ratios and accuracy classes will be chosen such that secondary current is less than 100 amperes and transformation errors are less than 10% under maximum fault conditions.
- m. If the interconnection voltage requires, a voltage transformer will be provided by the Generating Facility and will be connected to the Company side of the interconnecting breaker or contactor. The voltage from this VT will be used in the interlock as specified above. For three phase applications, a VT for each phase is required.
- n. All protective relays required by this Protection Policy will meet ANSI/IEEE Standard C37.90, C37.90.1 and C37.90.2 and be of a manufacturer and type generally accepted for use by the Company.
- o. Voltage relays will be frequency compensated to provide a uniform response in the range of 40 to 70Hz.
- p. Tripping by protective relays required to satisfy the requirements of this Protection Policy must be hardwired to the device they are tripping. No interposing computer or programmable logic controller or the like is permitted in the trip chain between the relay and the device being tripped.
- q. On three phase installations where voltage relaying is required by this Protection Policy, all three phases must be sensed either by three individual relays or by one relay that contains three elements. If the voltage on any of the three phases is outside the bounds specified by the Company, the unit will be tripped.

- r. The Generating Facility will provide an undervoltage relay sensing voltage, preferably on the Company's side of the interconnection breaker or contactor, which trips the interconnection breaker or contactor.

Requirements for Synchronous Generator (Type C) installations:

Category 2 Facilities utilizing synchronous generators will meet all the requirements that are applicable to synchronous generators for Category 3, 4 and 5 Facilities.

CATEGORY 3, 4 and 5 Facilities

Protection related information

- a. The following information must be submitted by the Customer for review and acceptance by the Company prior to the Customer finalizing the Generating Facility's protection design and the Company's approving the Customer's request for interconnection:
 - II Three copies of a station one-line drawing.
 - II Three copies of a one-line drawing showing the relays and metering including current transformer (CT) and voltage transformer (VT) connections and ratios.
 - II Three copies of a three-line drawing showing the AC connections to the relays and meters.
 - II If the Generating Facility is a synchronous generator, the nameplate information including rated voltage, rated current, rated kVA and power factor plus transient, sub-transient and synchronous impedances and zero sequence impedance.
 - II If the Generating Facility is an induction generator, the nameplate information including rated voltage, rated current, power factor, HP/kW, rated speed, locked rotor current, stator reactance, stator resistance, rotor reactance, rotor resistance and magnetizing reactance.
 - II If the Generating Facility owns the transformer between the Company and the Generating Facility, the nameplate information including rated voltage, rated kVA, proposed winding connections, positive sequence impedance plus zero sequence impedance and zero sequence equivalent circuit.
 - A list of protective relay equipment proposed to be furnished to conform to this Protection Policy including relay types, styles, manufacturer's catalog numbers, ranges and descriptive bulletins. Three copies of applicable relay instruction manuals may also be required if the Company does not already possess them.
 - II Schematic drawings showing the control circuits for the interconnection breaker(s) and synchronizing breaker(s).

- II Specifications for CTs and VTs relevant to the interconnection including their make, model, accuracy class, ratio, and available taps.
 - II Interconnection breaker operating time if it is tripped by protective relays required by this Protection Policy.
 - II The proposed grounding method for the stator winding.
 - II Other information that may be determined by the Company as required for a specific interconnection.
- b.** Relay settings for all Generating Facility protective relays that affect the interconnection with the Company's system must be submitted at least four weeks prior to the scheduled date for setting the relays for review and acceptance by the Company.
- c.** If, due to the interconnection of the Generating Facility to the line, the fault interrupting, continuous, momentary or other rating of any of the Company's equipment or the equipment of other customers connected to the Company's system is exceeded, the Company will have the right to require the Customer to pay for the purchase, installation, replacement or modification of equipment to eliminate the condition. Likewise, when the proposed interconnection may result in reversed load flow through the Company's load tap changing transformer(s), line voltage regulator(s) or secondary network protector(s), control modifications necessary to mitigate the effects may be made to these devices by the Company at the Customer's expense or the Generating Facility may be required to limit its output so reverse load flow cannot occur or to provide reverse power relaying that trips the Generating Facility. Where such action is deemed necessary by the Company, the Company will, where possible, permit the Customer to choose among two or more options for meeting the Company's requirements as described in this Protection Policy.

Protection requirements

- a.** A circuit breaker will be installed to isolate the Generating Facility from the Company's system ("Interconnection Breaker"). If there is more than one Interconnection Breaker, the requirements of this Protection Policy apply to each one individually.

- b.** The Customer will designate one or more breakers to be used to synchronize the Generating Facility's generator to the Company's system. This "synchronizing breaker" could be a breaker other than the Interconnection Breaker. In some induction generator applications a contactor may serve this function.
- c.** The Company's lines generally have automatic reclosing following a trip with reclosing times as short as five seconds without regard to whether the Generating Facility is keeping the circuit energized. The Customer is responsible for protecting the Generating Facility's equipment from being re-connected out of synchronism with the Company's system by an automatic line reclosure operation. The Customer may choose to install additional equipment such as direct transfer tripping from the Company's station(s) to insure the Generating Facility is off the line prior to the line reclosing. However this option is not feasible in all cases, particularly where the Company uses pole-mounted reclosers between its substation and the Generating Facility.
- d.** The Company will review the relay settings as submitted by the Customer to assure adequate protection for the Company's facilities. The Company will not be responsible for the protection of the Generating Facility or Customer's other facilities. The Customer will be responsible for protection of the Generating Facility's system against possible damage resulting from parallel operation with the Company. If requested by the Customer, the Company will provide system protection information for the line terminal(s) directly related to the interconnection. This protection information is provided exclusively for use by the Customer in evaluating protection of the Generating Facility or the Customer's other facilities during parallel operation.
- e.** The Company reserves the right to specify the winding connections for the transformer between the Company's voltage and the Generating Facility's voltage ("Step Up Transformer") as well as whether it is to be grounded or ungrounded at the Company's voltage. In the event that the transformer winding connection is grounded-wye/grounded-wye the Company also reserves the right to specify if and how the generator stator is to be grounded. The Generating Facility will be responsible for procuring its equipment with a level of insulation and fault withstand capability compatible with the specified grounding method.

- f. Across the line starting of rotating machines is not permitted unless it can be demonstrated that the resultant voltage flicker is within the Company's limits for starting of similar sized motors.

Protection equipment requirements

- a. Where the Interconnection Breaker (or Interconnection Contactor as may be the case with some smaller induction machines) is to be tripped by protective relays required to meet the requirements of this Protection Policy then the Interconnection Breaker (or Interconnection Contactor) control circuits will be DC powered from a station battery.
- b. The synchronizing breaker(s) must be capable of withstanding at least twice rated system voltage and must be capable of interrupting the current produced when the Generating Facility is connected out of phase with the Company's system.
- c. A control interlock scheme that detects voltage on the Company's line(s) will be used to prevent the Generating Facility from energizing or attempting to energize the Company's line(s). The logic for this scheme should be hardwired to prevent the synchronizing breaker, Interconnection Breaker (or Interconnection Contactor where appropriate) from closing. No interposing computer or programmable logic controller or the like is to be used in this logic.
- d. The Generating Facility will be equipped with a switch at the interconnection point with the Company that can be opened for isolation. The Company will have the right to open the interconnection during emergency conditions and with reasonable notice to the Customer at other times. The Company will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on the Company side by Company personnel. The switch will be of a manufacture and type generally accepted for use by the Company.
- e. Protective relaying control circuits will be DC powered from a station battery. Solid-state relays will be self-powered or DC powered from a station battery.

- f. CT ratios and accuracy classes will be chosen such that secondary current is less than 100 amperes and transformation errors are less than 10% under maximum fault conditions.
- g. The Generating Facility will be equipped with a voltage transformer, connected to the Company side of the interconnecting breaker. The voltage from this VT will be used in the interlock as specified in this Protection Policy. If the Generating Facility's step up transformer is ungrounded at the Company voltage, this VT will be a single three-phase device or three single-phase devices connected from each phase to ground on the Company's side of the Generating Facility's step up transformer, rated for phase-to-phase voltage and provided with two secondary windings. One winding will be connected in open delta, have a loading resistor to prevent ferroresonance, and be used for the relay specified in this Protection Policy.
- h. All protective relays required by this Protection Policy will meet ANSI/IEEE Standard C37.90, C37.90.1 and C37.90.2 and be of a manufacture and type generally accepted for use by the Company.
- i. Voltage relays will be frequency compensated to provide a uniform response in the range of 40 to 70Hz.
- j. Protective relays utilized by the Generating Facility as required per this Protection Policy will be sufficiently redundant and functionally separate so as to provide adequate protection, as determined by the Company, upon the failure of any one component. The use of a single all-inclusive relay package is not acceptable.
- k. The Company may require the Generating Facility to be equipped with two independent, redundant relaying systems in accordance with NPCC criteria for the protection of the bulk power system if the interconnection is to the bulk power system or if it is determined that delayed clearing of faults within the Generating Facility adversely affects the bulk power system.
- l. A direct transfer tripping system, if one is required by either the Customer or by the Company, will use equipment generally accepted for use by the Company and will, at the option of the Company, use dual channels.
- m. Tripping by protective relays required to satisfy the requirements of this Protection Policy must be hardwired to the device they are tripping. No interposing computer or

programmable logic controller or the like is permitted in the trip chain between the relay and the device being tripped.

- n. On three phase installations when voltage relaying is required by this Protection Policy, all three phases must be sensed either by three individual relays or by one relay that contains three elements. If the voltage on any of the three phases is outside the bounds specified by the Company the unit will be tripped.

Requirements for Induction Generator (Type B) installations

- a. A Generating Facility using induction generators connected in the vicinity of capacitance sufficient to self-excite the generator(s) will meet the requirements for synchronous machines in this Protection Policy. The capacitors that enable self-excitation may actually be external to the Generating Facility. The Company will not restrict its existing or future application of capacitors on its lines nor restrict their use by other customers of the Company to accommodate a Generating Facility with induction machines. As changes occur in the location and size of capacitors, the Generating Facility may be required in the future to upgrade its interface to meet the requirements for synchronous machines if self-excitation becomes possible, even if not initially possible.

The Generating Facility may be required to install capacitors to limit the adverse effects of drawing reactive power from the system for excitation of the generator. Capacitors for supply of reactive power at or near the induction generator with a kVAR rating greater than 30% of the generator's kW rating may cause the generator to become self-excited.

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(If self-excitation can occur, the Generating Facility will be required to provide protection as specified in this Protection Policy for synchronous machines.)

- b. The Generating Facility will be equipped with the following relays for island detection supplied from a voltage transformer that may be connected to either the generator or Company voltage:

	<u>minimum setting range</u>	<u>minimum time delay range</u>
X overfrequency	60 - 62Hz	.1 - 2 secs
X underfrequency	60 - 58Hz	.1 - 2 secs
X overvoltage	105 - 115% normal	.1 - 4 secs
X undervoltage	85 - 95% normal	.1 - 4 secs

- c. During system conditions where local area load exceeds system generation, NPCC Emergency Operation Criteria requires a program of phased automatic underfrequency load shedding of up to 25% of area load to assist in arresting frequency decay and to minimize the possibility of system collapse. Depending on the point of connection of the Generating Facility to the Company's system and in conformance with the NPCC Emergency Operating Criteria, the Generating Facility may be required to remain connected to the system during the frequency decline to allow the objectives of the automatic load shedding program to be achieved, or to otherwise provide compensatory load reduction, equivalent to the Generating Facility's generation lost to the system, if the Customer elects to disconnect the Generating Facility at a higher underfrequency set point.

Requirements for Synchronous Generator (Type C) installations

- a. A synchronous generator is a source of current for faults occurring on the Company's line(s). The Generating Facility must be equipped with protective relays to detect any faults, whether phase-to-phase or phase-to-ground, on the Company's line(s) or within

the Generating Facility, and isolate the Generating Facility from the Company's line(s) such that the following criteria are met, as determined by the Company:

- X The existing sensitivity of fault detection is not substantially degraded.
- X The existing speed of fault clearing is not substantially degraded.
- X The coordination margin between relays is not substantially reduced.
- X The sustained unfaulted phase voltage during a line-to-ground fault is not increased beyond the design value for the existing system insulation levels and overvoltage protection.
- X Non-directional line relays will not operate for faults external to the line due to the Generating Facility's contribution.
- X Proper settings for existing relays are achievable within their ranges.

The Company may perform engineering studies to evaluate the Generating Facility's protection compliance with respect to the above and may make recommendations to the Customer on methods to achieve compliance. If, due to the interconnection of the Generating Facility to the Company's system, any of the above criteria is violated for the Company's facilities or for the facilities of others connected to the Company's system, the Company will have the right to require the Customer to pay for the purchase, installation, replacement or modification of protective equipment to eliminate the violation and restore the level of protection existing prior to the interconnection. This may include the addition of pilot relaying systems involving communications between all terminals. Where such action is deemed necessary by the Company, the Company will, where possible, permit the Customer to choose among two or more options for meeting the Company's requirements as described in this Protection Policy.

- b.** The Customer is responsible for procuring any communications channels necessary between the Generating Facility and the Company's stations and for providing protection from transients and overvoltages at all ends of these communication channels. The Customer will also bear the ongoing cost to lease these communication channels.

- c. If the Generating Facility's step up transformer connection is ungrounded, the Generating Facility will be equipped with a zero sequence overvoltage relay fed from the open delta of the three phase VT specified in this Protection Policy.
- d. The Generating Facility will be equipped to provide protection to limit sustained abnormal frequency and/or voltage conditions to the Company's customers directly supplied from the interconnection circuit should the Generating Facility and its interconnection circuit become isolated from the Company's system. The protection can consist of either the following relays supplied from a voltage transformer connected to either the generator or the Company's voltage or other means if the Generating Facility can demonstrate sufficient control of abnormal frequency and voltage excursions as seen by the Company's customers:

	<u>minimum setting range</u>	<u>minimum time delay range</u>
X overfrequency	60 - 62Hz	.1 - 2 secs
X underfrequency	60 - 56Hz	.5 - 30 secs
X overvoltage	105 - 115% normal	.1 - 4 secs
X undervoltage	85 - 95% normal	.1 - 4 secs

- e. During system conditions where local area load exceeds system generation, NPCC Emergency Operation Criteria requires a program of phased automatic underfrequency load shedding of up to 25% of area load to assist in arresting frequency decay and to minimize the possibility of system collapse. Depending on the point of connection of the Generating Facility to the Company's system and in conformance with the Emergency Operating Criteria, the Generating Facility may be required to remain connected to the system during the frequency decline to allow the objectives of the automatic load shedding program to be achieved, or to otherwise provide compensatory load reduction, equivalent to the Generating Facility's generation lost to the system, if the Customer elects to disconnect the Generating Facility at a higher underfrequency set point.

- e. The Generating Facility may be required to use high-speed protection if time-delayed protection would result in degradation in the existing sensitivity or speed of the protection systems on the Company's lines.
- g. The Generating Facility may be required to be equipped to provide local breaker failure protection which may include direct transfer tripping to the Company's line terminal(s) in order to detect and clear faults within the Generating Facility that cannot be detected by the Company's back-up protection.
- h. The Generating Facility will be equipped to provide protective relaying to prevent the closing of the synchronizing breaker(s) while the Generating Facility's generation is out-of-synchronization with the Company's system.

II Protection System Testing and Maintenance

The Company will have the right to witness the testing of selected protective relays and control circuits at the completion of construction and to receive a copy of all test data.

The Customer will provide the Company with at least a one-week notice prior to the final scheduling of these tests. Testing will consist of:

- X CT and CT circuit polarity, ratio, insulation, excitation, continuity and burden tests.
- X VT and VT circuit polarity, ratio, insulation and continuity tests.
- X Relay pick-up and time delay tests.
- X Functional breaker trip tests from protective relays.
- X Relay in-service test to check for proper phase rotation and magnitudes of applied currents and voltages.
- X Breaker closing interlock tests.
- X Paralleling and de-paralleling operation.
- X Other relay commissioning tests typically performed for the relay types involved.
- X An inverter with field adjustable settings for its internal protective elements will

be tested to verify these settings if those internal elements are being used by the Generating Facility to satisfy the requirements of this Protection Policy. The Generating Facility will be equipped with whatever equipment is required to perform this test. If a simulated utility is required to perform such testing the Company is unable to provide the equipment required to perform the test.

The protective relays will be tested and maintained by the Customer on a periodic basis but not less than once every four years or as otherwise determined by the Company. For relays installed in accordance with the NPCC Criteria for the Protection of the Bulk Power System, maintenance intervals will be in accordance with such criteria. The results of these tests will be summarized by the Customer and reported in writing to the Company.

Inverters with field adjustable settings for their internal protective elements will be periodically tested if those internal elements are being used by the Generating Facility to satisfy the requirements of this Protection Policy. If a Asimulated utility≅ is required to perform such testing the Company is unable to provide the equipment required to perform the test.

In its sole discretion, the Company may waive all or some of these requirements.

III. Protection Requirements – Momentary Paralleling of Standby Generators

Protective relays to isolate the Generating Facility for faults in the Company's system are not required if the paralleling operation is automatic and takes place for less than one-half of a second.

Parallel operation of the Generating Facility with the Company's system will be prevented when the Company's line is dead or out of phase with the Generating Facility.

The control scheme for automatic paralleling must be submitted by the Customer for review and acceptance by the Company prior to the Generating Facility being allowed to interconnect with the Company's system.

IV. Protection System Changes

The Customer must provide the Company with reasonable advance notice of any proposed changes to be made to the protective relay system, relay settings, operating procedures or equipment that affect the interconnection. The Company will determine if such proposed changes require re-acceptance of the interconnection per the requirements of this Protection Policy.

In the future, should the Company implement changes to the system to which the Generating Facility is interconnected, the Customer will be responsible at its own expense for identifying and incorporating any necessary changes to its protection system. These changes to the Generating Facility's protection system are subject to review and approval by the Company.

In its sole discretion, the Company may waive all or some of these requirements.

EXHIBIT 3
Form of Distribution Facilities Impact Study Agreement

This Agreement dated _____, is entered into between _____
(the Customer) and The Narragansett Electric Company (the Company), for the purpose of
setting forth the terms, conditions and costs for conducting a Distribution Facilities Impact Study
relative to _____.

1. The Customer agrees to provide, in a timely and complete manner, all required information and technical data necessary for the Company to conduct the Distribution Facilities Impact Study. The Customer understands that it must provide all such information and data prior to the Company's commencement of the Distribution Facilities Impact Study. Such information and technical data is specified in Attachment 1 to this Agreement.
2. All work pertaining to the Distribution Facilities Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Customer. Each party will inform the other in writing of its designated and authorized representative.
3. The Company will advise the Customer of any additional studies, as it may in its sole discretion deem necessary, in accordance with Good Utility Practice. The Company will not proceed with additional studies without the Customer's consent.
4. The Company contemplates that it will require [specify time] to complete the Distribution Facilities Impact Study. Upon completion of the Distribution Facilities Impact Study by the Company, the Company will provide a Distribution Facilities Impact Study Report to the Customer based on the information provided and developed as a result of this effort.

If, upon review of the Distribution Facilities Impact Study Report, the Customer decides to pursue its interconnection request, the Company will, at the Customer's direction, tender a Distribution Facilities Detailed Study Agreement within thirty (30) days if deemed additionally necessary by the Company. The Distribution Facilities Impact Study and Distribution Facilities Detailed Study, together with any additional studies contemplated in Paragraph 3, will form the basis for the Customer's proposed use of the Company's Distribution System and will be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Customer understands and acknowledges that any use of study results by the Customer or its agents, whether in preliminary or final form, prior to NEPOOL 18.4 approval, should such approval be required, is completely at the Customer's risk and that the Company will not guarantee or warrant the completeness, validity or utility of study results prior to NEPOOL 18.4 approval.

5. The estimated costs contained within this Agreement are the Company's good faith estimate of its costs to perform the Distribution Facilities Impact Study contemplated by this Agreement. The Company's estimates do not include any estimates for wheeling charges that may be associated with the transmission of Generating Facility output to third parties or with rates for station service. The actual costs charged to the Customer by the Company may change as set forth in this Agreement. Prepayment will be required for all study, analysis, and review work performed by the Company or its Affiliate, all of which will be billed by the Company to the Customer in accordance with Paragraph 6 of this Agreement.
6. The payment required is \$ _____ from the Customer to the Company for the primary system analysis, coordination, and monitoring of the Distribution Facilities Impact Study. Such amount will be payable in full to the Company prior to the Company beginning the work. The Company will, in writing, advise the Customer in advance of any cost increases for work to be performed if the total amount increases by 10% or more. Any such changes to the Company's costs for the study work will be subject to the Customer's

consent. The Customer will, within thirty (30) days of the Company's notice of increase, both authorize such increases and make payment in the amount set forth in such notice, or the Company will suspend the Distribution Facilities Impact Study and this Agreement will terminate.

In the event this Agreement is terminated for any reason, the Company will refund to the Customer the portion of the above credit or any subsequent payment to the Company by the Customer that the Company did not expend or commit in performing its obligations under this Agreement. Any additional billings under this Agreement will be subject to an interest charge equal to __% per year. Payments for work performed will not be subject to refunding except in accordance with Paragraph 7 below.

7. If the actual costs for the work exceed prepaid estimated costs, the Customer will make payment to the Company for such actual costs within thirty (30) days of the date of the Company's invoice for such costs. If the actual costs for the work are less than those prepaid, the Company will credit such difference toward the Company costs unbilled, or in the event there will be no additional billed expenses, the amount of the overpayment will be returned to the Customer with interest computed as stated in Paragraph 6 of this Agreement, from the date of reconciliation.
8. Nothing in this Agreement will be interpreted to give the Customer immediate rights to wheel over or interconnect with the Company's Distribution System.
9. Within one (1) year following the Company's issuance of a final bill under this Agreement, the Customer will have the right to audit the Company's accounts and records at the offices where such accounts and records are maintained, during normal business hours; provided that appropriate notice will have been given prior to any audit and provided that the audit will be limited to those portions of such accounts and records that relate to service under this Agreement. The Company reserves the right to assess a

reasonable fee to compensate for the use of its personnel time in assisting any inspection or audit of its books, records or accounts by the Customer or its Designated Agent.

10. The Customer agrees to indemnify and hold the Company and its affiliated companies and directors, officers, employees, and agents of each of them (collectively "Affiliates") harmless from and against any and all damages, costs (including attorney's fees), fines, penalties and liabilities, in tort, contract, or otherwise (collectively "Liabilities") resulting from claims of third parties arising, or claimed to have arisen as a result of any acts or omissions by the Company or its Affiliates under this Agreement. The Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all Liabilities for or arising from damage to its property due to a performance under this Agreement by the Company or its Affiliates.
11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.
12. This agreement will be construed and governed in accordance with the laws of the State of Rhode Island.
13. All amendments to this Agreement will be in written form executed by both parties.
14. The terms and conditions of this Agreement will be binding on the successors and assigns of either party.
15. This Agreement will remain in effect for a period of up to two years from its effective date and is subject to extension by mutual agreement. Either party may terminate this Agreement by thirty (30) days' notice except as is otherwise provided herein.

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Interconnection Requirements
For Customer-Owned Generation

Exhibit 3
Sheet 52

Customer:

The Company:

Name: _____

Name:

Title: _____

Title:

Date: _____

Date:

Attachment 1

Information to be provided to the Company by the Customer for the Distribution Facilities Impact Study

Note: For Category 1, 2 or 3 Facilities, the Company will accept the material requested in Exhibit 2 in lieu of the information requested in this attachment.

1.0 Facilities Identification

- 1.1 Requested capability in MW and MVA; summer and winter
- 1.2 Site location and plot plan with clear geographical reference
- 1.3 Preliminary one-line diagram showing major equipment and extent of Customer
- 1.4 Auxiliary power system requirements
- 1.5 Back-up facilities such as standby generation or alternate supply sources

2.0 Major Equipment

- 2.1 Power transformer(s): rated voltage, MVA and BIL of each winding, LTC and or NLTC taps and range, Z_1 (positive sequence) and Z_0 (zero sequence) impedances, and winding connections. Provide normal, long-time emergency and short time emergency thermal ratings.
- 2.2 Generator(s): rated MVA, speed and maximum and minimum MW output, reactive capability curves, open circuit saturation curve, power factor (V) curve, response (ramp) rates, H (inertia), D (speed damping), short circuit ratio, X_1 (leakage), X_2 (negative sequence), and X_0 (zero sequence) reactances and other data:

	Direct Axis	Quadrature Axis
saturated synchronous reactance	X_{dv}	X_{qv}
unsaturated synchronous reactance	X_{di}	X_{qi}
saturated transient reactance	$X_{=dv}$	$X_{=qv}$
unsaturated transient reactance	$X_{=di}$	$X_{=qi}$
saturated subtransient reactance	$X_{\cong dv}$	$X_{\cong qv}$
unsaturated subtransient reactance	$X_{\cong di}$	$X_{\cong qi}$
transient open-circuit time constraint	$T_{=do}$	$T_{=qo}$
transient short-circuit time constraint	$T_{=d}$	$T_{=q}$
subtransient open-circuit time constraint	$T_{\cong do}$	$T_{\cong qo}$
subtransient short-circuit time constraint	$T_{\cong d}$	$T_{\cong q}$

2.3 Excitation system, power system stabilizer and governor: manufacturer's data in sufficient detail to allow modeling in transient stability simulations.

2.4 Prime mover: manufacturer's data in sufficient detail to allow modeling in transient stability simulations, if determined necessary.

2.5 Busses: rated voltage and ampacity (normal, long-time emergency and short-time emergency thermal ratings), conductor type and configuration.

2.6 Transmission lines: overhead line or underground cable rated voltage and impeached (normal, long-time emergency and short-time emergency thermal rates), Z_1 (positive sequence) and Z_0 (zero sequence) impedances, conductor type, configuration, length and termination points.

- 2.7 Motors greater than 150 kWh 3-phase or 50 kW single-phase: type (induction or synchronous), rated hp, speed, voltage and current, efficiency and power factor at 2, 3/4 and full load, stator reactance and reactance, rotor reactance and reactance, magnetizing reactance.
 - 2.8 Circuit breakers and switches: rated voltage, interrupting time and continuous, interrupting and momentary currents. Provide normal, long-time emergency and short-time emergency thermal ratings.
 - 2.9 Protective relays and systems: ANSI function number, quantity manufacturer's catalog number, range, descriptive bulletin, tripping diagram and three-line diagram showing AC connections to all relaying and metering.
 - 2.10 CTs and VTs: location, quantity, rated voltage, current and ratio.
 - 2.11 Surge protective devices: location, quantity, rated voltage and energy capability.
- 3.0 Other
- 3.1 Additional data to perform the Distribution Facilities Impact Study will be provided by the Customer as requested by the Company.
 - 3.2 The Company reserves the right to require specific equipment settings or characteristics necessary to meet NEPOOL and NPCC criteria and standards.

EXHIBIT 4

Form of Distribution Facilities Detailed Study Agreement

This agreement dated _____, is entered into between _____ (the Customer) and The Narragansett Electric Company (the Company) for the purpose of setting forth the terms, conditions and costs for conducting a Distribution Facilities Detailed Study relative to _____. The Distribution Facilities Detailed Study will determine the detailed engineering, design and cost of the facilities necessary to satisfy the Customer's request for service interconnecting with the Company's Distribution System.

1. The Customer agrees to provide, in a timely and complete manner, all required information and technical data necessary for the Company to conduct the Distribution Facilities Detailed Study. Where such information and technical data was provided for the Distribution Facilities Impact Study, it should be reviewed and updated with current information, as required.
2. All work pertaining to the Distribution Facilities Detailed Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Customer. Each party will inform the other in writing of its designated and authorized representative.
3. The Company will advise the Customer of additional studies, as in its sole discretion deem necessary, in accordance with Good Utility Practice. The Company will not proceed with additional studies without the Customer's consent.
4. The Company contemplates that it will require [specify time] to complete the Distribution Facilities Detailed Study. Upon completion of the Distribution Facilities Detailed Study, the Company will provide a Distribution Facilities Detailed Study Report to the Customer

based on the information provided and developed as a result of this effort. If, upon review of the Distribution Facilities Detailed Study Report, the Customer decides to pursue its interconnection service request, the Customer must sign an Interconnection Service Agreement with the Company. The Distribution Facilities Impact Study and Distribution Facilities Detailed Study, together with any additional studies contemplated in Paragraph 3, will form the basis for the Customer's proposed use of the Company's Distribution System and will be furthermore utilized in obtaining necessary third-party approvals of any facilities and requested services. The Customer understands and acknowledges that any use of the study results by the Customer or its agents, whether in preliminary or final form should such approval be required, prior to NEPOOL 18.4 approval, is completely at the Customer's risk and that the Company will not guarantee or warrant the completeness, validity or utility of the study results prior to NEPOOL 18.4 approval.

5. The estimated costs contained within this Agreement are the Company's good faith estimate of its costs to perform the Distribution Facilities Detailed Study contemplated by this Agreement. The Company's estimates do not include any estimates for wheeling charges that may be associated with the transmission of Generating Facility output to third parties or with rates for station service. The actual costs charged to the Customer by the Company may change as set forth in this Agreement. Prepayment will be required for all study, analysis, and review work performed by the Company or its Designated Agent's personnel, all of which will be billed by the Company to the Customer in accordance with Paragraph 6 of this Agreement.

6. The payment required is \$_____ from the Customer to the Company for the primary system analysis, coordination, and monitoring of the Distribution Facilities Detailed Study to be performed by the Company for the Customer's requested service. Such amount will be payable in full to the Company prior to the Company beginning the work. The Company will, in writing, advise the Customer in advance of any cost increases for

work to be performed if the total amount increases by 10% or more. Any such changes to the Company's costs for the study work to be performed will be subject to the Customer's consent. The Customer will, within thirty (30) days of the Company's notice of increase, both authorize such increases and make payment in the amount set forth in such notice, or the Company will suspend the Distribution Facilities Detailed Study and this Agreement will terminate.

In the event this Agreement is terminated for any reason, the Company will refund to the Customer the portion of the above credit or any subsequent payment to the Company by the Customer that the Company did not expend or commit in performing its obligations under this Agreement. Any additional billings under this Agreement will be subject to an interest charge equal to __% per year. Payments for work performed will not be subject to refunding except in accordance with Paragraph 7 below.

7. If the actual costs for the work exceed prepaid estimated costs, the Customer will make payment to the Company for such actual costs within thirty (30) days of the date of the Company's invoice for such costs. If the actual costs for the work are less than that prepaid, the Company will credit such difference toward the Company costs unbilled, or in the event there will be no additional billed expenses, the amount of the overpayment will be returned to the Customer with interest computed in accordance with the provisions of the Interconnection Policy.
8. Nothing in this Agreement will be interpreted to give the Customer immediate rights to wheel over or interconnect with the Company's Distribution System.
9. Within one (1) year following the Company's issuance of a final bill under this Agreement, the Customer will have the right to audit the Company's accounts and records at the offices where such accounts and records are maintained, during normal business hours; provided that appropriate notice will have been given prior to any audit

and provided that the audit will be limited to those portions of such accounts and records that relate to service under this Agreement. The Company reserves the right to assess a reasonable fee to compensate for the use of its personnel time in assisting any inspection or audit of its books, records or accounts by the Customer or its Designated Agent.

10. The Customer agrees to indemnify and hold the Company and its affiliated companies and directors, officers, employees, and agents of each of them (collectively "Affiliates") harmless from and against any and all damages, costs (including attorney's fees), fines, penalties and liabilities, in tort, contract, or otherwise (collectively "Liabilities") resulting from claims of third parties arising, or claimed to have arisen as a result of any acts or omissions of the Company or its Affiliates under this Agreement. The Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all Liabilities for or arising from damage to its property due to a performance under this Agreement by the Company or its Affiliates.
11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.
12. This agreement will be construed and governed in accordance with the laws of the State of Rhode Island.
13. All amendments to this Agreement will be in written form executed by both parties.
14. The terms and conditions of this Agreement will be binding on the successors and assigns of either party.
15. This Agreement will remain in effect for a period of up to two years from its effective date and is subject to extension by mutual agreement. Either party may terminate this Agreement by thirty (30) days' notice except as is otherwise provided herein.

Narragansett Electric
Interconnection Requirements
For Customer-Owned Generation

Exhibit 4
Sheet 60

Customer:

The Company:

Name: _____

Name:

Title: _____

Title:

Date: _____

Date:

EXHIBIT 5
Insurance Requirements

These Insurance Requirements apply to all Category 2 Facilities, except Category 2 Facilities that are Net Metered, and all Category 3, 4, and 5 Facilities. The Customer, at its own cost and expense, will procure and maintain insurance in the forms and amounts acceptable to the Company at the following minimum levels of coverage:

- a) For Category 2 Facilities installed at a residential location:
 - Comprehensive General Liability Coverage including Operations, Contractual Liability and Broad Form Property Damage Liability written with limits no less than \$1,000,000.00 combined single limit for Bodily Injury Liability and Property Damage Liability.

- b) For Category 2 Facilities installed at a non-residential location and for all Category 3, 4 and 5 Facilities:
 - Statutory coverage for workers' compensation, and Employer's Liability Coverage with a limit no less than \$500,000.00 per accident;

 - Comprehensive General Liability Coverage including Operations, Contractual Liability and Broad Form Property Damage Liability written with limits no less than \$5,000,000.00 combined single limit for Bodily Injury Liability and Property Damage Liability; and

 - Automobile Liability for Bodily Injury and Property Damage to cover all vehicles used in connection with the work with limits no less than

\$1,000,000.00 combined single limit for Bodily Injury and Property Damage
Injury.

Prior to commencing the work on a Category 2 Generating Facility at a residential location, the Customer will have its insurer furnish to the Company certificates of insurance evidencing the insurance coverage required above.

Prior to commencing the work on a Category 2 Generating Facility at a non-residential location or on a category 3, 4 or 5 Generating Facility, the Customer will have its insurer furnish to the Company certificates of insurance evidencing the insurance coverage required above and the Customer will notify and send copies to the Company of any policies maintained hereunder written on a "claims-made" basis. The Company may at its discretion require the Customer to maintain tail coverage for five years on all policies written on a "claims-made" basis.

Every contract of insurance providing the coverages required in this provision will contain the following or equivalent clause: "No reduction, cancellation or expiration of the policy will be effective until thirty (30) days from the date written notice thereof is actually received by the Customer.≅ Upon receipt of any notice of reduction, cancellation or expiration, the Customer will immediately notify the Company.

The Company and its Affiliates will be named as additional insureds, as their interests may appear, on the Comprehensive General Liability and Automobile Liability policies described above.

The Customer will waive all rights of recovery against the Company for any loss or damage covered by said policies. Evidence of this requirement will be noted on all certificates of insurance provided to the Company.

Certificate of Service

I hereby certify that ten (10) copies of the attached filing were hand-delivered to the Rhode Island Public Utilities Commission. A copy was mailed via U.S. Mail to the Department of Attorney General and the RI Office of Energy Resources. All other individuals on this service list were provided an electronic copy via E-Mail.



Joanne M. Scanlon
National Grid

September 18, 2006

**Docket No. 3659 – Implementation of the Requirements of the
Energy Policy Act of 2005**

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