Information Regarding Staffing Needs to Fulfill Regional Emergency Operations Training Needs
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Background Information

The regional-specific emergency operations training will consist of instructor-led classroom sessions, net conferences, in-person System Operations Conferences, regional and sub-regional Black Start drills, emergency system response drills, computer-based self-study for designated net conferences and operator-in-training topics, and resource development for use in meeting the requirements of PER-005-1. The majority of these events will include simulations utilizing the SPP dispatcher training simulator (DTS).

Working with the Operations Training Working Group, SPP training staff will create emergency response scenarios with varying levels of complexity. Systems training will include critical decision making and problem-based scenarios that will be resolved using the DTS along with other resources.

Where it makes sense, SPP will utilize training staff to identify course requirements and design and deliver the courses. SPP training staff will submit individual learning applications to NERC for all courses to be approved for CEH credit. SPP training staff will track CE credits and submit CE hours by individual and event to the NERC SOCCED.

Where appropriate, SPP training staff will provide guidance and instruction regarding the requirements of PER-005-1.
Key Assumptions

1. Enrollment in the training events offered to registered entities within the SPP RE footprint will increase in 2010 and the following years due to NERC continuing education requirements, increased registered entity participation, and standards compliance.

2. Increased enrollment will raise the administrative demands related to documentation requirements for continuing education and compliance.

3. Increased enrollment will require an increase in the frequency of net conferences and instructor-led Regional Emergency Operations classroom sessions.

4. Due to current enrollment levels, additional System Operations Conferences will be required in 2010 to accommodate the demand. Even with the addition of a third conference in 2009, all the SOCs for 2009 are filled with waiting lists equivalent to an additional conference. These numbers do not include registered entities new to the SPP RE footprint or other potential new members.

5. Net conference emergency operations and continuing education topics and delivery methods (e.g. Computer-based Training) will expand.

6. SPP training staff will increase their consultative role due to the requirements of PER-005-1.

7. An Operator-in-Training framework for registered entities and computer-based training to support the basic curriculum of an Operator-in-Training program is necessary and will be designed and developed.

8. Design, development, and implementation of scenario-based Emergency Response Drills utilizing the dispatcher training simulator (DTS) will require coordination and facilitation between SPP members, the Operations Training Working Group, the Operations Reliability Working Group, and SPP operations engineering.

9. DTS scenario development and maintenance will require staffing to administer the DTS.

10. The majority of the regional emergency operations training and education will take place onsite at the SPP offices in Little Rock and via net conferencing with the exception of five System Operations Conferences and potential PER-005-1 workshops.

11. Two of the 4.5 FTEs needed will be hired in Q3 2009 to give adequate time for design and development of training events in order to meet the 2010 regional training calendar obligations. In considering the training offerings on the 2010 calendar, we must ensure that training staff are prepared to deliver the offerings. Hiring training staff in Q1 or Q2 of 2010 will not provide the necessary resources to meet the calendar obligations during that same period. This puts at risk our ability to meet the calendar commitments we would have made through the OTWG to SPP registered entities.

12. A total of 7.5 FTEs will be required in 2010 to meet the increased demand. There are currently 3.0 FTEs providing training and support for the registered entities. If the hiring of two FTEs is approved for Q3 2009, there would be 2.5 FTEs left to be hired in 2010.

13. The expansion of the RE training function will necessitate a dedicated number of staff and a supervisor for “Customer Training”.


**2010 Goals and Key Deliverables**

The primary goal of the regional training is to provide quality emergency operations training for registered entities in the SPP RE footprint to meet reliability objectives and maintain operator certification requirements. In order to meet this objective, the SPP training staff proposes the following:

1. Five System Operations Conferences (24 hours each)
2. Two Regional Black Start Drills (24 hours each)
3. Eight Sub-regional Black Start Drills (16 hours each)
4. Six Scenario-based Emergency Response Drills (8 hours each)
5. 36 Regional Emergency Operations Net Conferences (2 hours each)
6. Three Train-the-Trainer sessions (12 hours each)
7. Ten Regional Emergency Operations Classroom Sessions (20 hours each)
8. Computer-based Self-Study for designated net conferences and operator-in-training topics (2 hours each)
9. Resource development for use in meeting the requirements of PER-005-1

**Risks**

1. Inability to hire experienced trainers who can meet the job requirements for the Regional Emergency Operations training role
2. Inability to hire REOPs trainers enough in advance of the 2010 training events to allow ample time for design and development
3. Inability to hire a Dispatcher Training Simulator Administrator who can coordinate the scenario development between the OTWG, SPP engineering, and SPP training
Full-time Equivalent (FTE) Calculation Background
[see EXHIBIT A for details for calculating design and development hours]

Assumption: 1 FTE = 1800 hours

Following is an overview of the number of FTEs needed to fulfill the increased Regional Emergency Operations training demands. This estimate assumes the addition of four REOPS classroom sessions, the addition of twelve net conference deliveries to accommodate increased enrollment, the development of new net conferences each year, the development of additional OIT-related CBTs, the addition of two System Operations Conferences per year, the addition of six scenario-based Emergency Response drills, computer-based self-study for designated net conferences and operator-in-training topics, and development of resources for registered entities to use in meeting the requirements of PER-005-1. FTE calculations are based on curriculum development guidelines from Weber State University, the American Society for Training and Development, the U.S. Civil Service, and the Department of Energy.

- **System Operations Conferences** [Subtotal = 704 hours or 0.39 FTE]
- **Regional EOPS Classroom Sessions** [Subtotal = 1280 hours or 0.71 FTE]
- **Net Conferences** [Subtotal = 648 hours or 0.36 FTE]
- **CBT (Online) Courses** [Subtotal = 1280 hours or 0.71 FTE]
- **Scenario-based Emergency Response Drills** [Subtotal = 1392 hours or 0.77 FTE]
- **Dispatcher Training Simulator Administrator** [Subtotal = 1800 hours or 1.0 FTE]
- **PER-005-1 and Training Resources** [Subtotal = 240 hours or 0.13 FTE]
- **Administrative Duties** [Subtotal = 734 hours or 0.40 FTE]

**Total Proposed FTE Additions = 8,078 hours or approximately 4.48 FTE**

The 7.5 FTEs for 2010 include:
- 2.0 FTEs responsible for regional black start drills, sub-regional black start drills, and scenario-based Emergency Response Drills,
- 2.0 FTEs responsible for regional emergency operations classroom training, System Operations Conferences, and net conferences,
- 1.0 FTE responsible for administering the Dispatcher Training Simulator,
- 1.5 FTE shared training staff to provide instructional design, conduct Train-the-Trainer sessions, provide PER-005-1 standards training, coordinate OTWG meetings and activities, and computer-based training, and
- 1.0 FTE responsible for supervising the Customer Training function.
- Additional staff resources from IT and engineering will be used to support the objectives of the Customer Training Program.
EXHIBIT A

Guide for Determining Hours of Design and Development

Overview

A general rule of thumb can be used to determine the amount of time it takes to design, develop, implement, and evaluate training courses. The following is an example of the calculation of time needed for the design and development of seven different types of courses. Note: This does not include delivery times. Delivery time will be established based on the requirements of and amount of participation. Calculations are based on curriculum development guidelines from Weber State University, the American Society for Training and Development (ASTD), the U.S. Civil Service, and the Department of Energy.

According to “Calculating Cost Savings From Sharing of Training Materials” developed for the U. S. Department of Energy, Office of Nuclear Safety Policy and Standards (http://www.eh.doe.gov/nsps/training/costsav.pdf), the development time per hour of instruction (classroom) is 35-45 hrs of development/hour of classroom time. For technical fundamentals, an average of 50 hrs of development time/hr of classroom instruction is used to account for the increased complexity of the materials and the expertise of the reviewers (e.g., engineering support staff personnel).

The following information was excerpted from "Calculating Cost Savings from Sharing of Training Materials”.

   o Course is five days or less, then 3 hours of preparation for each hour of training.
   o Course is between five and ten days, then 2.5 hours of preparation for each hour of training.
   o Course is over 10 days, then 2 hours of preparation for each hour of training.

2. One hour of classroom (instructor led) training (30 hours):
   o Analysis – 4 hrs.
   o Design - 3 hrs.
   o Development - 16 hrs.
   o Evaluation and Revision - 7 hrs.

3. Highly technical or poorly defined training (45 hours):
   o Analysis - 10 hrs.
   o Design - 9 hrs.
   o Development - 18 hrs.
   o Evaluation and Revision - 8 hrs.

4. Self-Contained Training for hand-off to other instructors (50 to 100 hours):
   o Analysis - 12 to 24 hrs.
   o Design - 10 to 20 hrs.
   o Development - 19 to 38 hrs.
   o Evaluation and Revision - 9 to 18 hrs.

5. Interactive Multimedia Instruction (IMI): 200 - 500 man-hours for each instructional hour of IMI. If your organization is inexperienced, expect your average developmental man-hours to be closer to 450-500 man-hours per instructional hour. The 1995 August/September issue of CBT Solutions Magazine reported that 221 hours was the average development time.
Based on information from several resources, SPP developed a list of various types of learning experiences with varying levels of complexity and the time required to develop an 8-hour session for each type. The following assumes that the trainer is an expert in the subject matter being delivered. If this is not the case, the design and development times could increase.

1. **Information-Only Courses** (e.g., presentations)
   For every hour of informational training, it is necessary to spend approximately eight hours of development for each hour of the class. Because it is information only, it does not require a complicated development process. A complexity factor of “1” should be used if the course is informational and the evaluation is a simple objective assessment (e.g., Multiple Choice).

   In this instance, an 8-hour information-only course with an objective assessment will require:
   \[
   8 \text{ hours (course length)} \times 8 \text{ hours (development time)} \times 1 \text{ (complexity factor)} = 64 \text{ hrs}
   \]
   So for a one-day, information-only class with objective assessments, it will take approximately 1.5 uninterrupted weeks to design and develop content and assessments. *This does not include delivery time.*

2. **Activity-Based Courses** (e.g., workbooks/worksheets, tabletop exercises)
   For every hour of activity-based training, it is necessary to spend approximately eight hours of development for each hour of the class. Because it is activity-based, it requires a more complicated development process. A complexity factor of “2” should be used if the course is activity-based and the evaluation is a simple objective assessment (e.g., Multiple Choice) or a written problem-based assessment.

   In this instance, an 8-hour activity-based course with an objective assessment will require:
   \[
   8 \text{ hours (course length)} \times 8 \text{ hours (development time)} \times 2 \text{ (complexity factor)} = 128 \text{ hrs}
   \]
   So for a one-day, activity-based class with objective assessments, it will take approximately 3 uninterrupted weeks to design and develop content and assessments. *This does not include delivery time.*

3. **Scenario-Based Courses** (this might include the use of a simulator)
   For every hour of hands-on, performance-based training, it is necessary to spend approximately eight hours of development for each hour of the class. Because it is performance-based, it also requires additional time for developing performance-based assessments. A complexity factor of “3” should be used if the course and evaluation are hands-on. If a simulator is used, this will require additional time and coordination.

   In this instance, an 8-hour performance-base course with performance-based assessments will require:
   \[
   8 \text{ hours (course length)} \times 8 \text{ hours (development time)} \times 3 \text{ (complexity factor)} = 192 \text{ hrs}
   \]
   So for a one-day, hands-on class with performance-based assessments, it will take approximately 5 uninterrupted weeks to design and develop content and assessments. *This does not include delivery time.*
4. **Simulator-based**—an 8 hour performance-based, scenario-based course with performance-based assessments will require: For every hour of simulator-based training, it is necessary to spend approximately eight hours of development for each hour of the class. Because it is performance-based and involves the integration of simulator use, it requires additional time for developing performance-based assessments. A complexity factor of “4” should be used since the course and evaluation are hands-on and performance-based.

\[
8 \text{ hours (course length)} \times 8 \text{ hours (development time)} \times 4 \text{ (complexity factor)} = 256 \text{ hrs}
\]

So for a one-day, hands-on, simulator-based class with performance-based assessments, it will take approximately 6.5 uninterrupted weeks to design and develop content and assessments. *This does not include delivery time.*

5. **Vendor-Provided Courses**

If any of these courses are offered by a vendor, it reduces the amount of time required of the training staff. A good rule of thumb for vendor-provided training is to use the following:

\[
8 \text{ hours (course length)} \times 0.5 \text{ (complexity factor)} = 4 \text{ hrs}
\]

So for a one-day, vendor-provided class, it will take approximately ½ day of a training staff member. *This does not include delivery time.*

6. **Vendor-Partner Courses**

If any of these courses are offered by a vendor and training staff are asked to partner with the vendor in the design and development process, it reduces the amount of time required of the training staff, but still requires more than a course that is solely vendor-provided. A good rule of thumb for training developed in partnership with a vendor is:

\[
8 \text{ hours (course length)} \times 1.5 \text{ (complexity factor)} = 12 \text{ hrs}
\]

So for a one-day, vendor-partner class, it will take approximately 1.5 days of a training staff member. *This does not include delivery time.*

7. **Online Courses** (courses created using FLASH, CAPTIVATE, or other MACROMEDIA products that are animated and interactive)

Due to the nature of these courses, the design and development calculations are different than those above.

For a one-hour, online, interactive course, the following metrics apply:

- 40 hours research and development of data for course
- 40 hours script writing
- 40 hours Flash animation development
- 40 hours Captivate development and editing
- 8 hours audio recording

**168 Total Hours** or approximately 4 weeks of design and development time

So for a one-hour, online, interactive course, it will take approximately four weeks to design and develop content and assessments. This assumes that the developer will have experience using the available tools.
Website Resources

"Calculating Cost Savings From Sharing of Training Materials"
http://www.eh.doe.gov/nsps/training/costsav.pdf

This is an excellent site titled "Estimating Training Development Time and Costs". This site has an Excel spreadsheet with a rough cost estimator.  http://www.nwlink.com/~donclark/hrd/costs.html

Another excellent site titled "Knowledge, Performance, Training and Learning" contains
1. Instructional System Development Manual - A complete guide to analysis, design, development, implementation (delivery), & evaluation.
2. ISD Concept Map - A visual guide to the learning design process.
   http://www.nwlink.com/~donclark/hrd.html

This site has information regarding job tasks analysis that you might also find helpful: "Instructional System Design: Analysis Phase".
http://www.nwlink.com/~donclark/hrd/sat2.html#traincost

Approaches to Training and Development by Dugan Laird is another reference that you might find helpful- link to Amazon:  http://www.amazon.com/Approaches-Training-Development-Dugan-Laird/dp/0201044986
EXHIBIT B

Regional Training Requirements set Forth by NERC, FERC, and SPP Criteria

Following are excerpts from the NERC Reliability Standards, FERC Order 693, and the SPP Criteria.

NERC Standard EOP-005-1 requirement R6:
To ensure plans, procedures, and resources are available to restore the electric system to a normal condition in the event of a partial or total shut down of the system.

R6. Each Transmission Operator and Balancing Authority shall train its operating personnel in the implementation of the restoration plan. Such training shall include simulated exercises, if practicable.

NERC Standard EOP-005-1; 1.4 Additional Compliance Information requires:
1.4.3 Documentation must be retained in the personnel training records that operating personnel have been trained annually in the implementation of the plan and have participated in restoration exercises.

NERC Standard EOP-008-0 requirement R1.6:
Each reliability entity must have a plan to continue reliability operations in the event its control center becomes inoperable.

Requires Transmission Operators, Balancing Authorities, and Reliability Coordinators to “have a plan to continue reliability operations in the event its control center becomes inoperable.”, and:

R1.6. The plan shall include procedures and responsibilities for providing annual training to ensure that operating personnel are able to implement the contingency plans.

NERC Standard PER-002-0 requires:
Each Transmission Operator and Balancing Authority must provide their personnel with a coordinated training program that will ensure reliable system operation.

R1. Each Transmission Operator and Balancing Authority shall be staffed with adequately trained operating personnel.

R2. Each Transmission Operator and Balancing Authority shall have a training program for all operating personnel that are in:
R2.1. Positions that have the primary responsibility, either directly or through communications with others, for the real-time operation of the interconnected Bulk Electric System.

R2.2. Positions directly responsible for complying with NERC standards.

R3. For personnel identified in Requirement R2, the Transmission Operator and Balancing Authority shall provide a training program meeting the following criteria:
R3.1. A set of training program objectives must be defined, based on NERC and Regional Reliability Organization standards, entity operating procedures, and applicable regulatory requirements. These objectives shall reference the knowledge and competencies needed to apply those standards, procedures, and requirements to normal, emergency, and restoration conditions for the Transmission Operator and Balancing Authority operating positions.

R3.2. The training program must include a plan for the initial and continuing training of Transmission Operator and Balancing Authority operating personnel. That plan shall address knowledge and competencies required for reliable system operations.

R3.3. The training program must include training time for all Transmission Operator and Balancing Authority operating personnel to ensure their operating proficiency.
R3.4. Training staff must be identified, and the staff must be competent in both knowledge of system operations and instructional capabilities.

R4. For personnel identified in Requirement R2, each Transmission Operator and Balancing Authority shall provide its operating personnel at least five days per year of training and drills using realistic simulations of system emergencies, in addition to other training required to maintain qualified operating personnel.

**NERC Standard** PER-004-1 requires:
Reliability Coordinators must have sufficient, competent staff to perform the Reliability Coordinator functions.

**R1.** Each Reliability Coordinator shall be staffed with adequately trained and NERC certified Reliability Coordinator operators, 24 hours per day, seven days per week.

**R2.** All Reliability Coordinator operating personnel shall each complete a minimum of five days per year of training and drills using realistic simulations of system emergencies, in addition to other training required to maintain qualified operating personnel.

**R3.** Reliability Coordinator operating personnel shall have a comprehensive understanding of the Reliability Coordinator Area and interactions with neighboring Reliability Coordinator Areas.

**R4.** Reliability Coordinator operating personnel shall have an extensive understanding of the Balancing Authorities, Transmission Operators, and Generation Operators within the Reliability Coordinator Area, including the operating staff, operating practices and procedures, restoration priorities and objectives, outage plans, equipment capabilities, and operational restrictions.

**R5.** Reliability Coordinator operating personnel shall place particular attention on SOLs and IROLs and inter-tie facility limits. The Reliability Coordinator shall ensure protocols are in place to allow Reliability Coordinator operating personnel to have the best available information at all times.

**Proposed NERC Standard** PER-005-1 requires:
To ensure that System Operators performing real-time, reliability-related tasks on the North American Bulk Electric System (BES) are competent to perform those reliability-related tasks. The competency of System Operators is critical to the reliability of the North American Bulk Electric System.

**R1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall use a systematic approach to training to establish a new or modify an existing training program(s) for the BES company-specific reliability-related tasks performed by its System Operators.

**R1.1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall create a list of BES company-specific reliability-related tasks performed by its System Operators.

**R1.1.1.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall update its list of BES company-specific reliability-related tasks performed by its System Operators at least annually to identify new or modified tasks for inclusion in training.

**R1.2.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall design and develop learning objectives and training materials based on the task list created in R1.1.

**R1.3.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall deliver the training established in R1.2.

**R1.4.** Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall conduct an evaluation of the training program established in R1, to identify any needed changes to the training program and shall implement the changes identified.
R2. Each Reliability Coordinator, Balancing Authority, and Transmission Operator shall verify each or its System Operator’s capabilities to perform each assigned task identified in R1.1 at least one time.

R2.1. Within six months of a modification of the BES company-specific reliability-related tasks, each Reliability Coordinator, Balancing Authority, and Transmission Operator shall verify each of its System Operator’s capabilities to perform the new or modified tasks.

R3. At least every 12 months each Reliability Coordinator, Balancing Authority, and Transmission Operator shall provide each of its System Operators with at least 32 hours of emergency operations training applicable to its organization that reflects emergency operations topics (which includes system restoration) using training, drills, exercises, and hands on training using simulators.

FERC Order 693:

1331. PER-002-0 requires that transmission operator and balancing authority personnel are adequately trained. The Reliability Standard: (1) directs each transmission operator and balancing authority to have a training program for all operating personnel who occupy positions that either have primary responsibility, directly or indirectly, for the real-time operation of the Bulk-Power System or who are directly responsible for complying with the NERC Reliability Standards; (2) lists criteria that must be met by the training program and (3) requires that operating personnel receive at least five days of training in emergency operations each year using realistic simulations.

1332. In the NOPR, the Commission proposed to approve Reliability Standard PER-002-0 as mandatory and enforceable. In addition, the Commission proposed to direct that NERC submit a modification to PER-002-0 that: (1) identifies the expectations of the training for each job function; (2) develops training programs tailored to each job function with consideration of the individual training needs of the personnel; (3) expands the applicability to include reliability coordinators, generator operators, and operations planning and operations support staff with a direct impact on the reliable operation of the Bulk-Power System; (4) uses the Systematic Approach to Training (SAT) methodology in its development of new training programs and (5) includes performance metrics associated with the effectiveness of the training program. In addition, the Commission requested comments on the benefits and appropriateness of required “hands-on” training using simulators in dealing with system emergencies.

SPP Criteria 9.1.1 requires:

“Balancing Authorities and Transmission Operators shall train appropriate personnel in the implementation and execution of their black start plan.”

SPP Criteria 9.2 suggests that the black start plan of each Balancing Authority and Transmission Authority contain:

“g. Provisions for training and documentation of training for personnel”

SPP Criteria 10.1 requires:

“The Reliability Authority shall instigate and monitor this testing and training process” in regard to SPP Emergency Communication