NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Project 2007-02, COM-002-4 Operating Personnel Communications Protocols Rationale and Technical Justification

Justification for Requirements in Posting 7

Background

Posting 7 of Project 2007-02 – Operating Personnel Communications Protocols combines COM-002-3 and former draft COM-003-1 into one standard that addresses communications protocols for operating personnel in Emergency, alert and non-emergency conditions. The Operating Personnel Communications Protocols Standard Drafting Draft (OPCP SDT) determined that one communications protocols standard that addresses emergency and non-emergency situations will improve communications because system operators will not need to refer to a different set of protocols during the issuance of a Reliability Directive. The OPCP SDT believe this will improve consistency of communications and mitigate confusion during stressful emergency situations. As a result of the combination, the standard has been renumbered as COM-002-4 to maintain the consecutive numbering of the standards (e.g., COM-001, COM-002) since the combined standard will replace COM-002-2 and COM-002-3, where necessary.

In preparing COM-002-4, the Operating Personnel Communications Protocols Standard Drafting Team (OPCP SDT) considered the comments provided on draft 6 of COM-003-1 and also reviewed the recommendation of the NERC Board of Trustees (Board) Standards Oversight and Technology Committee (SOTC). In this posting, the OPCP SDT seeks industry comment on a combined communications standard. This provides an opportunity for industry to comment and ballot a combined standard prior to the Board's consideration of a communications standard at the November 2013 meeting of the Board.

The latest draft reflects a results-based approach to strengthening communications during non-emergency, alert, and emergency operating conditions. The following sections outline the OPCP SDT's revisions to the communications standards and rationale.

Definition of Operating Instruction

The proposed definition of "Operating Instruction" has been revised to read as follows:

> A command by operating personnel responsible for the Real-time generation control and operation of the interconnected Bulk Electric

> System to change or preserve the state, status, output, or input of an Element of the Bulk Electric System or Facility of the Bulk Electric System. A discussion of general information and of potential options or alternatives to resolve Bulk Electric System operating concerns is not a command and is not considered an Operating Instruction. A Reliability Directive is one type of an Operating Instruction.

As opposed to the definition used in draft 6 of COM-003-1, this revised definition characterizes a Reliability Directive as a type of Operating Instruction. Retaining the definition of Reliability Directive and including it within the scope of the definition of Operating Instruction is necessary since it is currently used in other Reliability Standards (e.g., TOP-001-2 and IRO-001-3).

A "command" as used in the definition refers to both oral and written commands by operating personnel. In the requirements of COM-002-4, the OPCP SDT has specified "oral" or "written" as needed to define which Operating Instructions are covered by the requirement. The definition continues to clarify that general discussions are not considered Operating Instructions.

Applicability

In addition to Balancing Authorities, Reliability Coordinators, and Transmission Operators, the proposed standard applies to Distribution Providers and Generator Operators. The OPCP SDT added these Functional Entities in the Applicability section because they are often on the receiving end of Operating Instructions. The OPCP SDT determined that it would leave a gap to not cover them in a communications standard that addresses operating personnel. Recognizing that Generator Operators and Distribution Providers typically only receive Operating Instructions, the OPCP SDT proposed that only Requirements R2 and R4 apply to these Functional Entities. As a result, Generator Operators and Distribution Providers need only develop communications protocols governing receipt of Operating Instructions.

Requirements in COM-002-4

Requirement R1

Requirement R1 requires entities that can <u>both issue and receive</u> Operating Instructions to have documented communications protocols that include a minimum set of elements, outlined in Parts 1.1 through 1.9 of the requirement. Because Operating Instructions affect Facilities and Elements of the Bulk Electric System, the communication of those Operating Instructions must be understood by all involved parties, especially when those communications occur between Functional Entities. An EPRI study reviewed nearly 400 switching mishaps by electric utilities and found that roughly 19% of errors (generally classified as loss of load, breach of safety, or equipment damage) were due to communication

failures.[1] This was nearly identical to another study of dispatchers from 18 utilities representing nearly 2000 years of operating experience that found that 18% of the operators' errors were due to communication problems.[2] The necessary protocols include the use of the English language unless agreed to otherwise (except for internal operations), time formatting, specified nomenclature for Transmission interface Elements, alpha-numeric clarifiers, and three-part communications.

The OPCP SDT drafted Requirement R1 to ensure consistency among communications protocols while also allowing flexibility for entities to develop additional communications protocols. The OPCP SDT determined that the inclusion of the elements in Parts 1.1 through 1.9 are necessary to tighten communications protocols but are not overly prescriptive. The OPCP SDT determined that this approach is the best way to promote effective communications while maintaining flexibility for entities to include additional communications protocols based on its own operating environment.

On September 19, 2012, the NERC Operating Committee issued a Reliability Guideline entitled: "System Operator Verbal Communications – Current Industry Practices." As stated on page one, the purpose of the Reliability Guideline ". . . is to document and share current verbal BES communications practices and procedures from across the industry that have been found to enhance the effectiveness of system operator communications programs." This guideline serves as an additional source of information on best practices that entities can draw on in creating the documented communications protocols.

The term *documented communication protocols* in R1 refers to a set of required protocols specific to the Functional Entity and the Functional Entities they must communicate with. An entity should include as much detail as it believes necessary in their documented protocols, but they must address all of the applicable parts of Requirement R1. Where an entity does not already have a set of documented protocols that meet the parts of Requirement R1, the entity must develop the necessary communications protocols. Entities may also adopt the documented protocols of another entity as its own communications protocols, but the entity must maintain its own set of documented communications protocols to meet Requirement R1.

Each part of Requirement R1 is discussed below:

> *1.1. Require the issuer of a Reliability Directive to identify the action as a Reliability Directive to the receiver.*

[1] Beare, A., Taylor, J. *Field Operation Power Switching Safety*, WO2944-10, Electric Power Research Institute.

[2] Bilke, T., *Cause and prevention of human error in electric utility operations*, Colorado State University, 1998.

The OPCP SDT has included this part to ensure consistency with TOP-001-2, which requires compliance with the identified Reliability Directive by the Transmission Operator. This identification must be required in order to meet the performance expected in TOP-001-2. TOP-001-2 requires each Balancing Authority, Generator Operator, Distribution Provider, and Load-Serving Entity to comply with each Reliability Directive *issued and identified* as such by its Transmission Operator(s), unless such action would violate safety, equipment, regulatory, or statutory requirements.

> *1.2. Require the issuer and receiver of an oral or written Operating Instruction to use the English language, unless agreed to otherwise. An alternate language may be used for internal operations.*

The OPCP SDT has included this part to carry forward the same use of English language included in COM-001-1, Requirement R4. Retirement of this Requirement in COM-001-1 was specifically referred to Project 2007-02. The requirement continues to permit the issuer and receiver to use an agreed to alternate language. This has been retained since use of an alternate language on a case-by-case basis may serve to better facilitate effective communications where the use of English language may create additional opportunities for miscommunications. Part 1.2 requires the use of English language when issuing oral or written (e.g. switching orders) Operating Instructions. This creates a standard language (unless agreed to otherwise) for use when issuing commands that could change or preserve the state, status, output, or input of an Element of the Bulk Electric System or Facility of the Bulk Electric System. It also clarifies that an alternate language can be used internally within the organization.

> *1.3. Require the issuer of an oral two-party, person-to-person Operating Instruction to wait for a response from the receiver. Once a response is received, or if no response is received, require the issuer to take one of the following actions:*
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> - *Confirm the receiver's response if the repeated information is correct.*
> - *Reissue the Operating Instruction if the repeated information is incorrect, if the receiver does not issue a response, or if requested by the receiver.*

The OPCP SDT has included this part to require communications protocols for the use of three-part communications for oral two-party, person-to-person Operating Instructions by the issuer. This carries forward the requirement to use three-part communications in COM-002-2 and COM-002-3.

The reliability benefits of using three-part communication (R1, parts 1.3 and 1.4) are threefold:

1. The removal of any doubt that communication protocols will be used and when they will be used. This will reduce the opportunity for confusion and misunderstanding among entities that may have different doctrine. An example is: One entity uses three-part for emergencies, and the other uses it for all operating conditions.

2. There will be no mental "transition" when operating conditions shift from normal to Emergency. The communication protocols for the operators will remain standard during transitions through all conditions.

3. The formal requirement for three-part communication will create a heightened sense of awareness in operators that the task they are about to execute is critical, and recognize the risk to the reliable operation of the BES is increased if the communication is misunderstood.

1.4. Require the receiver of an oral two-party, person-to-person Operating Instruction to take one of the following actions:

- *Repeat the Operating Instruction and wait for confirmation from the issuer that the repetition was correct.*
- *Request that the issuer reissue the Operating Instruction.*

The OPCP SDT has included this part to require communications protocols for the use of three-part communications for oral two-party, person-to-person Operating Instructions by the receiver. This is consistent with the approach to using three-part communications in COM-002-2 and COM-002-3.

1.5. Require the issuer of an oral Operating Instruction to verbally or electronically confirm receipt by at least one receiver when issuing the Operating Instruction through a one-way burst messaging system used to communicate a common message to multiple parties in a short time period (e.g., an all call system).

The OPCP SDT has included this part to require communications protocols for an issuer for the use of a one-way burst messaging system. The drafting team has included this because the use of three-part communications is not practically possible when utilizing this type of communication. Therefore, it is necessary to include a different set of protocols for these situations.

1.6. Require the receiver of an oral Operating Instruction to request clarification from the issuer if the communication is not understood when receiving the Operating Instruction through a one-way burst messaging system used to communicate a common message to multiple parties in a short time period (e.g., an all call system).

The OPCP SDT has included this part to require communications protocols for a receiver for the use of a one-way burst messaging system. The drafting team has included this because the use of three-part communications is not practically possible when utilizing this type of communication. Therefore, it is necessary to include a different set of protocols for these situations.

1.7. Specify the instances that require time identification when issuing an oral or written Operating Instruction and the format for that time identification.

The OPCP SDT has included this part to add necessary clarity to Operating Instructions to reduce the risk of mistakes. Clarifying time and time zone (where necessary) contributes to reducing misunderstandings and reduce the risk of a grave error during BES operations.

> *1.8. Specify the nomenclature for Transmission interface Elements and Transmission interface Facilities when issuing an oral or written Operating Instruction.*

Project 2007-03 chose to eliminate TOP-002-2a Requirement R18 when it developed TOP-002-3. This Requirement states "Neighboring Balancing Authorities, Transmission Operators, Generator Operators, Transmission Service Providers and Load Serving Entities shall use uniform line identifiers when referring to transmission facilities of an interconnected network." COM-002-4, while reintroducing the concept of line identifiers, limits the scope to only Transmission interface Elements or Transmission interface Facilities (e.g. tie lines and tie substations). This ensures that both parties are readily familiar with each other's interface Elements and Facilities, eliminating hesitation and confusion when referring to equipment for the Operating Instruction. This shortens response time and improves situational awareness.

> *1.9. Specify the instances where alpha-numeric clarifiers are required when issuing an oral Operating Instruction and the format for those clarifiers.*

The OPCP SDT has included this part to avoid miscommunications due to the fact that several letters in the English language sound alike and can be confused in stressful or noisy situations. For example, some letters sound alike when spoken, and can easily be confused; such as "D" and "B." The phonetic alphabet specifies a common word for each letter of the English alphabet. By using a word for each letter, there is less chance that the person listening will confuse the letters. Using the phonetic alphabet, "Delta" and "Bravo" are more easily differentiated. The effects of noise, weak telephone or radio signals, and an individual's accent are reduced through the use of the phonetic alphabet.

Requirement R2

Requirement R2 requires the development of documented communications protocols for Generator Operators and Distribution Providers receiving Operating Instructions. As Generator Operators and Distribution Providers typically only receive Operating Instructions, the OPCP SDT determined that a separate requirement for these Functional Entities covers their communications protocols but does not subject them to the additional requirements imposed upon entities who issue Operating Instructions. The requirement includes similar parts requiring the inclusion in communications protocols of the use of English language, three-part communications, and protocols for the use of a one-way burst messaging system.

Requirements R3 and R4

Requirement R3 requires entities that issue and receive Operating Instructions to implement the documented communications protocols in Requirement R1. Requirement R4 requires Generator Operators and Distribution Providers who receive Operating Instructions to implement the documented communications protocols in Requirement R2.

The associated Measures for R3 and R4 explain that evidence demonstrating compliance may include, but is not limited to, descriptions of the management practices in place that provide the entity reasonable assurance that protocols established in Requirement R1 are being followed by personnel responsible for the real-time generation control and operation of the interconnected Bulk Electric System, spreadsheets, memos, or logs, evidencing periodic, independent review of operating personnel's adherence to the protocols established in Requirement R1 and the remediation of noted exceptions in fulfillment of Requirement R5. The VSLs for Requirement R3 and R4 have also been designed to reflect the identification of a pattern of not using the documented communications protocols developed in Requirement R1 and R2 as the VSL for Operating Instructions that are not Reliability Directives, also in addition to the severe VSL for not using the documented communications protocols developed in Requirement R1 and R2 when issuing or receiving a Reliability Directive.

Requirement R5

Requirement R5 requires entities that are subject to Requirement R1 to continually assess the communications protocols and determine whether personnel adhere to them. The OPCP SDT determined that communications protocols need to be evaluated but allowed flexibility for entities to determine when to evaluate and how to assess or modify those communications protocols. The OPCP SDT believed this creates a learning environment through the use of feedback and most effectively promotes reliable communications.