NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

CIP V5 Issues for Standard Drafting Team Consideration

September 15, 2015

From experience in the V5 Transition Study and the on-going implementation efforts, the CIP Version 5 Transition Advisory Group (V5TAG) identified specific issues with the CIP Version 5 standard language that caused difficulty in implementation of the requirements. In many cases, the V5TAG members found that select language within the CIP Version 5 standards may be understood in multiple ways. These interpretations appear to go beyond the intended flexibility of the standard language that is necessary to accommodate the diverse nature of facts and circumstances across the electric sector. At this time, the V5TAG proposes the following issues to be addressed by the CIP V5 Revisions drafting team (SDT) or other appropriate team for standards development:

- **Cyber Asset and BES Cyber Asset definitions**

  The foundational definition for the CIP Version 5 standards is 'Cyber Assets.' When Cyber Assets meet a threshold of Bulk Electric System (BES) impact they become 'BES Cyber Assets (BCA)' which are grouped, by a Responsible Entity, into 'BES Cyber Systems (BCS).' Viewing BCAs too broadly can lead to many thousands of devices in the typical utility becoming an administrative burden for which few if any cyber security controls can actually be applied or where there is limited associated cyber security risk. Vast amounts of effort would be expended for these types of cyber assets to track and document their lack of capability for even the most basic cyber security controls. Viewing BCAs too narrowly could lead to missing consideration of devices that have a sufficient level of cyber capability and risk impact.

  The SDT should consider the definition of Cyber Asset and clarify the intent of "programmable" by considering such factors as if a device is merely configurable, its executable code is not field upgradable, or if its functionality can only be changed via physical DIP switches, swapping internal chips, etc.

  The SDT should consider clarifying and focusing the definition of "BES Cyber Asset" including:

  a. Focusing the definition so that it does not subsume all other cyber asset types. Protected Cyber Assets (PCA), by nature of being on the same network, can have some form of adverse impact if misused. Electronic Access Control or Monitoring Systems (EACMS) if misused or unavailable can have some form of adverse impact. This can result in a "hall of

mirrors" effect where everything in or that creates an Electronic Security Perimeter (ESP) also meets the BCA definition.

b. Considering if there is a lower bound to the term 'adverse' in "adverse impact". For example, is the focus of a typical generating unit the servers and operator human machine interfaces (HMI) and controller cabinets and Programmable Logic Controllers (PLCs) or is it the thousands of individual sensors and transmitters throughout the plant?

c. Clarify the double impact criteria (cyber asset affects a facility and that facility affects the reliable operation of the BES) such that "N-1 contingency" is not a valid methodology that can eliminate an entire site and all of its Cyber Assets from scope.

- **Network and Externally Accessible Devices (ERC, ESP, IRA)**

  The SDT should consider the concepts and requirements concerning Electronic Security Perimeters (ESP), External Routable Connectivity (ERC), and Interactive Remote Access (IRA) including:

  a. Clarify the 4.2.3.2 exemption phrase "between discrete Electronic Security Perimeters." When there is not an ESP at the location, consider clarity that the communication equipment considered out of scope is the same communication equipment that would be considered out of scope if it were between two ESPs.

  b. The word 'associated' in the ERC definition is unclear in that it alludes to some form of relationship but does not define the relationship between the items. Striking 'associated' and defining the intended relationship would provide much needed clarity.

  c. Review of the applicability of ERC including the concept of the term "directly" used in the phrase "cannot be directly accessed through External Routable Connectivity" within the Applicability section. As well, consider the interplay between IRA and ERC.

  d. Clarify the IRA definition to address the placement of the phrase "using a routable protocol" in the definition and clarity with respect to Dial-up Connectivity.

  e. Address the Guidelines and Technical Basis sentence, "If dial-up connectivity is used for Interactive Remote Access, then Requirement R2 also applies."

- **Transmission Owner (TO) Control Centers Performing Transmission Operator (TOP) Obligations**

  CIP-002-5.1 Attachment 1 – Impact Reliability Criteria, sections 1.1, 1.2, 1.3, 1.4, 2.11, 2.12, and 2.13 employ the language "used to perform the functional obligation of", and then lists the functional registration. It was intended that this caveat would capture entities that perform obligations of a specific registered function, whether they are registered for that function or not. However, this language has caused confusion, especially in section 2.12 concerning TOP Control Centers. The term "functional obligation" may be interpreted to have different meaning in a variety of situations.

One interpretation is for the defined term Control Center to be strictly associated with the Balancing Authority (BA), Generator Operator (GOP), Reliability Coordinator (RC), and Transmission Operator (TOP) functional registrations, and that control rooms or dispatch centers owned and operated by Transmission Owners (TOs) with control of limited BES facilities would be excluded. A second interpretation may expand or contract the applicability of the Control Center designation, based on criteria that may not take into consideration overall risk to reliable operations of the BES.

Early analysis found the potential for TOs (not Registered as TOPs) that only operate limited breakers to be pulled in as medium impact Control Centers, even if the few Facilities they control are low impact. (For example, an entity with one 161kV breaker in one substation and a second 161kV breaker in a different substation, both breakers associated with low impact Facilities.) As currently written, low impact Control Centers are to be identified per criteria 3.1 and could be commensurate with risk for these scenarios.

Areas for the SDT to address are:

a. CIP-002-5.1, Attachment 1 Control Center criteria for additional clarity and for possible revisions related to TOP or TO Control Centers performing the functional obligations of a TOP, in particular for small or lower-risk entities. A potential revision could be a size for criteria 2.12, Control Centers performing the functional obligations of a TOP.
b. Clarify the applicability of requirements on a TO Control Center that perform the functional obligations of a TOP, particularly if the TO has the ability to operate switches, breakers and relays in the BES. Review the corresponding Guidelines and Technical Basis of CIP-002-5.1, specifically: the "CIP-002-5" section paragraph starting with "Responsibility for the reliable operation of the BES is spread across all Entity Registrations"; the table following that paragraph; the "High Impact Rating (H)" section; and the criterion bullets for Control Centers under the "Medium Impact Rating (M)" section.
c. The definition of Control Center (if pursued, recognize possible impacts on operations and planning standards and/or glossary terms that include 'Control Center', for example, the revised Glossary term for "System Operator" to be effective July 1, 2016).
d. The language scope of "perform the functional obligations of" throughout the Attachment 1 criteria.

- **<u>Virtualization</u>**

  The CIP Version 5 standards do not specifically address virtualization. However, because of the increasing use of virtualization in industrial control system environments, questions around treatment of virtualization within the CIP Standards are due for consideration.

The SDT should consider revisions to CIP-005 and the definitions of Cyber Asset and Electronic Access Point that make clear the permitted architecture and address the security risks of network, server and storage virtualization technologies.

The transition to CIP Version 5 continues as the compliance deadline of April 1, 2016 approaches. The V5TAG continues to discuss challenging issues being undertaken during the on-going implementation. The group may find additional issues to transfer to the SDT for consideration.