

Draft for Discussion Only - Do Not Cite, Quote, or Distribute

Substation Transformer Backfeeding Protection	Avangrid	Central Hudson Gas & Electric	Consolidated Edison	National Grid	Orange and Rockland	PSE&G
Common definition and criteria for neutral over-voltage protection.	Neutral over-voltage protection (commonly referred to as 3V0) is required where there is reverse power flow through substation power transformers from the distribution system as a result of having generation sources on the distribution system. This protection package is needed for substations comprised of delta-wye transformers that are radially fed or tapped from a single transmission source where backfeeding is expected. Neutral overvoltage protection reduces prolonged over voltage from phase to ground faults on delta-wye connected transformers.					
Criteria and values to determine amount of allowable backfeeding before neutral over-voltage protection is required (i.e. 3V0)						
What is the minimum daytime load time-frame used in your calculations?				8 am to 8 pm		
How is the minimum daytime load determined when actual transformer loading information is not available?	(Feeder level) Estimated at 15% of historical peak load (more than 1 year of data)			(Feeder level) Estimated at 25% of annual peak load when EMS data is not available		
What is the typical range of costs of 3V0 protection in your territory?						
What is the typical range of costs of an LTC or substation regulator upgrade in your territory?						
If there is a document which provides additional information on these requirements, please identify it here.						
Monitoring and Control	Avangrid	Central Hudson Gas & Electric	Consolidated Edison	National Grid	Orange and Rockland	PSE&G
Describe any differences in monitoring and control requirements from those in the "Interim JU Monitoring and Control Criteria (September 1, 2017)"	N/A	N/A	N/A	N/A	N/A	
What is the typical range of costs for monitoring equipment for PV projects less than 50kW	TBD	TBD	TBD	TBD	TBD	
What is the typical range of costs for monitoring and control equipment for PV projects 50kW to 500 kW	TBD	TBD	TBD	TBD	TBD	
What is the typical range of costs for monitoring and control equipment for PV projects greater than 500 kW	TBD	TBD	TBD	TBD	TBD	
If there is a document which provides additional information on these requirements, please identify it here.	Interim JU Monitoring and Control Criteria (September 1, 2017) (Link to be added)					
Anti-Islanding Mitigation	Avangrid	Central Hudson Gas & Electric	Consolidated Edison	National Grid	Orange and Rockland	PSE&G
Describe any differences in or additions to the anti-islanding protection requirements from those in the "Interim JU Anti-Islanding Criteria (February 9, 2017)" that are part of your standard procedure.						
If DTT protection is determined to be required, explain the different types of communications used and the reasoning for using each type.						
What is your typical range of costs for installing reclose blocking on one (1) mid-line recloser?						

What is your typical range of costs for installing reclose blocking on a substation breaker?						
What is your typical range of costs for installing direct transfer trip (DTT)?						
If there is a document which provides additional information on these requirements, please identify it here.	Interim JU Anti-Islanding (February 9, 2017) (Link to be added)					
Effective Grounding	Avangrid	Central Hudson Gas & Electric	Consolidated Edison	National Grid	Orange and Rockland	PSE&G
For projects that require effective grounding evaluation, what calculations or software models are utilized to determine whether additional grounding mitigation methods are required? OR What criteria and values are used to determine whether the proposed system is in fact effectively grounded or if additional grounding mitigation is required.						
The following questions are projects connecting to the grid using a <u>Grounded Wye (Yg) High Side- Grounded Wye (Yg) Low Side</u> generator step-up transformer connecting to an effectively grounded system.	-	-	-	-	-	-
What is the minimum system size where additional effective grounding mitigation methods will always be required?				500 kW		
What is the minimum system size in which the system's effective grounding will be evaluated?						
For this configuration, what mitigation methods are acceptable? (i.e. lowside grounding banks, high side grounding banks or others)						
Do you recommend the use of a particular document which provides a method of estimating the size of the grounding device in order to maintain system effective grounding? If so, please provide a title or link to said document.						
If the developer's proposed grounding bank size is not acceptable, is the project placed on hold until a different size is resubmitted? What is your process for determining an acceptable bank size with a developer?						
The following questions are projects connecting to the grid using a <u>Grounded Wye (Yg) High Side - Delta (▲) Low Side</u> generator step-up transformer connecting to an effectively grounded system.	-	-	-	-	-	-
What is the minimum system size where a neutral impedance will always be required?						

What is the minimum system size in which the requirement of a neutral impedance will be evaluated?						
What is the maximum fault current contribution of the system before a neutral impedance is required?						
By using this transformer configuration, are there any additional protection concerns (other than single-phase open protection) that must be addressed? If so, please identify the concern and provide technical background.						
What are some proven mitigation methods that have successfully addressed the protection concerns you mentioned above? (e.g. customer recloser, product listings, etc.)						
If there is a document which provides additional information on these requirements, please identify it here.						
Single-Phase Open Protection	Avangrid	Central Hudson Gas & Electric	Consolidated Edison	National Grid	Orange and Rockland	PSE&G
Do you require single-phase open protection?						
What are some approved mitigation methods utilized to address these concerns? (i.e. negative sequence relaying w/ PCC recloser, etc.)						

Disclaimer: The statements and cost estimates provided in this document are for quick reference only and may change on a project by project basis. The members of the Joint Utilities are not held to the estimates or study procedures outlined in this document and, therefore, developers may see significant differences in their own projects.