



# ISO Planning Standards – Remedial Action Scheme Guidelines Update

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# Stakeholder Process

## PROPOSAL DEVELOPMENT

## DECISION

## IMPLEMENTATION

Issue paper

↳ Straw proposal

Draft proposal

Draft business requirement specification

Draft tariff

Final proposal

ISO Board  
EIM Governing Body

Tariff filing

FERC

Business practice manual revisions  
Market simulation

Go Live

Stakeholder input

*This represents the typical process, and often stages of the process run in parallel.*

We are here

# Recap - Scope of the Review and Updates of the Current SPS Guidelines

## Scope

- Review and update the current System Protection Schemes (SPS) guidelines in the ISO Planning Standards to align with and complement NERC Reliability Standards.
  - The SPS Guidelines will be updated as Remedial Action Schemes (RAS) guidelines in accordance with the NERC terminology.
- Refine and simplify RAS guidelines to enable modeling in the ISO market and to ensure a secure and reliable ISO infrastructure development.

# Recap - Background on the RAS Guideline Review Process

- The ISO initiated a stakeholder initiative in June 2021 to discuss potential revisions to the RAS guidelines. During the initiative discussions, it was discovered that the modeling of the RAS in the ISO Market needed to be considered as part of the initiative. Thus the initiative was put on hold to allow the ISO time to consider this additional scope.
- After further internal consultation with the Power System & Market Technology, and Operations Engineering team, the ISO proceeded with the revised Issue paper and the initiative
- The ISO resumed the stakeholder initiative with a meeting on July 22, 2022 to present the Issue paper as well as to solicit stakeholder inputs.

## Major issues identified for the current RAS guidelines

- The ISO presented Issue paper at the Stakeholder Call on July 22, 2022
- In addition, the ISO also requested stakeholder inputs and comments to the Issue paper
- The ISO summarized stakeholder inputs and comments in the next two slides

# Major issues identified for the current RAS guidelines (cont'd)

- Twelve out of the seventeen current RAS guidelines have redundant requirements that overlap with the NERC PRC-012-2 Standard for new and existing Remedial Action Scheme.
- Stakeholders provided the following comments:
  - RAS guidelines need to be clearer in terms of implementation requirements
  - RAS concurrently monitoring resources with bi-directional flow (i.e., energy storage) is not recommended
  - Concerns about dynamic arming and disarming of resources that make the RAS more complex to implement
  - RAS monitoring overloads under normal conditions (i.e., N-0) should be avoided
  - Concerns about RAS growing more complex as it is modified to accommodate future generation interconnection projects
  - Increased complexity in the RAS operation may pose significant challenges in ensuring reliable operation of the RAS

# Major issues identified for the current RAS guidelines (cont'd)

- Concerns about RAS that trips resources with low effectiveness factors
- Concerns about RAS that monitors facilities beyond the PTO's service territory
- Suggestion of having RAS as temporary mitigation solution but to be phased out with long-term permanent transmission upgrades
- Increased transmission utilization that is enabled by the implementation of RAS increases the exposure of not meeting applicable NERC system performance criteria if the RAS fails or inadvertently operates.
- Currently planned retirement of Diablo Canyon nuclear generating facility:
  - Diablo Canyon outage of a single unit of 1150 MW corresponds to maximum amount of reserve requirement in the event of a single transmission or generation element outage. Its retirement may impact the maximum generation curtailment under a single-element outage.

# Proposed RAS Guideline Updates

- The ISO proposes RAS guideline updates based on the following two major categories:
  - Removal of redundant language in the RAS guidelines that NERC PRC-012-2 Standard also covers;
  - Refinements of existing RAS guidelines to provide further clarity, as well as to avoid complex RAS designs, based on feedback from internal ISO organizations as well as from external stakeholders.



# Removal of Redundant Language in the Existing RAS Guidelines

- Twelve of the current ISO RAS guidelines are proposed to be eliminated as they are redundant to the NERC PRC-012-2 Standard.
- The following ISO RAS guidelines are proposed to be eliminated from the ISO Planning Standards:
  - ISO SPS1, 2, 4, 5, 8, 9, 11 , 12, 13, 14, 15, and 17.
  - These guidelines are covered by the NERC PRC-012-2 Standard as shown in the summary table on the next slide.

# Removal of Redundant Language in the Existing RAS Guidelines

Existing ISO RAS Guidelines to be removed	Corresponding PRC-012-2 Standard Requirements	Notes
ISO SPS1	R1 – R3	Requirements for new RAS
ISO SPS2	R1- R3, R5 – R8	Approval of new RAS by the RC, assessment and corrective actions to address RAS failure, periodic RAS testing
ISO SPS4, SPS5, SPS8	R1 – R3, R4	Requirements for new RAS Study assessment of existing RAS
ISO SPS9	R1 – R3	Requirements for new RAS
ISO SPS11	R1 – R3	Requirements for new RAS
ISO SPS12	R8	RAS-entity to perform periodic testing of the RAS to verify overall RAS performance
ISO SPS13	R9	RAS documentation and RAS database
ISO SPS14	PRC-012-2 R4, TPL-001-5	PC performs periodic study assessment of the RAS as well use of the RAS in annual transmission planning study
ISO SPS15	R1 – R3, R8	RAS-entity provides RAS documentation to the RC; periodic RAS testing
ISO SPS17	R1 – R3	RAS-entity to provide required documentation of the new RAS to RC for approval

# Refinements of Existing RAS Guidelines and Proposed New RAS Standards

- **ISO S-RAS1 –**

New RAS implementation should meet the NERC PRC-012-2 (or subsequent version) requirements.

This is a new standard to supersede the ISO RAS guidelines that are proposed to be removed due to redundancy to PRC-012-2 Standard.

# Refinements of Existing RAS Guidelines and New RAS Standards

- **ISO S-RAS2 –**

The RAS should not be proposed for mitigating reliability concerns under normal conditions (i.e., Category P0).

This is a new RAS standard. RAS is typically designed to mitigate reliability concerns under contingency conditions. While it is rare to have RAS to mitigate reliability concerns under normal condition, the ISO would like to reinforce the design principles to have RAS designed for mitigating reliability concerns for contingency conditions only to avoid the frequency of the RAS being used.

# Refinements of Existing RAS Guidelines and New RAS Standards

- **ISO G-RAS3 –**

The following are guidelines for optimizing resources to participate in the RAS design and implementation so that generation deliverability benefit is maximized:

- A. The RAS should be designed for simple operation to trip a fixed set of generation under specific contingencies. It should not be implemented with complex design and operation that are conditioned on different flow levels on monitored transmission facilities to trip various amounts of generation.
- B. The RAS should trip load and/or resources that have effectiveness factors greater than 10% on the constraints that need mitigation such that the magnitude of load and/or resources to be tripped is minimized. As a matter of principle, voluntary load tripping and other pre-determined mitigations should be implemented before involuntary load tripping is utilized. Involuntary load tripping should not be included in the RAS in the high density load area(s).

The above guideline is proposed as a result of stakeholder feedback for simple RAS. It is also based on feedback from the ISO Power System and Market Technology Division that complex RAS is challenging to be implemented in the ISO market.

# Refinements of Existing RAS Guidelines and New RAS Standards

**ISO G-RAS4** – the following guidelines are intended to help simplify RAS design and implementation.

The RAS must be simple and manageable:

- A. RAS should have no more than 6 contingencies.
- B. RAS should not be monitoring more than 4 elements.
- C. Overlapping RAS (i.e., two different RAS monitoring one or more of the same elements or contingencies) is not allowed.
- D. A RAS that includes storage facilities and is implemented to operate when there is an excess of generation should not also be implemented to operate when there is an excess of charging. Similarly, a RAS that includes storage facilities and is implemented to operate when there is an excess of charging should not also be implemented to operate when there is an excess of generation.

# Refinements of Existing RAS Guidelines and New RAS Standards

## ISO G-RAS4 (cont'd)

- E. The RAS should only monitor overloading facilities no more than 1 substation beyond the first point of interconnection.
- F. A RAS should not require real-time operator actions to arm or disarm the RAS or change its set points.
- G. A RAS should not include logics to dynamically arm and trip various generation level to achieve transmission facility flow objectives.

# Refinements of Existing RAS Guidelines and New RAS Standards

## **ISO S-RAS5 -**

If the RAS is designed for new generation interconnection, the RAS should not include the involuntary interruption of firm customer load. Voluntary interruption of load paid for by the generator is acceptable.

The above is converted from the existing ISO SPS7 guideline to a standard to ensure that firm load is not impacted with the addition of new generation interconnection.



# Refinements of Existing RAS Guidelines and New RAS Standards

## **ISO G-RAS6 -**

The total net amount of generation ( $P_{\max}$  – auxiliary load) tripped by a RAS for a single contingency (P1) should not exceed the ISO's largest single generation contingency (currently one Diablo Canyon unit at 1150 MW). The total net amount of generation tripped by a RAS for multiple contingencies (P3 – P7) cannot exceed 1400 MW.

- For example, 1500 MW of solar plants producing 150 MW would be exceeding the P1 tripping limit and could not all be tripped—this is to ensure the set of generators to be armed and tripped is always the same (see ISO G-RAS3).

The above is from the existing ISO SPS3 guideline. It is recommended to maintain the existing MW limit for generation tripping to avoid impact to the existing RAS. A review of ISO contingency reserve awards indicate a value of 1400 MW or higher for 99% of the time.

# Refinements of Existing RAS Guidelines and New RAS Standards

## **ISO G-RAS7 -**

The ISO, in coordination with affected parties, may relax RAS requirements as a temporary “bridge” to system reinforcements. Normally this “bridging” period would be limited to the time it takes to implement a specified alternative solution.

The above is from the existing ISO SPS10 guideline. It is recommended to keep this guideline to provide flexibility to enable temporary “bridge” to long-term transmission reinforcements.

## Next steps

- Please submit comments on the revised straw proposal using the commenting tool linked on the initiative webpage.
  - Comments are due by end of day October 10.
- The ISO will consider stakeholder comments to incorporate into the revised straw proposal and will follow up with a stakeholder call.

# Feedback Request

The ISO is requesting stakeholders to provide comments regarding the following:

- Are the proposed planning guideline updates sufficiently clear for understanding? If not, which specific proposed guidelines or standards would need further clarifications?
- Do the proposed guideline and standard updates help in simplifying RAS design and implementation?
- Do the proposed guideline and standard updates help address your concerns in implementing new RAS to connect new resources and/or to maintain transmission reliability? If not, what are the suggested enhancements?
- Do you have any further suggestions to the proposed guideline and standard updates?

# Schedule

Item	Date
<b>Post straw proposal</b>	<b>September 19, 2022</b>
Stakeholder call	September 26, 2022
Comments due	October 10, 2022
<b>Post revised straw proposal</b>	<b>October 26, 2022</b>
Stakeholder call	November 2, 2022
Comments due	November 16, 2022
<b>Post draft final proposal</b>	<b>January 4, 2022</b>
Stakeholder call	January 11, 2022
Comments due	January 25, 2022

All initiative related information is available at: [California ISO - Planning standards - remedial action scheme guidelines update \(caiso.com\)](https://www.caiso.com/California-ISO-Planning-standards-remedial-action-scheme-guidelines-update)

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