



NORTHEAST POWER COORDINATING COUNCIL, INC.
1040 AVE. OF THE AMERICAS, NEW YORK, NY 10018 (212) 840-1070 FAX (212) 302-2782

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The NPCC Task Forces Response to Comments Received in the Second Open Process Posting of revised Directory#7 *Special Protection Systems*.

The NPCC Task Forces would like to thank those who provided comments on the proposed revisions to Directory#7 which was posted from August 28, 2020 to October 12, 2020. The Task Force responses to individual comments are provided below.

Comments from HQT:

Comment#1:

Make sure to have a consistency throughout the document on how the idea of “BES or BPS” is expressed. The document currently includes the terms ‘BES plus BPS’, ‘BES or BPS’ and ‘BES/BPS’:

- Page 2: 1.6 Applicability: NPCC adopts the NERC RAS definition and limited impact RAS description where any reference in the NERC RAS definition to BES is to be interpreted as BES plus BPS
- Page 3 performance issues on the BES or BPS,
- Page 6: SPS type II ... cause or contribute to BES/BPS cascading
- Page 18 and 19: 6.4.1.3 BES Cascading versus 6.4.1.4 BES/BPS versus 6.4.1.5 BES/ BPS
- Page 25: 2.9.4 Communication systems should be designed to mitigate the effects of signal interference from other communication sources and to assure adequate signal transmission during BES disturbances

Task Force Response:

Comment accepted.

The term BES/BPS has been removed and the connector “plus”, “and” or “or” used as appropriate.

For bullet 5, “BES” has been removed.

Comment#2:

In a few sections, ‘BES’ is mentioned without a reference to ‘BPS’. Replace ‘BES’ by ‘BES or BPS’ or equivalent expression in the sections below:

- Section 5.1: “The relative effect on the BES bulk power system due to a failure of a RAS to operate [...]” **agreed**
- Section 6.4.1.3 **agreed**
- Section 6.5.1.3 & section 6.5.1.4 **agreed**
- Appendix A, sections 2.1.2 and 2.9.4 **agreed for 2.1.2 and removed from 2.9.4**

Task Force Response:

Comments accepted.

Comment#3:

Section 6.4.1.3, including footnote 3: revise text to make it consistent with the Limited Impact classification found in section 1.6.2. (remove the 3 occurrences of “uncontrolled” that are not mentioned in section 1.6.2)

Task Force Response:

Comment accepted.

Comment#4:

Appendix C, section 3.1: there is a list of items (Remedial Action Scheme, Communication links, etc.), but there are no explicit explanations on what is expected to be done with that list. Please add clarifications.

Task Force Response:

Thank you for your comment.

The language in this section has been clarified.

Comment#5:

Section 1.6.2.2.2 Reclassification of RAS: The exercise of reclassification of RAS must be performed by TFSS and to be reported to TFSP. Suggestion to modify as following:

Reclassification must be determined by TFSS and assessment shall be reported to TFSP.

Task Force Response:

Thank you for the comment. The comment is not accepted.

The phrasing “submitted to the RAS review process” covers all aspects of the reclassification including assessment.

Comment#6:

Item 5.12.6 should appear at item 5.12.7 and item 5.12.6 should be left « intentionally left blank ».

Task Force Response:

Thank you for your comment.

The reference in 5.12.1 and 5.12.2 have changed to 5.12.6 and all « intentionally left blank » section removed from the document.

Comments from ISO-NE:

Comment#7:

Section 1.6.2.1 reads, "Each new RAS will be submitted for review in accordance with the requirements in Section 6". However, there are no requirements listed in Section 6. Suggest redlining as shown below:

1.6.2.1 New Facilities

*Each new **RAS** will be submitted for review in accordance with ~~the Requirements in~~ Section 6.*

Task Force Response:

Comment accepted.

Comment#8:

Section 1.6.2.2 seems to be assuming that replacement of a component due to obsolescence doesn't fall into the category that the language is describing. Directory 7 has a section for unplanned replacement in kind, for planned modification, but no section for planned replacement in kind.

The document needs to be clear about what expectations for planned in-kind replacement. If it triggers conformance with more stringent NPCC criteria, then it should be explicitly described in 1.6.2.2.1; if it does not trigger conformance, then the title of 1.6.2.2.3 should be, "Planned and Unplanned In-kind Replacement"

Task Force Response:

Comment accepted.

Planned in-kind replacements are to be considered under Section 1.6.2.2.1. This is to avoid having a RAS upgraded one component at a time and avoiding a rigorous review.

Section Heading revised to: Planned Modification or in-kind replacement of RAS equipment to Existing Facilities

Also note that App. B, section 2 uses the term "functional modification". In addition, it says that in-kind replacement does not fall into this bucket. So, where does it belong?

It seems that the title of Section 1.6.2.2.1 should be "Planned Functional Modification to Existing Facilities", to align better with Appendix B Section 2. Based on this, we propose the following redline edit.

1.6.2.2.1 Planned Functional Modification to Existing Facilities

If any RAS or sub-systems of these facilities are replaced as part of a modification to the facility and do not comply with all of these...

Task Force Response:

Section 1.6.2.2.1 refers to the review of any modified RAS for exceptions granted to the NPCC more stringent criteria.

Appendix B, Section 2 is for the review of any functionally modified RAS.

Comment#9:

Section 1.6.2.2.1 Planned Modification to Existing Facilities

If any RAS or sub-systems of these facilities are replaced as part of a modification to the facility and do not comply with all of these criteria, then an assessment shall be conducted for those criteria that are not met.

The review and acceptance for exceptions requested to the NPCC more stringent RAS criteria will be documented.

All other RAS modifications shall be submitted as a Modified RAS.

There appears to be an issue with Section 1.6.2.2.1. Overall, D7 is to be followed for both NERC requirements and NPCC criteria it remains unclear on distinctions between NERC and NPCC criteria.

The language above says that you can take an exception to the more stringent NPCC criteria, but if that is not accepted, you submit it as a Modified RAS. What if you modify the RAS so that it doesn't need an exception...the language says that it doesn't get reviewed under the NPCC or NERC process. The language should ensure that NPCC stringent rules do not dictate what goes into the process. Also, "Modified RAS" is not a defined term and, as such, it should not be capitalized.

Task Force Response:

All RAS with modification, with or without exception will be submitted to the process.

Section 1.6.2.2.1 revised for clarity.

Comment#10:

Section 1.6.2.2.2 Reclassification of RAS

Any RAS that are identified as potentially requiring reclassification shall be submitted to the RAS review process.

For Type I RAS, where the RAS-entity has determined that the cost and risks involved to implement the more stringent NPCC criteria for physical separation, as per Section 5.12, cannot be justified, the reason for this determination and an assessment shall be reported to the Task Force on System Protection (TFSP).

The language above only requires submittal and does not include a review process. If a TFSP review is required, that process should be described.

Task Force Response:

Comment accepted.

Added language “TFSP will review the exception request and approve or reject as per the RAS review process”.

Comment#11:

5.1 General Criteria

A RAS shall be designed to recognize the specific power system conditions associated with its intended function.

Due consideration shall be given to dependability and security. The relative effect on the BES or BPS due to a failure of a RAS to operate when desired versus an unintended operation shall be weighed carefully in selecting design parameters as follows in Sections 5.2, 5.3, and 5.4:

The language above should include either BES or BPS, since there is BPS that is not BES. Note that the terms where BES or BPS are used should be reviewed throughout the document. There are varying terms and using both terms “BES or BPS” should be considered for consistent use throughout the document.

Task Force Response:

Thank you for your comment.

Please refer to Section 1.6. Document reviewed for BES and BPS phrasing and revised as appropriate.

Comment#12:

5.2 Criteria for Dependability

To enhance dependability, a RAS shall be designed with redundancy such that the RAS is capable of performing its intended function while itself experiencing a single component failure. Multiple RAS Groups that are used to obtain redundancy within a RAS shall not share any of the same components. If the two RAS Groups share a redundant component in order to achieve improved reliability, the galvanic isolation and physical separation of the two RAS Groups shall not be compromised. These criteria do not apply to Type II RAS unless identified as necessary by the Planning Coordinator and RAS-entity.

The language above is not clear regarding sharing a redundant component. The second sentence states that multiple RAS groups cannot share the same component, while the third sentence says that two RAS groups can share a redundant component. This needs to be made clear, especially since FERC Order 1000 may result in someone other than a NPCC member designing projects in New England.

Task Force Response:

Thank you for your comment.

The criteria has been revised.

Comment#13:

5.3 Criteria for Security

A RAS [Type I or Type II] shall be designed to avoid significant adverse impact due to unintended operation for any single component malfunction. The single component malfunction scenarios shall be jointly validated by the Planning Coordinator and the RAS-entity.

Elsewhere in the document, NERC's language has been adopted by avoiding "significant adverse impact" and listing cascading, uncontrolled separation, etc. We recommend doing the same here.

Task Force Response:

Thank you for your comment.

The language has been revised.

Comment#14:

5.4.1 The thermal capability of all RAS components shall be rated to withstand the maximum short time and continuous loading of the associated protected elements.

There is no consideration of long-time rating in the sentence above.

Task Force Response:

Thank you for your comment.

The comment is accepted.

Comment#15:

5.4.4 RAS components with redundant power supplies shall be powered from the same DC battery system.

The sentence above indicates that system A and B must use the same battery, which removes any independence between these systems. Under FERC Order 1000, someone other than a NPCC member might be designing projects in New England and language that is not clear may be problematic.

Task Force Response:

Thank you for comment.

For clarity, the section language has been revised to:

“RAS components with redundant power supplies within a single RAS Group shall be powered from the same DC battery system.”

Comment#16:

5.8.6 DC supply to the RAS component shall be continuously monitored to detect loss of voltage and be annunciated to a 24-hour Operations center so that operating personnel can respond and can initiate appropriate actions.

Bullet 5.8.6 seems to be the same as 5.8.5 – why not just add loss of DC voltage to 5.8.5 to make the language more condensed and clear?

Task Force Response:

Thank you for your comment.

These are different devices. The comment is not accepted.

Comment#17:

5.10.3 Each trip coil shall be monitored in a fail-safe manner for continuity and presence of corresponding DC voltage and annunciated to allow prompt attention by appropriate operating authorities. (This criterion does not apply if the over arming is used.)

Delete the word “the” before over arming.

Task Force Response:

Thank you for your comment.

The comment is accepted.

Comment#18:

5.14.7 Cascading breaker failure shall not be permitted.

We don't understand the point being made here. Why would anyone be assuming more than one breaker failure?

Task Force Response:

Thank you for your comment.

Cascading breaker failure is allowed in some protection schemes.

The comment is not accepted.

Comment#19:

6.4.1.3 For limited impact³ RAS, the inadvertent operation of the RAS or the failure of the RAS to operate does not cause or contribute to BES Cascading, uncontrolled separation, uncontrolled angular instability, uncontrolled voltage instability, uncontrolled voltage collapse, or unacceptably damped oscillations.

Suggest change to 6.4.1.3 as redlined above, in order to align language with NERC PRC-012-2.

Task Force Response:

Comment accepted

Comment#20:

6.5.1.3 The RAS was effective in mitigating BES performance issues it was designed to address.

6.5.1.4 The RAS operation resulted in any unintended or adverse BES response.

In language above use “BES or BPS” since this process is being used to address both parts of the system. This should be reviewed throughout the document, BES/BPS is not really clear either.

Task Force Response:

Comment accepted.

Language revised

Comment#21:

6.6 Each RAS-entity shall participate in developing a Corrective Action Plan (CAP) and submit the CAP to the reviewing Reliability Coordinator(s) and TFCP within six full calendar months of:

- *Being notified of a deficiency in its RAS pursuant to Requirement-section 6.4, or*
- *Notification of a deficiency identified in the operational performance analysis pursuant to Requirement section 6.5.2, or*
- *Identifying a deficiency in its RAS through functional testing of the RAS as per Requirement section 6.8*

Task Force Response:

Comment accepted.

Language revised

Comments on Appendix A

Comment#22:

2.1.2 The relative effects on the BES of a failure to operate when desired versus an unintended operation should be weighed carefully in selecting design parameters. For example, the choice of duplication as a means of providing redundancy improves the dependability of the RAS but can also jeopardize security in that it may increase the probability of an unintended operation. This general objective can be met only if the RAS can dependably respond to the specific conditions for which it is intended to operate and differentiate these from other conditions for which action must not take place.

Modify language above to refer to BES or BPS.

Task Force Response:

Thanks for your comment.

Please refer to section 1.6.

Document reviewed for BES and BPS phrasing and revised as appropriate.

Comment#23:

2.5.3 Continuous streaming of sampled values may consume a large amount of LAN bandwidth. The network architecture should account for bandwidth-intensive applications and RAS Group response, as required by planning standards, should not be impacted by increased traffic during any scenario.

We don't know what part of planning standards is being referred to above.

In 2.5.3, replace "by planning standards" with "to meet the performance requirements required for the events and conditions for which the RAS is designed"

Task Force Response:

Thank you for your comment.

The comment is accepted.

Comment#24:

2.9.2 Two identical communication equipment should not be used in independent RAS Groups, due to the risk of simultaneous failure of both RAS Groups because of design deficiencies or equipment problems.

There appears to be a word missing in “two identical communication equipment”. Suggestion: Two identical communication equipment packages should not be used in independent RAS Groups, due to the risk of simultaneous failure of both RAS Groups because of design deficiencies or equipment problems.

Task Force Response:

Thank you for your comment.

The word “models” was added.

Comment#25:

2.9.4 Communication systems should be designed to mitigate the effects of signal interference from other communication sources and to assure adequate signal transmission during BES disturbances.

Change as follows:

2.9.4 Communication systems should be designed to mitigate the effects of signal interference from other communication sources and to assure adequate signal transmission during BES system disturbances.

Task Force Response:

Thank you for your comment.

Language revised to “power system”.

Appendix B Comments

Comment#26:

2.2. TFCP shall forward the documentation from the RAS-entity to TFSS to review and confirm the proposed RAS Type. TFSS shall confirm the proposed RAS Type by reviewing the analysis that the RAS-entity has performed to determine the consequences of either a failure of the RAS to operate when and how it is required, or an inadvertent or unintended operation of the RAS. If

necessary, TFSS shall request that the RAS-entity conduct additional studies. TFSS shall forward a summary of their findings confirming the Type of the RAS to TFCP.

The responses to previous comments indicate that TFCP is assuming that TFSS is reviewing more than the RAS type. However, currently they are only tasked with reviewing the RAS Type, as indicated in the language in 2.2

If the expectation is that TFSS is to review more than the RAS Type, then change the second sentence to read “TFSS review for conformance with Attachment 2 and confirm the proposed RAS Type.”

Task Force Response:

Comment accepted.

Language revised

Comment#27:

2.3.8 Upon TFCP approval the RAS may be deployed.

It is not clear how a Reliability Coordinator could demonstrate compliance with the PRC-012 requirement to approve the RAS prior to implementation with a process that allows TFCP to approve the RAS.

Task Force Response:

Language revised to indicate that RAS cannot be deployed without TFCP approval.

This does not preclude the RC from rejecting deployment

Comment#28:

2.4.4 Upon TFCP approval the RAS may be deployed.

Same concern as 2.3.8

Task Force Response:

Language revised to indicate that RAS cannot be deployed without TFCP approval.

This does not preclude the RC from rejecting deployment

Comment#29:

*2.5.1 TFCP shall forward the documentation from the RAS-entity to TFSS.
TFSS shall review the analysis that the RAS-entity has performed to determine the consequences of the removal of the RAS.*

There is no mention of any criteria here, though it may be implied with the language that it does not prevent the BES or BPS from meeting the performance requirements for the events and conditions for which the RAS had been designed.

Task Force Response:

Comment accepted.

Language revised

Comment#30:

2.5.6 Upon TFCP approval the RAS may be retired.

Same concern as previously described in 2.3.8.

Task Force Response:

Language revised to indicate that RAS cannot be retired without TFCP approval.

This does not preclude the RC from rejecting the request to retire.

Comment#31:

Comments on the first flow chart – decision block containing language “TFSS reviews proposed typing and provides a statement of findings to TFCP”

TFSS is only doing typing and we believe, based on the responses provided to previous comments that TFCP thinks that TFSS is doing a more complete review.

Task Force Response:

Comment Accepted

Changed flowchart to ‘TFSS reviews proposal and provides a statement of Findings.’

In the decision block containing language “TFCP reviews compliance with applicable criteria” - replace "applicable criteria" with the concept of, "the BES or BPS meets the performance requirements for the events and conditions for which the RAS has been designed"

Task Force Response:

Comment accepted – changed criteria to performance requirements

Comments on Appendix C

Comment#32:

1.0 Introduction

In accordance with the applicable facilities described in Section 1.6.2 of this Directory, RAS- entity should provide the Task Force on Coordination of Planning (TFCP) and their Reliability Coordinator with advance notification of any of its new Remedial Action Scheme (RAS) facilities, or significant changes in its existing RAS facilities. TFCP will forward the request to review the design to TFSP. Notification should be made to the TFSP early in the engineering design stage, prior to submitting the information specified in Section 6.1.

A new term “significant changes” has been introduced. The term "significant changes" should be changed to "functional modification" to match a term already defined in PRC-012-2.

Task Force Response:

Thank you for your comment.

Language revised to “significant equipment changes or functional modification”

Additionally, this language gives TFSP the obligation to review RAS facilities and sign off before the RAS Type has been agreed upon. It seems like TFSP would need to know the RAS Type when performing its review.

Task Force Response:

Thank you for your comment.

The RAS Type is determined under Section 1.6.

Comments from National Grid

Comment#33:

Cover Page and Section 1.4 - Effective Date: Please consider listing the effective date as December 27, 2007 instead of December 27th, 2007.

Task Force Response:

Comment accepted

Comment#34:

Section 3.0 NERC ERO Reliability Standard Requirements: Please consider stating Reliability Coordinators, instead of “RCs”. Please consider moving this section to an appendix document since revisions of appendix documents only require Task Force approval.

Task Force Response:

Agreed to change to Reliability Coordinators.

Section 3 is part of the Directory Standard format and will remain in Section 3.

The Task Force can make non substantive or errata changes without a review of the entire Directory.

Comment#35:

Section 4.0 NPCC Regional Reliability Standard Requirements: Please consider listing “None” instead of “None at this time.”

Task Force Response:

Comment accepted

Comment#36:

Please consider moving this section to an appendix document since revisions of appendix documents only require Task Force approval.

Task Force Response:

Thank you for your comment.

This section is part of the Directory Standard format and will remain

Comment#37:

Section 5.13 Grounding Criteria: Please consider stating Transmission Owner, Generator Owner or Distribution Provider, instead of “TO” “GO” and “DP”; or consider stating, “Each RAS-entity shall...”

Task Force Response:

Comment accepted

Comment#38:

Section 7.0 Compliance Monitoring Process: Please consider removing the sentence, “Measures and corresponding Levels of Non-Compliance for these requirements are contained within the compliance templates associated with this Directory.”

Levels of non-compliance were removed from the NPCC Criteria Compliance and Enforcement Program (CCEP) in 2017.

Task Force Response:

Comment accepted

Comment#39:

Please consider adding a statement, “NPCC will not enforce a duplicate sanction for the violation of any Directory #7 requirement that is also required for compliance with a NERC Reliability Standard.” For reference, please see the Compliance section in Directory #11.

Task Force Response:

Comment accepted

Comments from OPG

OPG appreciates the opportunity to review the redlined draft of the attached revised NPCC Directory #7 Special Protection Systems and has the following comments:

Comment#40:

Page 11-12:

“5.10 Circuit Breakers Criteria

5.10.1 Where **RAS** redundancy is achieved by the use of independent **RAS Groups** tripping the same circuit breakers without overwarming, which is defined as providing for more corrective action than would be necessary if no failures are considered, each circuit breaker shall be equipped with two independent trip coils. (This ~~dual trip coil~~ criterion does not apply to Type II ~~RASs~~**RAS**.) “

OPG recommends adding an exemption clause to allow existing single coil breaker to operate.

Task Force Response:

Thank you for comment.

There is a process to ask for exception to specific criteria at existing facilities.

Comment#41:

Page 12:

“5.10.3.1 The design for trip coils monitoring shall not introduce a single point of failure in the trip circuits.”

OPG recommends adding a definition of the term: "single point of failure".

Task Force Response:

Thank you for your comment.

TFSP believes the term “single point of failure” is self explanatory.

Comment#42:

Page 16:

“5.14.7 Cascading breaker failure shall not be permitted.”

OPG recommends changing "breaker failure" to: "breaker failure scheme" or "breaker failure initiation".

Task Force Response:

Thank you for your comment.

The section has been revised to:

5.14.7 Cascading breaker failure protection schemes shall not be permitted.

Tabular Summary of Comments Received

Section/Topic	Comment #		<u>Complete</u>
General Comments	#1, #2		<u>Completed</u>
Section #1 Introduction	#33	CP	<u>Completed</u>
Section #1.5 Background	None		
Section #1.6 Applicability	#5, #7, #8, #9, #10,	CP	<u>Completed</u>
	#8, 9	SP	<u>Completed</u>
Section #2 Defined Terms	None		
Section #3 Associated NERC Standards	#34	CP	<u>Completed</u>
Section #4 NPCC Regional Standard Requirements	#35, #36	CP	<u>Completed</u>
Section #5 NPCC More Stringent Criteria	#6, #11, #12, #13, #14, #15, #16, #17, #18, #37, #40, #41, #42	SP	<u>Completed</u>
Section #6 RAS Review Process	#3, #19, #20, #21	CP	<u>Completed</u>
Appendix A – Guidance for Consideration in Remedial Action Scheme Design	#22, #23, #24, #25	SP	<u>Completed</u>
Appendix B – Procedure for Review of a Remedial Action Scheme	#26, #27, #28, #29, #30,	CP	<u>Completed</u>
Appendix C – Procedure for Reporting to TFSP New and Modified Remedial	#4, #32	SP	<u>Completed</u>

Action Schemes			
Comment on Flow Charts	#31	CP	<u>Completed</u>
Compliance Section #7	#38, #39	CP	<u>Completed</u>
Cost Effectiveness Survey Comments	None	CP	<u>NA</u>