Standard Authorization Request Form

Title of Proposed Standard	System Personnel Training Requirements
Request Date	2/8/2006

SAR Requestor Information		**SAR Type** (Put an 'x' in front of one of these selections)
Name	NERC Personnel Subcommittee	☒ New Standard
Primary Contact Earl Cass, Chair NERC PS		☐ Revision to existing Standard
Telephone 605-882-7550 Fax 605-882-7453		☐ Withdrawal of existing Standard
E-mail cass@wapa.gov		☐ Urgent Action

Purpose/Industry Need (Provide one or two sentences)
A training standard is required to set the minimum acceptable requirements for the development, implementation and maintenance of initial and continuing System Personnel Training programs.   This standard is needed to help insure that System Personnel performing operating tasks in real time are provided with an adequate amount of training in order to promote the Reliability and Adequacy of the North American Interconnections and their bulk electrical systems.

Reliability Functions

The Standard will Apply to the Following Functions *(Check box for each one that applies by double clicking the grey boxes.)*

☒	Reliability Authority	Ensures the reliability of the bulk transmission system within its Reliability Authority area. This is the highest reliability authority.
☒	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within its metered boundary and supports system frequency in real time
☒	Interchange Authority	Authorizes valid and balanced Interchange Schedules
☒	Planning Authority	Plans the bulk electric system
☐	Resource Planner	Develops a long-term (>1year) plan for the resource adequacy of specific loads within a Planning Authority area.
☐	Transmission Planner	Develops a long-term (>1 year) plan for the reliability of transmission systems within its portion of the Planning Authority area.
☒	Transmission Service Provider	Provides transmission services to qualified market participants under applicable transmission service agreements
☐	Transmission Owner	Owns transmission facilities
☒	Transmission Operator	Operates and maintains the transmission facilities, and executes switching orders
☐	Distribution Provider	Provides and operates the "wires" between the transmission system and the customer
☐	Generator Owner	Owns and maintains generation unit(s)
☒	Generator Operator	Operates generation unit(s) and performs the functions of supplying energy and Interconnected Operations Services
☒	Purchasing-Selling Entity	The function of purchasing or selling energy, capacity and all necessary Interconnected Operations Services as required
☒	Market Operator	Integrates energy, capacity, balancing, and transmission resources to achieve an economic, reliability-constrained dispatch.
☒	Load-Serving Entity	Secures energy and transmission (and related generation services) to serve the end user

Reliability and Market Interface Principles

Applicable Reliability Principles *(Check boxes for all that apply by double clicking the grey boxes.)*		
☒	1.	Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2.	The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3.	Information necessary for the planning and operation of interconnected bulk electric systems shall be made available to those entities responsible for planning and operating the systems reliably.
☒	4.	Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
☒	5.	Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
☒	6.	Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified and have the responsibility and authority to implement actions.
☒	7.	The security of the interconnected bulk electric systems shall be assessed, monitored and maintained on a wide area basis.
Does the proposed Standard comply with all of the following Market Interface Principles? *(Select 'yes' or 'no' from the drop-down box by double clicking the grey area.)*		
	1.	The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes
	2.	An Organization Standard shall not give any market participant an unfair competitive advantage.Yes
	3.	An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes
	4.	An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes
	5.	An Organization Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes

Detailed Description (Provide enough detail so that an independent entity familiar with the industry could draft, modify, or withdraw a Standard based on this description.)

Introduction

The public comments to the latest standards authorization request for the NERC Training Standard revealed that the SAR did not explain adequately the intent of the proposed training standard nor the concepts upon which that standard would be based. This response provides more detail, and includes a SAR revision that should provide greater comfort to those who identified key issues with the first draft.

The SAR drafting team noted three common concerns among these comments, specifically that the standard would:

1. Unduly prescribe the details for training programs,

2. Cover too broad a range of operating personnel, and

3. Require a "one size fits all" approach to training

The comments also indicated some confusion surrounding the separation and interdependencies of training, personnel certification, organization certification and continuing education, which we will clear up as well.

This latest response to the public comments is divided into four sections:

1. General explanation of the concepts of the standard,

2. What the standard *does not* cover,

3. Responses to the three common concerns listed above, and

4. Responses to all other comments.

In response to comments received on the first SAR for a training standard, the SAR drafting team has determined that:

1. More explanation is needed to the industry regarding the approach planned to write a training standard.

2. The scope of the initial training standard should be limited to the initial training of new staff and the continuing education of existing staff performing operating tasks in real-time that directly impact the reliability of the Bulk Electric System (BES). The Personnel Subcommittee (PS) is in the process of conducting an Operating Tasks Analysis. Operating tasks that impact reliability are already known, but the Operating Task Analysis will identify who performs those tasks, and thereby clarify the target audience for the initial Training Standard.

3. The initial training standard will not cover operations support

personnel because we will not have adequate data to include those tasks performed by support personnel that can directly impact reliability. After completion of the Real-Time Operations Task Analysis the Personnel Subcommittee will conduct an Operations Support Task Analysis to determine who and which tasks performed can directly impact reliability. The initial training standard need not be delayed for the second round of tasks analysis to identify support tasks, and is targeted for completion by mid-May, 2006.

4.   In the section on page SAR-2 above titled Reliability Functions, the drafting team has checked several functional entities that may or may not end up being covered by the standard. The Personnel Subcommittee is conducting a Task Analysis to determine those tasks performed by operating personnel in real time that directly impact reliability. The results of that study will shed further light on the functional model entities that might be covered by this standard. However, that study will not, and cannot be all inclusive, so there will still be some responsibility on organizations to recognize real time operating tasks their personnel perform that directly impact reliability that may not be on the list from the study. The Functional Model entities is not a perfect system for identifying tasks that impact reliability, and the drafting team has therefore decided to use a task-based approach to identifying who directly impacts real-time reliability. The drafting team does not and cannot know the Functional Model entities to which this standard will apply because the Functional Model is the wrong thing to use to identify tasks that directly impact real time reliability.

5.   The target for completion of this second round of tasks analysis will be mid summer, 2006, with amendment of the Training Standard to be done in fall-winter 2006 to include persons performing support tasks that directly impact reliability

This approach accomplishes several objectives that have been expressed as concerns by the industry.

1.   It puts a training standard in place for the highest priority personnel – those that directly operate the BES - in 2006.
2.   It bases the training standard on tasks known to directly impact the reliability of the BES using Task Analysis data that has been gathered by a proven and widely accepted approach.
3.   It supplies the industry with tasks analysis data that will serve as a foundation for performance requirements required to determine competency gaps. This is of particular benefit for the smaller entities that may not be able to afford a full Job Task Analysis. The PS and Standard Drafting Team are conducting one for them. Some additional amount of assessment will be required by specific entities to determine the training their employees in particular need, but the brunt of the more costly needs assessment process of a Job Task Analysis will have been done for

the industry for the tasks of highest priority to reliability, with a commitment to immediately follow-up with other studies to address support tasks in a legitimate way.

4.   It establishes a systematic approach to training as the norm for the industry. This is critical to achieve measurable results from training, and at the same time provides the most flexibility for the industry to determine training needs for their specific jobs. Training results must be measured as required competency. Required competency cannot be measured without taking a systematic approach to developing training, which includes determining the competency required by tasks and the existing competency of employees. It is the elimination of the gap between competency required and existing competency that is the goal of training, and is what can and must be measured to validate that competency has been achieved through training. Specifying a number of training hours does not guarantee that competency will be achieved. Competency-based training is the most critical requirement of any legitimate training program, and this approach to a training standard ensures that the process required to deliver competency will be followed.

The Concepts of the Training Standard

The goal of operator training is to develop *competency*, which is "the ability to do something well or to a required standard."[1] Competent system operators understand the tasks they are expected to perform and how to do those tasks. They also understand the reliability standards to which they and their organizations are held accountable. The organization, in turn, must design and implement its training program to ensure this competency. The proposed NERC training standard includes the requirements for these training programs.

While training on its own won't ensure competency, it is a necessary ingredient for developing system operators who are competent—at what they do. System operators gain expertise through on-the-job training structured and executed according to this standard. However, on the job training not structured and executed in accordance with a systematic approach to training is seldom complete enough to ensure that system operators understand *why* their actions produce certain outcomes. Furthermore, unstructured training does not ensure that system operators will be able to deal with novel situations or simultaneous events they have never experienced. The failure to recognize that "the perfect storm" was brewing was one of the root causes of the August 2003 blackout and the subsequent requirement that all system operators receive at least five days of training annually in emergency operations.

Approach to Developing A Training Standard

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[1] Source: Encarta Dictionary

The approach of the revised SAR for a training standard is to be flexible to the industry in determining their unique training needs and not try to force a single set of training topics on a widely diversified audience. To provide for flexibility is not a compromise on quality of training. Quite the opposite. Quality training results from applying a systematic approach to training that includes training needs assessment, training development, delivery, and evaluation. Using this process, an organization can identify training needs and deliver quality training that eliminates competency gaps. Not using this fundamental process for training, or leaving out any step in the process, will not produce training that can validate competency required for job performance.

The primary purpose of training is to produce competency where a gap exists between ability (or performance required for the job) and the existing competency of a person performing that job. A systematic approach to training starts by determining performance requirements. You must know what performance is required before you can say the capability to perform exists or not. Determining performance requirements simply means knowing what a person is supposed to be able to do, and is only the first step in determining and delivering training that produces needed competency. Once you know what is supposed to be done and how well (performance requirements), you must then determine the existing level of competency of personnel performing those tasks. The process for determining the difference between required competency and existing competency, which is a competency gap, is termed training needs assessment.

Valid training is the result of a systematic approach to identify performance deficiencies and correcting the lack of ability to perform with valid training. Training, when done using a systematic approach, cannot guarantee competency, or the ability to perform. However, training, without attention to other performance factors such as tools, procedures, etc. required to do a job cannot make performance happen.

The approach to a training standard could be to select a list of topics that must be covered and a specific number of hours per year of training. That approach would not guarantee competency. Learning might occur, but whether or not the right learning occurred (leaning required to perform tasks) would be unknown without a method for validating learning. That is the principle of the systematic approach to training – training is a process that, without each of its critical elements, cannot guarantee competency. Without competency performance will not occur as desired.

To expand on the approach being proposed by the revised SAR, the approach will be based on the fact that developing and maintaining an effective training program involves a number of steps:

1. **Determining the needs for training** through a task analysis or job and task analysis process, followed by a training needs assessment. This step enables the organization to know what training its operators need.

2. **Designing and adjusting the training program** to make sure it

directly correlates performance requirements, learning objectives, and learning evaluation to tasks. The training program must be designed to bring the system operators from their current level of competency to the organization's desired level of competency.

3. **Developing the training program** so that it includes effective learning experiences and delivery methods. The approach to this step, as well as step 2, will drive the requirements for training and operating staffs.

4. **Delivering the training to the personnel**; in other words, ensure that the training actually takes place as designed.

5. **Verifying and documenting the competency** that the personnel achieved through a documented assessment process

When all of these steps are correctly applied, training will be able to validate competency. The omission of any step means that the training cannot guarantee the desired competency. The training standard includes all five of these steps, and measures compliance by requiring documentation that these steps were performed. If the process is followed credible training will result. If the process is not followed, the needed learning may not occur.

Requirements the Training Standard Does Not Include

Does not specify the number of hours of training the organization must deliver, with one exception: that every system operator must receive at least 32 hours of training in emergency operations. This training was specifically required in NERC's original recommendations following its initial investigations into the August 2003 blackout and the drafting team agrees it must be in the training standard until data substantiates another number.

Does not specify who must be trained. That's the purpose of the job and task analysis. The Personnel Subcommittee (PS) is conducting a job and task analysis to provide the industry with a solid base of tasks that impact reliability. (See text box at bottom on Determining Tasks.)

Does not list the training subjects that must be taught. The subjects must be germane to the tasks that the system operators perform, and these are revealed through the job and task analysis. Even though the PS is supplying the majority of operator tasks that directly impact reliability, the list is neither complete nor does it list specific training subjects for an organization. A needs assessment must still be conducted by each organization to determine the training needs of their personnel.

Does not require operator certification or specify who must be certified. NERC certification of personnel is not covered by this standard.

Does not specify how many hours of NERC continuing education a system operator must have for renewal of a NERC certificate.

Does not require a specific number of training staff. The number of

qualified training staff is a function of training needed to maintain qualified operating personnel, which must be determined by each organization. Staffing with qualified personnel to operate is a responsibility of each organization impacting the reliability of the BES.

Does not require an operator training simulator, though it does require simulation training as part of the training in emergency operations, the standard must certainly encompass training using simulators

Does not accredit training programs. If the systematic approach to training is followed, training programs will be credible and produce the desired competency.

Determining tasks

The proposed training standard will require every organization to determine the tasks that its operating personnel perform. This is accomplished through a task analysis or a job and task analysis (JTA). Organizations with long-established training programs conduct JTAs whenever needed to ensure their training programs include the proper content. But most organizations, especially those who do not have their own training programs, probably don't perform JTAs.

The proposed standard does not require the organization to perform a formal JTA. It does require the organization to explain how it identified the tasks for which its training program was designed.

To help the industry identify these critical operating tasks, the NERC Personnel Subcommittee is conducting three studies. The first study determined the competencies of excellent operators. The second will identify the tasks done by operating personnel that directly impact reliability. The third will identify tasks performed by support personnel that directly impact reliability. The results of the first two studies will be factored into the initial training standard. In late 2006, the study of support personnel tasks will be included in a revision to the training standard. Organizations may use this "generic" JTA to identify those operating personnel who must be included in their training program, but they must conduct a training needs assessment to determine the specific training needs of their personnel.

Related Standards

Standard No.	Explanation
	None

Related SARs

SAR ID	Explanation These Organization Certification standards are not yet approved
Draft BA_CERTIFICATION_01_03	Certification of the Balancing Authority function includes requirements for staffing with NERC-certified system operators. The proposed standard should set a required minimum training program for these certified system operators.
Draft	Certification of the Interchange Authority function includes

IA_CERTIFICA TION_01_02	requirements for staffing with NERC-certified system operators. The proposed standard should set a required minimum training program for these certified system operators.
Draft RA_CERTIFICA TION_01_02	Certification of the Reliability Authority function includes requirements for staffing with NERC-certified system operators. The proposed standard should set a required minimum training program for these certified system operators.
Draft TOP_CERTIFIC ATION_01_02	Certification of the transmission Operator Authority function includes requirements for staffing with NERC-certified system operators. The proposed standard should set a required minimum training program for these certified system operators.

Regional Differences

Region	Explanation
ECAR	
ERCOT	
FRCC	
MRO	
NPCC	
RFC	
SERC	
SPP	
WECC	

Related NERC Reliability Standards or Planning Standards

ID	
PER-001-0	Operating Personnel Responsibility and Authority
PER-002-0	Operating Personnel Training
PER-003-0	Operating Personnel Credentials
PER-004-0	Reliability Coordination Staffing
1200	Urgent Action Standard – Cyber Security – 1211 Training