



Planning Procedure Updates

Planning Procedures 5-1 & 5-6

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SENIOR ENGINEER, SYSTEM PLANNING



Planning Procedure Redline Overview

Proposed Effective Date: March 2018

- The ISO is proposing updates to Planning Procedure 5-1 & 5-6
 - PP5-1: Procedure for Reporting Notice of Intent to Construct or Change Facilities in Accordance with Section I.3.9 of the ISO New England Tariff (Proposed Plan Application Procedure)
 - PP5-6: Interconnection Planning Procedure for Generation and Elective Transmission Upgrades
- Procedure updates are needed to:
 - Introduce certain requirements appropriate for current industry activities
 - Clarify several provisions (consistent with the current practices) and remove potential conflict between procedures
- Today's presentation will review:
 - Additional proposed revisions to PP5-6 & its Appendices
 - Additional proposed revisions to PP5-1 & its Attachments

ADDITIONAL PROPOSED REVISIONS TO PP5-6



Categories of Additional Proposed Changes in PP5-6

1. Inverter Based Resource Updates

- a) Clarify that it is acceptable for inverter-based resources to control terminal voltage in short-term dynamics



Example of Category 1 Changes in PP5-6 & Appendices – Inverter Based Resource Updates

Procedure Location	Procedure Change	Reason for Change
6.0 Other Requirements 6.1 Voltage Control and Reactive Power Requirements	While it shall be identified in the Interconnection Study if the voltage control strategy must be designed with the purpose of maintaining a scheduled voltage at the Point of Interconnection (or some other appropriate point), it shall be acceptable for the resource to dynamically control its terminal voltage under transient conditions , unless the Interconnection Study identifies a reliability issue that requires the resource be capable of controlling voltage at another point, such as the Point of Interconnection.	Clarify that it may be acceptable for inverter-based resources to control terminal voltage in short-term dynamics



Example of Category 1 Changes in PP5-6 & Appendices – Inverter Based Resource Updates

Procedure Location	Procedure Change	Reason for Change
Appendix D Detailed Considerations for the Study of an Inverter Based Generating Facility	<ul style="list-style-type: none">• The following voltage regulation modes should be reviewed as appropriate:<ul style="list-style-type: none">• Generating units regulating voltage at a remote bus• Generating units regulating voltage at a Park transformer high side bus• Generating units regulating voltage at a Park transformer low side bus• Generating units regulating voltage at a fixed power factor	To indicate that not all modes need to be reviewed



PROPOSED REVISIONS TO PP5-1



Categories of Additional Proposed Changes in PP5-1 and its Attachments

1. Clarifications
 - a. Material change definition for protection and relay changes
 - b. PRD changes
2. Timely Submittal and automatic withdrawal of PPAs
3. PPA Forms update



Examples of Category 1 Changes in PP5-1 & Attachments – Clarifications

Procedure Location	Procedure Change	Reason for Change
2.3 Demand Resource Additions and/or Incremental Upgrades	Any generation additions or changes, including Distributed Generation, should follow the generation submittal and notification requirements of this PP5-1, even if they are intended to participate in ISO New England markets as Demand demand Resourcesresources . No notification or submittal is required pursuant to this PP5-1, for Demand demand Resources resources that are not comprised of generation.	Clarifying Demand Resource change to lower case with introduction of PRD. This is because the term is no longer a defined term and is now becoming the generic term.



Examples of Category 1 Changes in PP5-1 & Attachments – Clarifications (cont.)

Procedure Location	Procedure Change	Reason for Change
4 Facility Changes That Do Not Require Proposed Plan Applications or Revisions to Previously Approved Proposed Plan Applications	Facility changes, such as but not limited to the following, do not require Proposed Plan Applications or revisions to previously approved Proposed Plan Applications: -Routine protection and relaying changes only if there will be no increase in the fault clearing times and no material change in elements tripped for all events that would be analyzed pursuant to the Proposed Plan Application process.	Clarifying material change definition for protection and relay changes.

Examples of Category 2 Changes in PP5-1 – Timely Submittal and automatic withdrawal of PPAs

Procedure Location	Procedure Change	Reason for Change
2.1 Generation Additions or Changes in Net Station Output	<p>The provisions of Schedules 22 and 23 of the ISO New England Open Access Transmission Tariff Part II of the Tariff with regard to the interconnection of new generation or modification of existing generation or the provisions of Market Rule 1, Section III of the Tariff, with regard to a reduction in the capacity or a retirement of a generator must also be observed. Proposed Plan Applications shall be submitted in accordance with this Planning Procedure within 30 calendar days from the end of the Interconnection Customer's comment process following the completion of a System Impact Study pursuant to Schedule 22 or Schedule 23 of the ISO New England Open Access Transmission Tariff.</p> <p>As soon as possible afterAt the same time (and for the same Reliability Committee meeting) as the submittal of the Generation Proposed Plan Application, the Governance Participant, if necessary, must submit a Proposed Plan Application for transmission associated with the generation in accordance with Section 2.2 of this procedure.</p>	Late submittal causes the PPA-approved system to become out-of-synch with the studied system.

Examples of Category 2 Changes in PP5-1 – Timely Submittal of ETU PPAs

Procedure Location	Procedure Change	Reason for Change
2.2 Transmission Changes	Proposed Plan Applications associated with Elective Transmission Upgrades shall be submitted in accordance with this Planning Procedure within 30 calendar days from the end of the Interconnection Customer's comment process following the completion of a System Impact Study pursuant to Schedule 25 of the ISO New England Open Access Transmission Tariff.	Late submittal causes the PPA-approved system to become out-of-synch with the studied system.



Follow-up on Process Suggestion associated with automatic withdrawal of PPAs Proposed Revision

- During the December 19th walkthrough, the ISO presented a proposed revision to PP5-1, Section 1.1.4 that would make PPA withdrawals associated with projects that have withdrawn from the queue automatic and not dependent on waiting for Governance participants submitting PPA withdrawals
- Several stakeholders noted the importance of receiving PPA withdrawal notifications and requested that these PPA withdrawals, while automatic, continue to be listed on the Consent Agenda along with the opportunity to be moved to the Regular Agenda for discussion
- The ISO agrees to continue listing the PPA withdrawals, including automatic PPA withdrawals triggered by a withdrawal of a queue project, on the Consent Agenda and that RC member's will continue to have the opportunity to remove the item for discussion if desired
- The ISO suggests for the Committee's consideration that rather than include a copy of the withdrawn PPA in the materials to instead note the RC meeting in which the PPA was approved

Examples of Category 3 Changes in PP5-1 & Attachments – PPA Forms Update

Procedure Location	Procedure Change
Attachment 1,2 and 4	<p>Updated Attachments 1,2 and 4 as part of comprehensive PPA forms revisions.</p> <ul style="list-style-type: none">•See Appendix 1 of this presentation for proposed revisions to Attachments 1,2 and 4.



Conclusion

- The proposed revisions to PP5-1 and PP5-6:
 - Introduce certain requirements appropriate for current industry activities
 - Clarify several provisions (consistent with the current practices) and remove potential conflict between procedures
- Proposed effective date of March 2018

Stakeholder Schedule

Stakeholder Committee and Date	Scheduled Project Milestone
Reliability Committee November 15, 2017	Initial Presentation
Reliability Committee December 19, 2017	Planning Procedure Redlines
Reliability Committee January 17, 2018	Planning Procedure Redlines with additional updates to Proposed Plan Application forms
Reliability Committee February 13, 2018	Vote
Participants Committee March 2, 2018	Vote

Questions

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APPENDIX 1

Proposed Revisions to PP5-1, Attachments 1,2 and 4



Proposed Revisions to PP5-1, Attachments 1.

Attachment 1

ISO New England Planning Procedure 5-1

Page 1 of 2

GENERATION PROPOSED PLAN APPLICATION

Applicant _____ Date _____.

Contact Person _____ Phone # _____.

1. Station Name and Location _____.

Unit Identification _____.

	Winter (0 Deg F)*	Winter (20 Deg F)	Summer (50 Deg F)**	Summer (90 Deg F)
Gross Unit Rating (MW)				
Net Unit Rating (MW)				
Unit Rating (Lagging MVAR)		N/A		
Unit Rating (Leading MVAR)		N/A		

* Enter values corresponding to the M_{maximum} gross unit-facility rating must be that occurs at a temperature of 0 degrees F or greater.

** Enter values corresponding to the M_{maximum} net unit-facility rating output must be that occurs at a temperature of 50 degrees F or greater.

2. Type of Application

☐ Construction ☐ Capacity Change

3. Effective Commercial Operation Date _____.

Proposed Revisions to PP5-1, Attachments 1, cont'd

4. ~~Will the unit be equipped for AGC?~~ ☐ Yes ☐ No
- a. ~~What is the unit's low operating limit based on its physical characteristics?~~
- b. ~~Does the unit have an operating range of 25MW or more?~~ ☐ Yes ☐ No
- c. ~~Does the unit have a response rate of ≥ 1 MW/Min?~~ ☐ Yes ☐ No
-
5. Will the unit-facility be equipped with a functioning governor? ☐ Yes ☐ No (A "No" response may be grounds for rejection pursuant to OP 14 "Technical Requirements for Generators, Demand Resources and Asset Related Demands and Alternative Technology Resources".)
6. Is the unit equipped with under-frequency protection? ☐ Yes ☐ No
- If "yes":
- a. Has the host utility reviewed the settings? ☐ Yes ☐ No
- b. Will the unit be tripped for under-frequency conditions in the area above the curve in Figure 1 of Standard PRC-006-NPCC Document A-3? ☐ Yes ☐ No
- i. If "Yes": Has additional automatic load shedding been provided equivalent to the amount of generation to be tripped? ☐ Yes ☐ No
- c. Will the unit be tripped in conjunction with dropping low voltage feeders during load shedding? ☐ Yes ☐ No
- i. If "Yes": Has the host utility ensured that sufficient automatic load shedding capability will be available to system operators? ☐ Yes ☐ No ☐ Yes ☐ No

Proposed Revisions to PP5-1, Attachments 1, cont'd

~~7. Provide estimates of SO₂, NO_x and CO₂ emissions rates as well as rate estimates for other regulated atmospheric emissions in the format of pounds per MMBTU and pounds per MWH on a per unit basis. Attach a list of all restrictions on generation operation due to environmental or other constraints (such as limited hours of operation, max. output) on the unit. Define conditions under which these restrictions can be lifted.~~

~~8. Will the operation of this unit impact other generating units or interconnections in the vicinity?~~

~~☐ Yes ☐ No If "Yes", describe, using an attachment if necessary.~~

~~9.7. Provide the following information on fuel used by the unit~~

~~a. List the unit's primary fuel _____ and secondary fuel _____.~~

~~b. How is the fuel being transported to the site? _____:~~

~~c. Does fuel availability vary with the season? ☐ Yes ☐ No If "Yes", please describe~~

~~d. What contingency plans are there to cover fuel shortages? _____:~~

~~e. Specify number of days of fuel storage. _____:~~

~~f. What alternate form(s) of fuel transportation are available to the unit? _____:~~

Proposed Revisions to PP5-1, Attachments 1, cont'd

10.8. Will the unit have black start capability? ☐ Yes ☐ No
If "Yes", can it be operated on its own auxiliaries prior to synchronization with the system? ☐ Yes ☐ No

11.9. Attach an electrical one line diagram showing all essential devices including GSU impedance, station arrangements, station service and connections to the ~~bulk power system~~ transmission system (69 kV and higher), including the voltage levels.

12.10. Is a Transmission Proposed Plan Application required? ☐ Yes
☐ No

a. If "Yes", identify the Transmission Applications associated with this Application, the Governance Participant responsible for filing and the date the Application was/will be submitted.

~~b. If "No", are thermal, stability, or other reliability analyses required for this application?~~ ☐ Yes ☐ No

13.11. System Reliability Studies

Short Circuit

☐ Completed

☐ Planned

☐ Not Needed

Load Flow

☐ Completed

☐ Planned

☐ Not Needed

Stability

☐ Completed

☐ Planned

☐ Not Needed

Other _____

☐ Completed

☐ Planned

☐ Not Needed

14. Do any of the above studies indicate problem areas? ☐ Yes ☐ No

If "Yes", attach description.

NOTE: APPLICATIONS FOR HYDRO UNITS MUST INCLUDE COMPLETED ATTACHMENT 2

Proposed Revisions to PP5-1, Attachments 2

Attachment 2

ISO New England Planning Procedure 5-1

PROPOSED PLAN APPLICATION DATA REQUIREMENTS FOR HYDRO-ELECTRIC FACILITIES

1. Applicant _____ Date _____

2. Station Name _____

3. Number of Units _____ Type of Turbine _____
(Adj. Blade, Kaplan, etc.)

For each turbine type:	Full Gate	Best Gate	Speed No Load
Capacity (kW) / (kvar)			
Flow (cfs)			
Head (ft)			
Water Use Efficiency (kW/cfs)			

(Attach additional sheets for each different turbine type)

4. Mode of Operation
(ISO definition: i.e., Daily cycle, Storage, Run of River, etc.)

5. River

6. Minimum Flow to Support Power Production (cfs)

7. Drainage Area at Site (sq. mi.)

8. USGS Gauging Station Number and Drainage Area (sq. mi.)

9. Usable Storage in Pond (kWh)

10. Upstream Storage Available (kWh)

11. Upstream Storage Transit Time (Hrs.)

12. Minimum In-stream Discharge Requirements (cfs)

Can this flow be used through the unit(s) Yes ☐ No ☐

13. Attach Monthly Flow Duration data (20 year maximum record)

Proposed Revisions to PP5-1, Attachments 4

1. StationName _____

- a. Location/Interconnection Point (Indicate point of coupling with utility system by specifying distribution feeder or transmission line name(s) or substation name. Distribution facilities should include the transmission facility substation(s) that the distribution facilities are supplied from.)

- b. Address of Plant (~~Town or City, County, State and Zip Code~~)

Street Address _____

Town or City _____

County _____ State _____ Zip Code _____

- c. Unit/Aggregate Generation Asset Identification _____

Net ratings entered in ~~d, e, and f~~ below should reflect the netting of auxiliary loads from the gross unit rating(s) that are directly related to the operation of the unit/aggregate generation.

	<u>Winter (0 Deg F)*</u>	<u>Winter (20 Deg F)</u>	<u>Summer (50 Deg F)**</u>	<u>Summer (90 Deg F)</u>
<u>Gross Unit Rating (MW)</u>				
<u>Net Unit Rating (MW)</u>				
<u>Unit Rating (Lagging MVAR)</u>		<u>N/A</u>		
<u>Unit Rating (Leading MVAR)</u>		<u>N/A</u>		

* Enter values corresponding to the maximum gross facility that occurs at a temperature of 0 degrees F or greater.

** Enter values corresponding to the maximum net facility output that occurs at a temperature of 50 degrees F or greater.

- ~~d. Ratings at 20 degrees F ambient and at 90 degrees F ambient.~~

	<u>Winter (20 Deg F)</u>	<u>Summer (90 Deg F)</u>
<u>Gross Unit Rating (MW)</u>		
<u>Net Unit Rating (MW)</u>		
<u>Unit Rating (Lagging MVAR)</u>		
<u>Unit Rating (Leading MVAR)</u>		

- ~~e. The maximum gross unit rating is at _____ degrees F ambient. (Must be at 0 degrees F or greater.)~~

Proposed Revisions to PP5-1, Attachments 4, cont'd

Maximum Gross Unit Rating (MW)	
Net Unit Rating (MW)	
Unit Rating (Lagging MVAR)	
Unit Rating (Leading MVAR)	

~~f. The maximum net unit rating is at _____ degrees F ambient. (Must be at 50 degrees F or greater.)~~

Gross Unit Rating (MW)	
Maximum Net Unit Rating (MW)	
Unit Rating (Lagging MVAR)	
Unit Rating (Leading MVAR)	

~~g.d. What is the maximum net power injection at the point of interconnection? _____~~

~~h.e. Is there load reduced by operating this generation? (Check ☒ yes/Yes or ☐ no/No) ☐ Yes ☐ No~~

If "Yes":

By how much is the load reduced? _____

Where is the load located? _____

2. Type of Application (Check ☒ one)

☐ Construction ☐ Capacity Change

3. Requested ~~Effective~~ Commercial Operation Date _____

~~4. Indicate whether the unit or generation aggregate capability is affected by steam host requirements.~~

~~(Check ☒ yes or no) ☐ Yes ☐ No~~

~~— If "Yes", define these requirements.~~

Proposed Revisions to PP5-1, Attachments 4, cont'd

5. Is the unit equipped with under-frequency protection? (Check ☒ yes or no) ☐ Yes ☐ No

If "Yes":

- a. Has the host utility reviewed the settings? ☐ Yes ☐ No
 - b. Will the unit be tripped for under-frequency conditions in the area above the curve in Figure 1 of [Standard PRC-006-NPCC Document A-3](#)? ☐ Yes ☐ No
 - i. If "Yes": Has additional automatic load shedding been provided equivalent to the amount of generation to be tripped? ☐ Yes ☐ No
 - c. Will the unit be tripped in conjunction with dropping low voltage feeder during load shedding? ☐ Yes ☐ No
 - i. If "Yes": Has the host utility ensured that sufficient automatic load shedding capability will be available to system operators? ☐ Yes ☐ No
 - d. If "Yes" to b or c: Has additional automatic load shedding been provided equivalent to the amount of generation to be tripped? ☐ Yes ☐ No
- If "Yes", describe using an attachment.

Note: A "No" response to b.i or c.i is grounds for rejection. A generator will not be allowed to be activated in the New England Markets for a "No" response to d. Such generator may request Settlement Only Resource treatment.

6. On a separate sheet, provide the following information:
- a. Prime mover code for the units (from "Generator Unit/Technology Types" listed on page 4);
 - b. Number of units;
 - c. Manufacturer and model number of the energy conversion unit(s);
 - d. Manufacturer and model number of the exciter(s) for synchronous unit(s); and
 - e. Manufacturer and model number of the voltage regulator(s) for synchronous unit(s).

Proposed Revisions to PP5-1, Attachments 4, cont'd

~~7. On a separate sheet, provide estimates of SO₂, NO_x, and CO₂ emissions rates. Also include rate estimates for other regulated atmospheric emissions in the format of pounds per MMBTU and pounds per MWH. Attach a list of all restrictions on generation due to environmental or other constraints (such as limited hours of operation, max. output) on the unit. Define conditions under which these restrictions can be lifted.~~

~~8. Will the operation of this unit impact other generating units or interconnections in the vicinity?~~

~~(Check ☒ yes or no) ☐ Yes ☐ No~~

~~If "Yes", describe, using an attachment if necessary.~~

9. Provide the following information on fuel used by the unit.

a. List the unit's primary energy source code (from "Energy Sources" listed on [the following page 4](#)).

b. List the unit's secondary energy source code (from "Energy Sources" listed on [the following page 4](#)).

~~c. How is the fuel being transported to the site? (from "Mode of Transportation" listed on page 4). _____~~

~~d. Does energy source (fuel) availability vary with the season? (Check ☒ yes or no) ☐ Yes ☐ No~~

~~If "Yes", describe. _____~~

~~e. What contingency plans are there to cover energy source shortages?~~

~~f. Specify number of days of energy source storage. _____~~

~~g. What alternate form(s) of fuel transportation are available to the unit for primary energy source?~~

~~h. What alternate form(s) of fuel transportation are available to the unit for secondary energy source?~~

Proposed Revisions to PP5-1, Attachments 4, cont'd

10. Will the unit have black start capability? (Check ☒ ~~yes~~ Yes or ~~no~~ No) ☐ Yes ☐ No
If "Yes", can it be operated on its own auxiliaries prior to synchronization with the system? ☐ Yes ☐ No

11. Provide the following information on the interconnection point.

- a. Specify the interconnection bus name and the voltage level the unit is connected to.

- b. Specify the modeled PSS/E bus name and number that is electrically closest to where the unit is interconnected.

(Check ☒ the appropriate box and provide appropriate diagram(s))

- ☐ The unit is connected to the power system at transmission voltage (69 kV or higher). Provide an electrical one line diagram showing all essential devices including GSU impedance, station arrangements, station service and connections to the bulk power system, including the voltage levels below 69 kV.
- ☐ The unit is connected to the distribution system. Provide one line diagram(s) showing the unit connection and where the distribution network connects to the bulk power system.

12. Has an interconnection request been submitted for the new unit or change of less than 5 MW? (Check ☒ yes or no) ☐ Yes ☐ No

- a. If "Yes", when was the interconnection request submitted and to whom?

- b. If "No", when will the interconnection request be submitted and to whom?

~~NOTE: APPLICATIONS FOR HYDRO UNITS MUST INCLUDE COMPLETED PP5-1 ATTACHMENT 2~~

Proposed Revisions to PP5-1, Attachments 4, cont'd

Return to PPA Form Updates Attachments 1,2 and 4

GENERATOR UNIT/TECHNOLOGY TYPES

CODE	PRIME MOVER (UNIT TYPE)
ST	Steam Turbine, including nuclear, geothermal and solar steam (does not include Combined Cycle)
GT	Combustion (Gas) Turbine (does not include Combined Cycle)
IC	Internal Combustion (diesel, piston) Engine
CC	Combined Cycle—Represents the total unit/plant/asset. Also used for combustion turbine units that are in the planning stage, for which specific generator details cannot be provided. (Includes EIA Codes CA, CT, and CS.)
HD	Hydro (Conventional Daily)
HW	Hydro (Conventional Weekly)—Stations may be considered as operated on a weekly or seasonal draw-down cycle (HW) provided there is on-site Energy storage between normal operating elevations equivalent to at least ten (10) times Claimed Capability Ratings, assuming zero (0) inflow from natural run-off and upstream station water discharge. Otherwise, stations will be considered as operated on a daily cycle (HD).
PS	Hydro (Pump Storage)
PV	Photovoltaic
WT	Wind Turbine
CE	Compressed Air Energy Storage
FC	Fuel Cell
OT	Other

MODE OF TRANSPORTATION

CODE	TRANSPORTATION (DESCRIPTION)
CV	Conveyor
PL	Pipeline
RR	Railroad
TK	Truck
WA	Water Transportation