

Standard Authorization Request (SAR)

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The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	CIP-014-3 Risk Assessment Refinement		
Date Submitted:	05/18/23 (Revised 12/15/2023)		
SAR Requester			
Name:	Jamie Calderon, NERC J.P. Skeath, NERC (Revised by the 2023-06 Drafting Team)		
Organization:	NERC		
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SAR Type (Check as many as apply)			
<input type="checkbox"/> New Standard	<input type="checkbox"/> Imminent Action/ Confidential Issue (SPM Section 10)	<input type="checkbox"/> Add, Modify or Retire a Glossary Term	<input type="checkbox"/> Variance development or revision
<input checked="" type="checkbox"/> Revision to Existing Standard	<input type="checkbox"/> Other (Please specify)	<input type="checkbox"/> Withdraw/retire an Existing Standard	
Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)			
<input checked="" type="checkbox"/> Regulatory Initiation	<input type="checkbox"/> NERC Standing Committee Identified	<input type="checkbox"/> Emerging Risk (Reliability Issues Steering Committee) Identified	<input type="checkbox"/> Enhanced Periodic Review Initiated
<input type="checkbox"/> Reliability Standard Development Plan	<input type="checkbox"/> Industry Stakeholder Identified		
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
In the NERC report ¹ filed in response to a FERC directive ² , NERC staff identified continuing inconsistency in registered entity CIP-014-3 risk assessments to most appropriately identify critical infrastructure. The Commission directed NERC to evaluate whether the physical security protection requirements in NERC's Reliability Standards are adequate to address the risks associated with physical attacks on Bulk Electric System (BES) Facilities, including the adequacy of the required risk assessment in CIP-014-3 Requirement R1. In the report, NERC found that CIP-014-3 required revision to assure adequate and			

¹ <https://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/NERC%20Report%20on%20CIP-014-3.pdf>; April 14, 2023

² Due to an increase in reports of physical attacks on electric substations, the Federal Energy Regulatory Commission issued the December 2022 Order in Docket No. RD23-2-000 directing NERC to evaluate the effectiveness of the Physical Security Reliability Standard CIP-014-3 in mitigating the risks to the Bulk-Power System ("BPS") associated with physical attacks.

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consistent approach in evaluating instability as well as the identification of infrastructure critical to the operation of the BPS.

As detailed in the report, NERC found that the CIP-014-3 risk assessment should be refined to ensure that entities conduct effective risk assessments of their applicable substations. The report indicates that while the overall objective of the risk assessment is sound, there are inconsistent approaches to performing the risk assessment. The requirement language within CIP-014-3 does not prescribe a specific method for how each risk assessment shall be performed. As such, specific components that comprise any supporting analytics are neither defined nor listed. As written, CIP-014-3 provides intentional flexibility for various approaches to the risk assessment due to expected differences in each registered entity’s facts and circumstances.³ However, NERC finds that flexibility does not alter the intent of CIP-014-3’s that each risk assessment must be “designed to identify” which applicable Transmission station(s) and Transmission substation(s), that if rendered inoperable or damaged, could result in instability, uncontrolled separation, or Cascading within an Interconnection. Registered entities may implement different approaches to complete this objective, but the approach must be able to accomplish the fundamental obligation of the requirement through effectively assessing all required adverse system conditions with sufficient supporting technical analyses.

Further, the ERO Enterprise has observed that, in certain instances, registered entities failed to provide sufficient technical studies or justification for study decisions; resulting in risk assessments that did not demonstrate effective evaluations for instability, uncontrolled separation, or Cascading within an Interconnection. In other instances, registered entities argued against adequately studying for instability for all applicable sites in the risk assessment while citing the language of CIP-014-3 Requirement R1 and the lack of specificity regarding dynamic studies. NERC determined that inconsistent approaches in performing risk assessments is largely due to a lack of specificity in the requirement language as to the nature and parameters of the risk assessment.

Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):

As the intent of CIP-014-3 is to identify and physically protect those Transmission stations, Transmission substations, and their associated primary control centers that are critical to the reliable and secure operation of the BPS, registered entity approaches for the risk assessment must be reasonably consistent and substantiated with sufficient technically based rationale. As highlighted in the report, there continues to be confusion within industry as to how to adequately evaluate instability. Therefore, this SAR proposes refinement of the risk assessment to assure critical sites are identified and physically protected.

The goal of this SAR is for the drafting team to modify risk assessment requirement(s) within CIP-014-3 to provide specificity regarding acceptable approaches to the risk assessment including appropriateness

³ NERC has provided guidance to Compliance Monitoring and Enforcement staff to aid in review of entity risk assessment methods due to the inherent flexibility. Available here: <https://www.nerc.com/pa/comp/guidance/CMEPPPracticeGuidesDL/CMEP%20Practice%20Guide%20CIP-014-3%20R1.pdf>.

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of models, study types, study parameters, documentation of criteria, and documentation of supporting technical rationale. These proposed revisions to CIP-014-3 will assure an adequate and consistent approach in evaluating instability and the identification of critical Transmission stations, Transmission substations, and their associated primary control centers.

Project Scope (Define the parameters of the proposed project):

The DT should revise CIP-014-3 R1 to:

1. Clarify the risk assessment methods for studying instability, uncontrolled separation, and Cascading within an Interconnection. The methods should account for dynamic studies.
2. Clarify the case(s) used for the risk assessment to be tailored to the Requirement R1 in-service window and correct any discrepancies between the study period, frequency of study, and the base case(s) a Transmission Owner uses.
3. Assure the adequacy and consistent implementation of technically supported justification for study decisions. Clarity should include specificity regarding the documentation, and usage of criteria to identify instability, uncontrolled separation, or Cascading within an Interconnection occur as part of a risk assessment.
4. Clarify what study scenario(s) and other study assumptions are appropriate and reasonable considering the intent of CIP-014-3 and the potential range of issues during a physical attack. Simulations should incorporate the loss of station elements without the reliance on local system protection.
5. Clarify how to account for adjacent Transmission stations or Transmission substations of differing ownership as well as for those Transmission stations or Transmission substations within line-of-sight to each other.

Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification⁴ which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (e.g., research paper) to guide development of the Standard or definition):

Each item from the above proposed scope is substantiated further in the NERC report.⁵ The main details for each are outlined as follows:

1. **Clarity should be added to the risk assessment to assure that instability, uncontrolled separation, and Cascading within an Interconnection are studied, as appropriate to the purpose of CIP-014. The risk assessments should be based on best utility practices. As such, the revision should outline technical supporting expectations to clearly identify when an applicable substation has not demonstrated instability, uncontrolled separation, or Cascading within an Interconnection. At a minimum, this revision should include specificity regarding the inclusion of dynamic studies to evaluate instability, uncontrolled separation, and Cascading**

⁴ The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

⁵ <https://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/NERC%20Report%20on%20CIP-014-3.pdf>

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within an Interconnection. To ensure that a station is effectively identified as non-critical, registered entities need to have performed both steady-state and dynamic studies. However, revisions should also include that once a transmission station or transmission substation is identified as critical, additional analysis does not need to be performed for that site.

Power system stability is generally discussed as a singular concept but can be analyzed through multiple paradigms. Thus, stability can be broken down into distinct sub-categories on time frame (short-term and long-term) and types (frequency, rotor angle, and voltage stability).

2. **Revisions to the risk assessment should be made to only include transmission and generation projects that are appropriate to the periodicity of the entity's risk assessments.**

Determinations of appropriateness should be clarified to align study periods, frequency of studies, and the power flow models used.

For instance, an entity that had previously identified a CIP-014 critical site and the periodicity of the risk assessment is at least once every 30 months (per the current Standard), it might not be appropriate from a technical standpoint to include projects that will not be in service by the time the next risk assessment is scheduled to be performed. If this entity includes projects like new generation or new transmission lines that are not projected to be in service by the time of the next risk assessment, the risk assessment results may obscure how the system would electrically respond during the time period of the risk assessment.

3. **Assure the development and documentation of technically supported justification for study decisions to provide greater assurance of risk assessment adequacy and consistency. Risk Assessments must consist of a documented transmission analysis or transmission analyses designed to identify the Transmission station(s) and Transmission substation(s) that if rendered inoperable or damaged could result in instability, uncontrolled separation, or Cascading within an Interconnection.**

There is currently no requirement to include documentation of criteria, parameters, and study decisions or assumptions made that would demonstrate the consistent application of a study methodology.

4. **Clarify what study scenario(s) and other study assumptions (such as use of delayed clearing) are appropriate and reasonable considering the intent of CIP-014-3 and the potential range of issues during a physical attack. Clarify the how the terms "inoperable" and "damaged" should be reflected in the risk assessment.**

There is no specific threat or physical attack identified in the Standard to be evaluated against. Nor is there a timeline for such a physical event provided to be studied against, such as within dynamic studies. NERC has verified during multiple oversight activities that registered entities often do not study a more severe failure which introduces risk from attacks intentionally conducted during stressed periods. Many registered entities have found that the term "inoperable" includes the total loss of communication and protection equipment at the substation, necessitating delayed clearance from far-end relaying to isolate the event's impacts. However, the assumption of loss of local protection equipment is not consistently implemented.

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5. Provide clear expectations regarding the inclusion of physically adjacent elements for the purpose of evaluating the impact from a physical attack.

The CIP-014-3 risk assessment differs from other transmission planning studies in that the registered entity must consider physical proximity regardless of electrical connection, as the risk assessment requires the entire transmission station to be considered as rendered inoperable or damaged as the result of physical attack rather than just particular elements electrically connected to a single electrical disturbance. There is no clarity on the scope of what physically adjacent elements shall be considered within the risk assessment. Some items that are commonly considered to outline this problem: line-of-sight between different substation yards for a single studied site, ease of access from a common public roadway that exists between all of the substation yards, if substation yards are in close enough proximity that a single event can impact both substations (e.g., the debris field from an incendiary device set off at one yard will impact the other yard), etc.

Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):

The cost impacts for the proposed changes to the CIP-014-3 risk assessment are expected to be minimal relevant to current CIP-014 risk assessment costs. The changes add clarity to the current Standard to bring consistency and clarify expectations for effectively evaluating for instability, uncontrolled separation, and Cascading within an Interconnection following a physical attack. The identification of additional transmission stations and transmission substations as critical to the Interconnection may result from revisions to R1, which may necessitate additional physical security measures.

Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (e.g., Dispersed Generation Resources):

None.

To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (e.g., Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):

Transmission Owners, Transmission Operators

Do you know of any consensus building activities⁶ in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.

None.

Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?

Project 2021-03 SAR – Modifications to CIP-002 and CIP-014. Project 2021-03 is reviewing the applicability of Facilities identified by the RC as critical to the derivation of IROLs in CIP-014.

Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.

⁶ Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

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None.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input checked="" type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles ?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability 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

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
n/a	n/a

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SAR Status Tracking (Check off as appropriate).	
<input type="checkbox"/> Draft SAR reviewed by NERC Staff <input type="checkbox"/> Draft SAR presented to SC for acceptance <input type="checkbox"/> DRAFT SAR approved for posting by the SC	<input type="checkbox"/> Final SAR endorsed by the SC <input type="checkbox"/> SAR assigned a Standards Project by NERC <input type="checkbox"/> SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer