Executive summary

With the introduction of competition to the RTEP process via FERC Order 1000, PJM and its stakeholders determined that a set of common minimum requirements for all entities proposing a transmission project via the competitive planning process was required. The Designated Entity Design Standards Task Force (DEDSTF) was chartered to develop these minimum requirements. Comprised of PJM stakeholders representing multiple sectors, and all PJM Transmission Owners, the DEDSTF elected to develop these standards within sub-groups, containing industry veterans and subject matter experts. The task force branched out into three sub groups which, in parallel, reviewed existing accepted industry requirements, existing PJM Transmission Substation Subcommittee guidelines and Manuals, and composed sets of minimum required standards, for Transmission Lines, Substation equipment and Protection and Controls. These minimum required standards must be adhered to by all entities proposing a competitive solution in the PJM Competitive Planning Process that requires the signing of a Designated Entity Agreement. This set of standards was accepted by the PJM members via a Planning Committee endorsement, and is posted to PJM.com.
Purpose of this report

This report will review and describe the work done by the Task Force of the Planning Committee: Designated Entity Design Standards Task Force (DEDSTF). The group met fifty six times from October 2015 through October 2017. The final version of the DEDSTF Minimum Required Standards was endorsed by the PJM Planning Committee at the November 9th 2017 meeting. This report serves as final documentation from the task force, to its parent committee that the deliverables outlined in the Issue Charge and Problem Statement has been completed.

Issue review

FERC issued a Final Rule on Order No. 1000 in July 2011 and PJM has subsequently submitted a number of compliance filings to establish the process by which the revised planning and cost allocation requirements of the Order are being implemented. PJM has now implemented the process over the course of the last 2 years and, together with the stakeholders, have gained significant experience in managing the competitive planning process contemplated by the Order. Over that time, it has become apparent to PJM and the stakeholders that a number of issues have arisen in carrying out the process that suggest the need for process improvement to make the process more effective and efficient for both PJM and the stakeholder, while maintaining compliance with the Order. PJM, under the auspices of the Planning Committee, is conducting a number of stakeholder feedback sessions, both at the Planning Committee and at other venues, to gather feedback from the stakeholders as to their suggestions for process improvements. This Problem Statement is focused on a specific issue that was identified by stakeholders, Engineering Design standards to be used for greenfield projects that are competitively solicited. For Greenfield projects that are designated as a result of the competitive process, the Designated Entity may follow design standards that differ from those of the zonal transmission owner. Questions were raised at PC/TEAC and Lessons Learned regarding the potential for introducing a weak point in the system or reducing the reliability by lest robust solutions. Feedback provided by stakeholders consisted of the following items:

- Ensure new project does not reduce the performance
- Consideration of physical geography and environment
- Consideration of other local requirements or codes
- Well integrated protection
- Robustness of physical construction
- Emergency Restoration
- Future considerations

Based on feedback, PJM recommends the development of minimum design standards, which would take into consideration geography, and physical and other local needs (noise level, undergrounding requirements, etc.) of the
project. The design standards would apply to projects that are competitively solicited and address the following areas.

- Transmission Lines
- Substations
- System Protection and Control Design and Coordination

DEDSTF Organizational Structure

The DEDSTF was facilitated by a group from PJM including a Chairman, Secretary and a team of Subject Matter Experts. The facilitation team identified co-leads, two individuals from PJM member companies with industry experience in their respective fields, for each of the 3 sub-groups, and additional experts as required for specific segments requiring detailed knowledge. These co-leads had the responsibility of developing requirements, coordinating comments/revisions while representing all stakeholders involved in the development of the DEDSTF minimum requirements. The final details of what was and was not included in these documents resided wholly with the stakeholders. PJM provided guidance and recommendations but did not develop these minimum requirements.

Education provided

The DEDSTF continually provided education to its members on a series of detailed design and procedural topics. The descriptions below are a high level explanation of the topics that were presented to the members of the DEDSTF.

PJM Subject matter experts led several educational sessions around the FERC orders, documentation and requirements of the competitive planning process. This included detailed explanations of the following:

- FERC Order #1000 and subsequent PJM filings
- PJM Designated Entity Agreement
- PJM Interconnection Coordination Agreement
- PJMs implementation of the Competitive Planning Process
- Existing Transmission and Substation Subcommittee practices and guidelines
- Minimum Design Standards currently in place at SPP and MISO
- Relay Subcommittee practices and responsibilities

Additionally, PJM and its stakeholders led several educational sessions focused on specific detailed aspects of design criteria including:
Final set of Minimum Required Standards

The DEDSTF developed a set of minimum required standards for each of the 3 major sections identified in the problem statement (Protection and Controls, Substation Equipment and Transmission Lines).

At the June 2017 Planning Committee, the following sections were endorsed by PJM Stakeholders:

- Overhead Transmission Lines
- Substation Equipment
- System Protection and Control Design Coordination

The task force continued to finalize the requirements of the Underground Transmission lines sections, which was ultimately endorsed by the Planning Committee at their November 2017 meeting.

It is important to note that the DEDSTF received education on HVDC technologies and determined that it was not appropriate to establish minimum standards for HVDC at this time, and that the need for this would be revisited at a future date.

It is also important to note that per the Problem Statement/Issue Charge, the discussion of ratings methodology was outside of the scope of this task force, and therefore is not included in the final set of minimum requirements.

The official set of DEDSTF Minimum Required Standards can be found at the following link:


and are posted to the Design, Engineering & Construction Page, within the planning section of www.pjm.com.
Conclusion

The final product of the DEDSTF was presented to the Planning Committee with the full support of the DEDSTF membership, therefore no alternatives were presented, and the group has completed all requirements and deliverables included in the Problem Statement/Issue Charge.

PJM and the DEDSTF members feel strongly that even though the deliverables have been completed, there will be a need for a periodic review of these minimum required standards, and therefore is recommending revisions to the charter of the DEDSTF that include a biennial review. In order to incorporate this ongoing review the task force will need to transform into a subcommittee, as reflected in the proposed charter revisions.
Appendix

Planning Committee materials:

November 9, 2017: Seeking PC endorsement of Underground Lines Section of DEDSTF Minimum Required Standards

DEDSTF Underground Lines Presentation
DEDSTF Underground Lines Redline
DEDSTF Underground Lines Clean

October 12, 2017: PC first read of Underground Lines Section of DEDSTF Minimum Required Standards

DEDSTF Underground Lines Presentation
DEDSTF Underground Lines Redline
DEDSTF Underground Lines Clean

June 8, 2017: Seeking PC endorsement of Overhead Lines, Protection and Substation Sections of DEDSTF Minimum Required Standards

DEDSTF Overhead Lines, Substation and Protection Presentation
DEDSTF Overhead Lines, Protection and Substation Combined Sections

May 4, 2017: PC first read of Overhead Lines, Protection and Substation Sections of DEDSTF Minimum Required Standards

DEDSTF Overhead Lines, Substation and Protection Presentation
DEDSTF Overhead Lines Section
DEDSTF Protection Section
DEDSTF Substation Section
April 13, 2017: PC pre-first read of Overhead Lines, Protection and Substation Sections of DEDSTF

Minimum Required Standards

- DEDSTF Update to Planning Committee
- Substation Group Draft Requirements
- Lines Group Draft Requirements
- Protection Group Draft Requirements

March 9, 2017: DEDSTF Update to PC

- DEDSTF Update to Planning Committee
- Substation Group Draft Requirements
- Lines Group Draft Requirements
- Protection Group Draft Requirements

December 15, 2016: DEDSTF Update to PC

- DEDSTF Update to Planning Committee

September 15, 2016: DEDSTF Update to PC

- DEDSTF Update to Planning Committee

June 9, 2016: DEDSTF Update to PC

- DEDSTF Update to Planning Committee

January 7, 2016: DEDSTF Charter Endorsement

- DEDSTF Charter Endorsement

December 3, 2015: DEDSTF Charter First Read

- DEDSTF Charter First Read
July 9, 2015: PC Endorsement of Problem Statement

**DEDS Problem Statement Presentation**

**DEDS Problem Statement First Read**

June 11, 2015: PC first read of Problem Statement

**DEDS Problem Statement Presentation**

**DEDS Problem Statement First Read**

**DEDSTF Meeting materials**

October 19, 2017: Finalize revisions to underground standards, HVDC on hold discussion

**Agenda**

**Underground standards**

**Minimum Requirements Document**

**Minimum Requirements Document – Post Meeting Version**

September 21, 2017:

**REMAINING LINKS TO BE COMPLETED**

September 7, 2017:

August 17, 2017:

July 20, 2017:

June 15, 2017:

May 22, 2017:

May 18, 2017:

May 15, 2017:

May 8, 2017:

May 1, 2017:
May 16, 2016:
April 14, 2016:
March 23, 2016:
February 23, 2016:
January 21, 2016:
December 16, 2015:
November 12, 2015:
October 12, 2015: