NERC

Personnel Performance, Training and Qualification Standards

PJM State & Member Training
2009
Objectives

• Summarize the PER requirements by which all operating entities must comply with, such as operator authority, training, and certification.
Purpose:
• Operating personnel must have the authority and responsibility to implement real-time actions to ensure the stability and reliability of the Bulk Power System*

Applicability:
• Transmission Operators
• Balancing Authorities

Requirements:
• Each entity shall provide operating personnel with the responsibility and authority to implement real-time actions to ensure the stable and reliable operation of the BES
Measurements:

• Provide documentation that operators have the responsibility and authority to include:
  - Written current job description
  - Current job description is accessible in the control room to all operators*
  - Written job description that states operators are compliant with NERC reliability standards*

• A written current job description must state in clear and unambiguous language the responsibilities and authorities of each operating position
Measurements:

• Written operating procedures that state that, during normal and emergency conditions, operators have the authority to take or direct timely and appropriate real-time actions without obtaining approval from higher level personnel to prevent or alleviate SOL or IROL violations.

Compliance:

• Every three years, a periodic on-site review including operator interviews, document verification, job description, and written operating procedures will be conducted.
Purpose:
• Entities must provide their personnel with a training program that ensures reliable system operation

Applicability:
• Balancing Authority
• Transmission Operator

Requirements:
• Each entity must be staffed with adequately trained operators
Requirements:

- Each entity shall have a training program for all operating personnel that are in:
  - Positions that have primary responsibility, either directly or through communications, for real-time operation of the bulk electric system*
  - Positions directly responsible for complying with NERC standards*
Requirements:

- Training programs must meet the following criteria:
  - Objectives must be defined, based on NERC and RRO Standards, entity operating procedures, and regulatory requirements to be able to apply during normal, emergency, and restoration conditions
  - Plan for initial and continuing training of personnel
  - Must include training time to ensure operating proficiency
  - Training staff must be identified and competent in knowledge of system operations and instructional capabilities
Requirements:

• Provisions for at least five days per year of training and drills using realistic simulations of system emergencies, in addition to required training to maintain qualified operators*

Compliance Monitoring Process:

• Every three years, the Regional Reliability Organization will conduct a periodic on-site review of the training program and training records
Purpose:
• Certification of operators to ensure minimum competencies for operating the bulk power system

Applicability:
• Transmission Operators
• Balancing Coordinators
• Reliability Coordinators
Requirements:

• Entities shall staff operating positions with NERC-certified operators for:
  - Positions with primary responsibility for real-time operation, either directly of through communications with others, of the interconnected BES*
  - Positions directly responsible for compliance of NERC standards*
Measures:

• All entities shall have NERC-certified operators on shift in required positions at all times except for:
  - An individual in training who may perform critical tasks only under direct, continuous supervision and observation of a NERC-certified individual*
  - Real-time operating emergency, when control is transferred from the primary to backup control center (limited to 4 hours)*
Purpose:
• Coordinators must have a competent staff to perform the Reliability Coordinator functions*

Applicability:
• Reliability Coordinators

Requirements:
• Each RC shall be staffed with trained and NERC-certified Reliability Coordinators operators, 24/7*
• Personnel shall complete a minimum of 5 days per year of training and drills using realistic simulations of system emergencies
Requirements:

- Personnel will have a comprehensive understanding of their area and its interactions with neighboring RC areas.
- Personnel should have an extensive understanding of the Balancing Authorities, Transmission Operators, and Generation Operators within the area including operating staff and practices, restoration priorities and objectives, outage plans, equipment capabilities, and operational restrictions. Personnel shall place particular attention on SOLs and IROLs and inter-tie facility limits.
- Ensure protocols are in place to have the best available information at all times*
Purpose:

• To ensure that System Operators performing real-time, reliability-related tasks on the Bulk Electric System are competent to perform those tasks

Applicability:

• Reliability Coordinator
• Balancing Authority
• Transmission Operator
Requirements:

- Each entity shall use a systematic approach to training to establish a training program for the Bulk Electric System company-specific, reliability-related tasks performed by its System Operators and shall implement the program.
  - Each entity shall create a list of the tasks as performed by its System Operators and update the list each calendar year to identify new or modified tasks for inclusion in training.
  - Each entity shall design and develop learning objectives and training materials based on the task list, deliver the training, and conduct an annual evaluation of the program to identify any needed changes, and implement the changes.
Requirements:

- Each entity shall verify each of its System Operator’s capabilities to perform each identified and assigned task at least one time
  - Within six months of a modification of the Bulk Electric System tasks, each entity shall verify each of its System Operator’s capabilities to perform the new or modified tasks
Requirements:

- At the minimum, on a 12-month basis, each entity shall provide each of its System Operators with at least 32 hours of emergency operations training, that applies to its organization, and reflects emergency operations topics to include system restoration utilizing exercises, drills, or other training required to maintain qualified personnel.

  - Each entity that has operational authority or control over facilities with established IROLs, or has established operating guides or protection systems to mitigate IROL violations shall provide each System Operator with emergency operations training using simulation technology.
Requirements:

- Simulation technology includes simulators, virtual technology, or other technology that replicates the operational behavior of the Bulk Electric System during normal and emergency conditions.
Measures:

• Each entity shall have available for inspection evidence of using a systematic approach to training to establish and implement a training program to include:
  - Company-specific reliability-related task list with the date of the last review and/or revision
  - Learning objectives and training materials
  - System Operator training records to include:
    - Names of the people trained
    - Title of the training delivered
    - Date of delivery
  - Instructor observations, trainee feedback, supervisor feedback, course evaluations, learning assessments, or internal audits results as proof of the annual training evaluation
Measures:

• Each entity shall have available evidence to show that it verified that each of its System Operators is capable of performing each assigned task to include:
  - Training records showing successful completion
  - Supervisor check sheets
  - Results of learning assessments

• Training records should also provide evidence that each System Operator has obtained 32 hours of emergency operations training including training using simulation technology
• Who has the authority to take or direct timely and appropriate real-time actions without obtaining approval from higher level personnel in order to prevent or alleviate system operating limit or interregional operating limit violations?
  a) Plant Operators
  b) Manager of System Operations
  c) Shift Manager or Supervisor
  d) System Operator
• Entities must have a training program for all operating personnel who meet which of the following criteria? (More than one answer)
  a) Primary responsibility for real-time operation of the Bulk Electric System
  b) Control of the Distribution System
  c) Directly responsible for complying with NERC Standards
  d) Responsibility for generation loading
In addition to the required training for maintaining qualified operators, entities must have provisions for training and drills using realistic simulations of emergency system conditions. What is the timeframe for this type of training?

a) 2 days per month  
b) 5 days per month  
c) 5 days per year  
d) 10 days within a 3 year period
• Entities are required to have NERC-certified operators on shift in required positions at all times under all circumstances. True or False?
  a) True
  b) False
NERC
System Performance Standards

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Purpose:
• To ensure that reliable systems are developed through periodic simulations and assessment to meet performance requirements with sufficient lead time, and to be able to be modified or upgraded to meet system needs, both present and future

Applicability:
• Planning Authority
• Transmission Planner
Requirements:

• Entities shall demonstrate through assessment that its area of the system with all transmission facilities in service and normal (pre-contingency) operating procedures in effect, the Network can be operated to supply customer demands and projected Firm Transmission Services at all demand levels over the range of forecast system demands, as defined in Category A of Table 1 of this Standard.
Requirements:

- To be valid, entities’ assessments shall:
  - Be made annually
  - Be conducted for near-term (1-5 years) and longer-term (6-10 years) planning horizons
- Be supported by current or past study and/or system simulation testing that addresses the following categories
Requirements:
- Cover critical system conditions and study years
- Be conducted annually
- Be conducted beyond the 5-year horizon only as needed to identify marginal conditions
- Normal established operating procedures in place
- All projected firm transfers modeled
- Be performed for demand levels over the range of forecast system demands
- Include existing and planned facilities
- Include reactive resource availability
- Address any planned upgrades
Requirements:

- If the system simulations indicate an inability to respond as prescribed:
  - A written summary of plans must be provided on achieving the required performance by:
    - Including an implementation schedule
    - Including the expected required in-service dates of facilities
    - Consider lead times necessary to implement plans
  - Review, in subsequent annual assessments, the need for identified system facilities

- Entities shall provide results annually to their RRO’s
Purpose:

• Simulations and assessments are needed to ensure that reliable systems are developed to meet performance requirements with enough lead time, and can be modified or upgraded, as needed, to meet present and future conditions

Applicability:

• Planning Authority
• Transmission Planner
Requirements:

- Entities shall demonstrate through assessment that its area of the system is planned such that the Network can be operated to supply customer demands and projected Firm Transmission Services, at all demand levels over the range of forecast system demands, as defined in Category B of Table 1 of this Standard.
Requirements:

• To be valid, the assessments shall:
  - Be made annually
  - Be conducted for both near-term (1-5 years) and long-term (6-10 years) planning
  - Be supported by current or past studies and/or system simulation testing for single contingencies

• System simulation tests must address the following,
  - Cover critical system conditions and study years
  - Be conducted annually
  - All projected firm transfers modeled
  - Be performed for demand levels over the forecast system demand range
Requirements:
- Be conducted beyond the 5-year horizon only as needed to address marginal conditions
- Demonstrate system performance meets Category B contingencies
- Include existing and planned facilities
- Include reactive resource availability
- Include existing and planned protection systems, to include back-up or redundant systems
- Include the effects of existing and planned control devices
- Include planned outages of bulk power equipment (maintenance, protection systems or their components)
Requirements:

• Address any planned upgrades to meet the performance requirements of Category B
• Consider all contingencies that apply to Category B
• If the system simulations indicate an inability to respond as prescribed:
  - A written summary of plans must be provided on achieving the required performance by:
    - Including an implementation schedule
    - Including the expected required in-service dates of facilities
    - Consider lead times necessary to implement plans
    - Review, annually, the need for identified facilities
Purpose:
• Simulations and assessments are needed to ensure that reliable systems are developed to meet performance requirements with enough lead time, and can be modified or upgraded, as needed, to meet present and future conditions

Applicability:
• Planning Authority
• Transmission Planner
Requirements:

• Entities shall demonstrate through assessment that its area of the system is planned such that the Network can be operated to supply customer demands and projected Firm Transmission Services at all demand levels over the range of forecast system demands, as defined in Category C of Table 1 of this Standard

• Controlled interruption of customer demand, the planned removal of generators, or the curtailment of firm power transfers may be necessary to meet this Standard
Requirements:

- To be valid, the assessments shall:
  - Be made annually
  - Be conducted for both near-term (1-5 years) and long-term (6-10 years) planning
  - Be supported by current or past studies and/or system simulation testing for multiple contingencies as defined in Category C
  - Be performed only for Category C contingencies that would produce severe system impacts/results
  - Cover critical system conditions
  - Be conducted annually
Requirements:

- Projected firm transfers modeled
- Be performed for demand levels over the forecast system demand range
- Include existing and planned facilities
- Include reactive resource availability
- Include existing and planned protection systems, to include back-up or redundant systems
- Include the effects of existing and planned control devices
- Include planned outages of bulk power equipment
Requirements:

• Address any planned upgrades to meet the performance requirements of Category C
• Consider all contingencies that apply to Category C
• If the system simulations indicate an inability to respond as prescribed:
  - A written summary of plans must be provided on achieving the required performance by:
    - Including an implementation schedule
    - Including the expected required in-service dates of facilities
  - Consider lead times necessary to implement plans
• Review, in subsequent annual assessments, the need for identified system facilities
Purpose:

- Simulations and assessments are needed to ensure that reliable systems are developed to meet performance requirements with enough lead time, and can be modified or upgraded, as needed, to meet present and future conditions.

Applicability:

- Planning Authority
- Transmission Planner
Requirements:

- Entities shall demonstrate through assessment that its portion of the system is evaluated for the risks and consequences of each of the extreme contingencies, as defined in Category D of Table 1 of this Standard.

- To be valid, the assessment shall:
  - Be made annually
  - Be conducted for near-term
  - Be supported by current or past studies and/or system simulation testing showing system performance following Category D contingencies
Requirements:

• System simulation tests must address the following:
  - Be performed only for Category D contingencies that would produce severe system impacts/results
  - Cover critical system conditions
  - Be conducted annually
  - Projected firm transfers modeled
  - Be performed for demand levels over the forecast system demand range
  - Include existing and planned facilities
  - Include reactive resource availability
Requirements:

- Include existing and planned protection systems, to include back-up or redundant systems
- Include the effects of existing and planned control devices
- Include planned outages of bulk power equipment
Purpose:
• To ensure each RRO complies with planning criteria, for assessment of overall adequacy and security of the bulk power system, both real-time and as planned

Applicability:
• Regional Reliability Organization
Requirements:

• Each RRO will annually conduct assessments of its existing and planned generation and transmission facilities (BES) for:
  - Summer, winter, and other conditions as needed
  - Near-term planning horizons (detailed assessments)
  - Long-term planning assessments that focus on analysis of resource and transmission adequacy trends, other industry trends, and reliability concerns
Requirements:

- Inter-regional reliability assessments that show that performance is in compliance with the NERC TPL Standards and regional transmission and generation criteria
- Assessments also should identify key reliability issues and any risks and uncertainties concerning security and adequacy
  - RRO’s will provide regional and inter-regional seasonal, near-term, and long-term reliability assessments to NERC annually
Requirements:

- RRO’s perform special assessments as requested by NERC under special directions and criteria, that can include:
  - Security assessments
  - Operational assessments
  - Emergency response preparedness evaluations
  - Adequate fuel supplies and hydro conditions
  - Reliability impacts of new or proposed rules
  - Reliability impacts of new or proposed legislation that affects adequacy of the bulk power system
**Purpose:**

- To ensure each RRO complies with planning criteria, for assessment of overall adequacy and security of the bulk power system, both real-time and as planned

**Applicability:**

- Regional Reliability Organization
Requirements:

• To be able to assess reliability and compliance with NERC reliability standards and regional planning criteria, each RRO shall provide system data, reports, and performance information (seasonally, annually, or as specified)
Requirements:
• Performance information shall include, but not be limited to:
  - Electric demand and net energy for load
  - Resource adequacy and supporting information
  - Demand-side resources and characteristics
  - Supply-side resources and characteristics
  - Transmission system and supporting information
  - System operations and supporting information
  - Environmental and regulatory impacts and issues
Questions ????