

Designated Entity Design Standards Task Force (DEDSTF) Minimum Design Requirements for FERC Order 1000 Projects System Protection Subgroup

Purpose of this document

The charge of the DEDSTF states that the purpose of the group is to establish minimum design standards to assure a minimum level of robustness is provided such that the new competitively-solicited facility (one that would require the signing of a Designated Entity Agreement) would not introduce a weak point in the system in terms of performance. These minimum design standards would only apply to projects that would require the signing of a Designated Entity Agreement (DEA).

Section 4.2 of the DEA states

For the purposes of this Agreement, applicable technical requirements and standards of the Transmission Owner(s) to whose facilities the Project will interconnect shall apply to the design, engineering, procurement, construction and installation of the Project to the extent that the provisions thereof relate to the interconnection of the Project to the Transmission Owner(s) facilities.

The System Protection Subgroup views this language as the basis for the minimum system protection related requirements. However, as written, section 4.2 of the DEA is in need of clarity as it relates to system protection.

Applicable Relay schemes under DEA 4.2

Relay schemes applicable to DEA 4.2 are schemes that “relate to the interconnection of the Project to the Transmission Owner(s) facilities”. ~~This refers to protection schemes to include designed to trip off any portion of the interconnection. This refers to those items listed below under the “Relay ‘design and engineering’ requirements” section. For example, if the Project included a new substation that interconnected to a Transmission Owner line in a breaker and a half configuration, any relay schemes that trip off either line breaker would be applicable.~~

~~From DEA 4.2, applicable relay schemes must utilize the Transmission Owners(s) protection system design and engineering standards.~~

Relay “design and engineering” requirements

The applicable system protection technical requirements and standards of the TO, as related to DEA 4.2 include:

- ~~Line r~~ Relay types
- ~~Line r~~ Relay scheme (POTT, current diff, etc)
- ~~Line protection c~~ Communication media (Fiber, Power Line Carrier, etc). If the local T.O. design standards include Fiber Optic communications for all newly designed line protection, then the developer must incur the cost of any required fiber, even if the existing interconnect line does not currently have a fiber path.

- Line protection communication scheme requirements – number of channels, channel type, general remote trip requirements
- Any protection system maintenance must be able to be performed without taking any primary element (e.g., line, transformer, bus) out of service. Test switch requirements—the general test switch requirements of the local TO must be incorporated into the developer design. For example, the local TO may require all microprocessor relay I/O to have a test switch.
- General rack requirements. For example, the local TO may have a requirement to separate primary and backup relays on separate racks.
- Reclosing practices. Local TO will decide reclosing timing, and reclosing method type (HBDL, sync check, etc) must be coordinated with the local TO.
- Breaker failure scheme design as related to the interconnection and system stability. This would include BF relay type, timing, logic, etc. Breaker failure timing must be coordinated per NERC Standard PRC-001.

Comment [A1]: The Northeast reliability council has requirements that primary and backup relays be on separate panels. PSE&G is one company that follows this practice. As long as it is known up front in the bidding process, I think AEP could accommodate this request by customizing panels and installing two of our "standard panels" instead of one for a given protection zone.

Comment [A2]: Do we really want to be told what relay to use for breaker failure? My thought is "no", but this might involve a bit of a fight with PSE&G. They have concerns about a developer using a breaker failure relay that doesn't drop out fast enough (they cite that a SEL351 may not drop out fast enough on their 500kV lines, but a SEL451 would suffice). I don't think it would be a big deal to modify timing, but modifying logic has the potential to cause problems. Using a local TO's relay type could potentially mean we couldn't use our standard if AEP were the bidder.

As related to the above listed bullets, the local TO has the right to require the Developer to follow local TO standards as related to the bullets listed above. The Local TO, at their discretion, may allow the Developer to utilize their own standards as related to the bullets listed above.

The requirements listed above are meant to be general in nature and must be "performance based". The Developer has the ability to develop their own schematics, rack layout details, relay I/O, wiring drawings, etc.

Comment: Each TO will need to provide their requirements as outlined in this section. This could be included as part of an appendix to this document so that any developer has the information available during the bidding process.

Comment [FDL3]: Do we really want the ongoing maintenance required if are to include each TO's design standards as part of a larger PJM DEDSTF Design Requirements document? Each TO's engineering requirements will be subject to change, and must then be updated in the DEDSTF document.

Relay schemes that are not applicable to DEA 4.2

Relay schemes that are not applicable to DEA 4.2 are those schemes not related to the line protection schemes/systems as outlined above, that do not affect the interconnection in any way. These schemes do not trip off any portion of the interconnection. For these schemes, the Developer must follow the requirements of PJM Manual 7.

Relay protection review

The substation layout and proposed relay protection for all FERC 1000 projects must be presented to the PJM Relay Subcommittee for review and approval prior to the manufacturing phase of the project.

Comment [FDL4]: Could we have the local TO review the proposed design and bring it to the RS only if they believe there is an issue.

Additional requirements

All protection schemes in the PJM footprint are required to follow the PJM Manual 7, "PJM Protection Standards". Additionally, all Developers must follow all applicable NERC reliability standards. For protection systems in the Developer substation that do not meet the applicability of PJM Manual 7 (for example, protection systems protecting only equipment < 200kV), the PJM Relay Subcommittee has developed a PJM M7 exceptions document.