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**The Task Force on System Protection (TFSP) Responses to Comments Received in the Open Process Posting of revised Directory#4 *System Protection Criteria*.**

The TFSP would like to thank those who provided comments on the proposed revisions to Directory#4 and the Directory#4 Criteria Cost Effectiveness and Resilience Survey which were posted from March 25, 2019 to May 9, 2019.

The TFSP responses to individual comments are provided below.

**Comments on TFSP Proposed Revisions to Directory#4 System Protection Criteria:**

*Comments from ISO-NE:*

**Comment 1:**

The addition to Directory #4 page A-2: 2.3.4.:

*‘For DCB schemes, design considerations should include pertinent alarms to minimize the risk associated with failure of these schemes.’*

If this language is to reflect the recommendation from the recently issued by TFSP white paper on DCB schemes then the message got lost.

It is the remote control not just alarms which should be considered.

**TFSP Response:**

Thank you for your comment.

TFSP had considered to include this in the Directory but it was decided to leave the provision of remote control of DCB schemes to be made in collaboration between TOs and their respective ISO.

TFCO's letter to TFSP dated May 16, 2018 did not support recommendations for eventual incorporation of such specific, additional requirements into Directory 4.

**Comment 2:**

The recommendation in "Directional Comparison Blocking Schemes - Single Component Failure: Over-Trip Report prepared by TFSP" page 12 reads:

*'When mutual agreement exists between protection system owners and system operators, consideration could be given to add design provision of remote control capability to allow operators to respond to an alarmed failure of a DCB component.'*

Reducing this recommendation to alarming by stripping away the control function defeats the purpose of design recommendation which TFSP came up with.

**TFSP Response:**

Thank you for your comment.

See response to Comment 1.

The White Paper was written to suggest several design considerations to mitigate DCB failure and improve DCB scheme performance.

[https://www.npcc.org/Library/Other/DCB%20Schemes%20-%20Single%20Component%20Failure%20Over-Trip%20\\_Final%20Version%20May%202019.pdf](https://www.npcc.org/Library/Other/DCB%20Schemes%20-%20Single%20Component%20Failure%20Over-Trip%20_Final%20Version%20May%202019.pdf)

*Comments from National Grid:*

**Comment 1:**

Section 3: Should PRC-027 Coordination of Protection Systems for Performance During Faults be added to Section 3?

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 2:**

Section 4: PRC-006-NPCC-02 should be PRC-006-NPCC-2 (or it could simply reference PRC-006-NPCC to avoid future edits).

**TFSP Response:**

Thank you for your comment.

Comment accepted.

The version of standard will not be noted.

**Comment 3:**

Section 5: Suggestion to change wording to read as: *‘These Criteria are in addition, more stringent or more specific than NERC continent-wide standards or any NPCC regional reliability standard.*

**TFSP Response:**

Thank you for your comment.

There are no other “NPCC” regional standards pertaining to this.

TFSP will remove “or any Regional Reliability standard requirements.” and add “continent-wide”.

**Comment 4:**

Section 5.2.4: Remove extra "." at the end of the section.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 5:**

Section 5.14.1: Suggestion to change wording to read as: *‘Protection system settings shall not constitute a loading limitation as per NERC continent-wide PRC standards’.*

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 6:**

Appendix A, Section 2.18.6.1: Change PRC-006-NPCC-2 Underfrequency Load Shedding Program Requirements to read as PRC-006-NPCC Automatic Underfrequency Load Shedding.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

***Comments from OPG:***

**Comment 1:**

Footnote #3 “Reference NERC Lessons Learned dated October 2, 2013 on loss of converter station due to initiation of a top oil temperature signal from the transformer A protection system.” is not available on NERC lessons learned postings for 2013.

Suggest to confirm if the actual Lesson Learned # is 20150201 and add the required information.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

The footnote will be revised.

[https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20150201\\_Digital\\_inputs\\_to\\_protection\\_systems.pdf](https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20150201_Digital_inputs_to_protection_systems.pdf)

**Comment 2:**

Appendix A – Guideline and Recommendations for Bulk Power System Protection, Transformer Protection, Page A8 – 2.15.1

OPG suggest that providing specific guidelines for the Buchholtz relay (due to electrical considerations) warrants clarification that should clearly state: “need not be duplicated”.

**TFSP Response:**

Thank you for your comment.

This is a guideline recommendation and it is up to the entity to determine specific elements to apply the redundancy.

**Comment 3:**

Page A9 – Generator start up and shut down additional protective relays requires clarification regarding need for duplication (i.e. 2.17.2.3).

**TFSP Response:**

Thank you for your comment.

This is a guideline recommendation and it is up to the entity to determine specific elements to apply the redundancy.

**Comment 4:**

Throughout the entire Directory #4 OPG suggest that instead of “PRC-006-NPCC-2 Underfrequency Load Shedding Program Requirements” to use “PRC-006-NPCC-2 Automatic Underfrequency Load Shedding or successors”

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 5:**

Page A10 OPG suggest that the reference to requirements specified in “Section 5.2 and Section 5.4 of Emergency Operation Criteria (Directory #2)” can be removed, however the reference to Directory #12 can be removed only after the retirement of D#12 which is a function of the NERC approval of PRC-006-NPCC-2 Underfrequency Load Shedding Program Requirements. The Northeast Power Coordinating Council, Inc. (NPCC) just requested that NERC post Regional Reliability Standard PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding for industry review and comment in accordance with the NERC Rules of Procedure.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

This will be revised as “Directory #12 until its retirement and PRC-006-NPCC upon its approval”.

**Comment 6:**

For **Existing Facilities** NPCC Directory #4 specifies that “It is the responsibility of individual companies to assess the **protection systems** at existing facilities and to make modifications which are required to meet the intent of these criteria as follows. ....two independent sets of **protective relays** ...”

5.0 NPCC Full Member, More Stringent Criteria,

5.2 Criteria for Dependability specifies “two **protection groups**, each of which is independently capable of performing the specified protective function for that **element**.”

OPG is merely suggesting that clarification are required for “two independent sets of protective relays”, “two protection groups”, “independent protection groups” and “backup Protection” in the context of NPCC Directory #4 and with respect to duplication requirements.

**TFSP Response:**

Thank you for your comment.

Each phrase needs to be read and interpreted individually. A section that is questionable needs to be noted in the question for TFSP’s clarification.

*Comments from HQT:*

**Comment 1:**

1.6.2.2.4: Missing what must be reported like in section 1.6.2.2.2 and 1.6.2.2.3. Please add “The new bulk power system element shall be reported to the TFSP”

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 2:**

In 5.4.3 we ask that the LAN is constantly monitored. In 5.11.1.3, the same requirements is asked, but for teleprotection equipment. There should be a criteria asking for the protection relay be constantly monitored and annunciated.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

TFSP agrees with your comment for protection relays that have the monitoring capability.

Requirement 5.4.7 has been added.

**Comment 3:**

5.5: Directory No. 1 -> Change to Directory # 1

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 4:**

5.6.1: Replace Current Transformer by CT (or remove CT and replace it by Current transformer in 5.6.2)

5.6.3: Replace Current Transformer by CT (or remove CT and replace it by Current transformer in 5.6.2)

5.6.4: Replace Current Transformer by CT (or remove CT and replace it by Current transformer in 5.6.2)

5.6.5: Replace Current Transformer by CT (or remove CT and replace it by Current transformer in 5.6.2)

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 5:**

5.8.2: Add criteria 5.8.2.1 : It is not required that the battery and charger supply the total load if both systems are supply by a set of independent chargers and independent batteries such as a single component failure will not compromise the supply of the system load (N+1 philosophy for new battery technology).



**TFSP Response:**

Thank you for your comment.

TFSP acknowledges this proposal and will consider it in future revision of the Directory. In the interim, TFSP will consider this design as a possible exception request to the current version of the Directory.

**Comment 6:**

5.8.3: Add criteria 5.8.3.1: The transfer arrangement is not required if both systems are supply by a set of independent chargers and independent batteries such as a single component failure will not compromise the supply of the system load (N+1 philosophy for new battery technology).

**TFSP Response:**

Thank you for your comment.

TFSP acknowledges this proposal and will consider it in future revision of the Directory. In the interim, TFSP will consider this design as a possible exception request to the current version of the Directory.

**Comment 7:**

5.8.6: Add “and annunciated”

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 8:**

5.12.1 and 5.11.1.1.1 are redundant in respect to teleprotection equipment. Remove 5.11.1.1.1. and rephrase 5.12.1 as such :

“The equipment for each protection group and teleprotection protecting the same system element shall be separated physically on non-adjacent vertical mounting assemblies or enclosures and designed to minimize the risk of both protection groups being disabled simultaneously by a single event or condition, except as noted in 5.12.7.”

**TFSP Response:**

Thank you for your comment.

The redundancy was to provide additional emphasis for the teleprotection equipment.

**Comment 9:**

5.12.9: Rephrase to “separated physically on non-adjacent panel” (like criteria 5.11.1.1.1)

**TFSP Response:**

Thank you for your comment.

No changes will be made.

**Comment 10:**

5.12.6 is the continuation of 5.12.5 and should therefore be 5.12.5.1

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 11:**

5.16.1: Should be sent to the appendix as it is more of a best practice than a requirement and doesn't improve reliability or add any value.

**TFSP Response:**

Thank you for your comment.

No changes will be made.

**Comment 12:**

5.19 D4 makes no distinction between VSC type and LCC type converter.

Hydro-Québec converter group propose the following:

“5.19 HVDC System Protection Criteria

5.19.1 LCC-type (Line Commutated Converter) converter Criteria

5.19.1.1 The ac portion of an HVdc converter station, up to the valve-side terminals of the converter transformers, shall be protected in accordance with these criteria.

5.19.1.2 Multiple commutation failures, unordered power reversals, and faults in the converter bridges and the dc portion of the HVdc link which are severe enough to disturb the bulk power system shall be detected by more than one independent control or protection group and appropriate corrective action shall be taken, in accordance with the considerations in these criteria.

#### 5.19.2 VSC-type (Voltage Source Converter) converter Criteria

5.19.2.1 The ac portion of an HVdc converter station, up to the converter arms terminals, shall be protected in accordance with these criteria.

5.19.2.2 Abnormal voltage, frequency and harmonic distortion, and faults in the converter arms and the dc portion of the HVdc link which are severe enough to disturb the bulk power system shall be detected by more than one independent control or protection group and appropriate corrective action shall be taken, in accordance with the considerations in these criteria.”

#### **TFSP Response:**

Thank you for your comment.

Comments accepted.

TFSP has added the new requirements under Section 5.19.

#### **Comment 13:**

6.0: Replace R1, R2 and R3 by 6.1, 6.2 and 6.3.

#### **TFSP Response:**

Thank you for your comment.

No changes will be made.

#### **Comment 14:**

Appendixes A: Remove 2.16.1 in the appendixes since it is already included in criteria 5.2.3

#### **TFSP Response:**

Thank you for your comment.

No changes will be made.

**Comment 15:**

Appendix B: Add a link to the PSRF form.

**TFSP Response:**

Thank you for your comment.

Comment accepted.

NPCC will make the form more visible on the website so it will be easier to be found.

*Comments from Eversource:*

**Comment 1:**

Appendix A. 2.2.1: Suggested rewording: “Some portions of elements may not in themselves be part of the bulk power system such as terminals of bulk power system elements connected to non-BPS buses. The requirements do not apply to the non-BPS bus terminals of that element.”

**TFSP Response:**

Thank you for your comment.

Comment accepted.

**Comment 2:**

Appendix A. 2.2.1: Eversource believes this should be added/clarified in the applicability section of the Criteria.

**TFSP Response:**

Thank you for your comment.

TFSP has considered your comment and has updated section 5.5 Operating Time Criteria.

*Comments from New Brunswick Power:*

Please see survey responses below.

**Responses to Directory#4 Criteria Cost Effectiveness and Resilience Survey:**

*National Grid Survey Response:*

**Question #1:**

*Do you agree that the Directory #4 reliability criteria are important to enhancing NPCC's BPS reliability and system resilience?*

Yes, National Grid agrees that the Directory #4 reliability criteria are important to enhancing NPCC's BPS reliability and system resilience.

**Question #2:**

*Are there any cost effective alternatives to achieving a similar or greater level of NPCC BPS reliability, system resilience and performance than provided by the criteria as described in the table?*

No. No cost effective alternatives were identified.

**TFSP Response:**

Thank you for your comment.

**HQT Survey Response:**

**Question #1:**

*Do you agree that the Directory #4 reliability criteria are important to enhancing NPCC's BPS reliability and system resilience?*

**Yes**  
**No**

*If you answered "No," which parts of the criteria in Directory #4 are not important to NPCC's BPS reliability and please explain why?*

**Question #2:**

*Are there any cost effective alternatives to achieving a similar or greater level of NPCC BPS reliability, system resilience and performance than provided by the criteria as described in the table?*

**Yes**  
**No**

*If you answered "Yes," please provide examples as well as any technical information or justification(s) that support your conclusions.*

An N+1 battery configuration where each of the N component are fully independent to one another available in emerging technologies would allow to save money by not designing the battery to take the total load of both system A & B since a single component failure would still allow the load of the system to not be compromise.

As such, having an N+1 configuration would improve reliability at a lesser cost.

Also, since an N+1 configuration would be present for both system A & B, maintenance of one of the string would not affect the load of the system. As such, the transfer switch would not be required anymore.

These would affect criteria 5.8.2 and 5.8.3.

**TFSP Response:**

Thank you for your comment.

TFSP acknowledges this proposal and will consider it in future revision of the Directory. In the interim, TFSP will consider this design as a possible exception request to the current version of the Directory.

***OPG Survey Response:***

**Question #1:**

*Do you agree that the Directory #4 reliability criteria are important to enhancing NPCC's BPS reliability and system resilience?*

**Yes**

*No*

*If you answered "No," which parts of the criteria in Directory #4 are not important to NPCC's BPS reliability and please explain why?*

**Question #2:**

*Are there any cost effective alternatives to achieving a similar or greater level of NPCC BPS reliability, system resilience and performance than provided by the criteria as described in the table?*

**Yes**

*No*

*If you answered "Yes," please provide examples as well as any technical information or justification(s) that support your conclusions.*

It appears that for the existing BES the traditional UFLS based only on frequency thresholds is cost effective for now. It may be possible that with the changes in the mix of generating resources and grid evolution, in the future this method will no longer be sufficient/reliable for emergency operating conditions and therefore new protective schemes, based on frequency derivative, must be developed/implemented.

Furthermore these type of protections can possibly be dynamically adapted to grid configurations (i.e. coupled with wide-area phasor measurements to limit or prevent the system from severe disturbances or even collapses due to delayed response and over shedding).

A change in UFLS approach will directly impact the direction given in criteria "2.18.3 Underfrequency **relays** which operate at a discrete frequency value are called "underfrequency threshold **relays**."

Selection of underfrequency sensing devices should be on a threshold basis. Alternatively, rate of change of frequency **load shedding** may be used when the requirements of the Balancing Authority indicate that this method will achieve the intent of the **load shedding** program. Appropriate studies are necessary to determine the application and settings of the rate of change of frequency **relays** for a particular Balancing Authority area."

**TFSP Response:**

Thank you for your comment.

SS-38 is tasked with UFLS program assessment.

Once the Working Group assesses that the program is no longer effective, TFSP will revise the Directory as required.

***New Brunswick Survey Response:***

NB Power supports the NPCC initiative to formalize a cost effectiveness analysis process as it relates to Directory criteria and has provided comments relating to Directory 4. Please see below.

**Question #1:**

*Do you agree that the Directory #4 reliability criteria are important to enhancing NPCC's BPS reliability and system resilience?*

Yes  
 No

*If you answered "No," which parts of the criteria in Directory #4 are not important to NPCC's BPS reliability and please explain why?*

Although answering "no" here, there is no doubt that Directory 4 criteria enhances reliability through its overarching goal to ensure BPS protection operation.

NB Power supports the NPCC initiative to formalize a cost effectiveness analysis process as it relates to directory criteria. While the Directory 4 criteria requirements, in and of themselves, promote reliability, there may be individual requirements that address risks at a cost in excess of the realized reliability benefit, in particular, if an entity has other mitigating measures to address the risk the requirement is designed to prevent. Practically speaking funds are not unlimited and spending in one area can diminish funds to other areas that support reliability.

Being mindful of the specific risk(s) that each requirement of Directory 4 is designed to address is an important consideration in determining the value of the requirement. Knowing the risk, a review by the entity to determine 1) the probability of occurrence, along with 2) existing mitigating controls, will help determine the value of each requirement.



For NB Power's situation, the requirement to separate protection system cables into separate trenches does not appear to warrant inclusion in Directory 4. This is due to the very low risk of occurrence as well as the existing mitigation measures as described below:

1. The occurrence of protection cable failures in a single trench is considered very low. NB Power has no record of such a failure.
2. NB Power manages its switchyard access and supervises digging and clearing activities.
3. Trenching stays within each switchyard and does not leave NB Power controlled areas.
4. Real time alarming occurs on loss of AC signals, DC Power and aux. contact disagreement.
5. The trip coil signals are monitored, and like the alarming in 4 above, are alarmed to a 24/7 control center.
6. Power cables are not installed in control cable trenches.
7. No butt splicing within cable trenches/raceways.

Note that in relation to 1 above, the Strategic Review of the NPCC Regional Reliability Criteria identifies an area for future investigation is those contributing factors to misoperation performance. In NB Power's case there has not been a misoperation due to protection cable failure.

NB Power recognizes that other entities circumstances may warrant the inclusion of this requirement which is very valid.

As a recommendation, in addition to addressing each of the risks identified in Directory 4 with a set of mandatory design criteria, alternatively allow entities to mitigate the risk the design criteria is meant to address, through other means or technologies. This would recognize the vast geographic, environmental and population density differences within the region and the rapidly changing technologies available.

**TFSP Response:**

Thank you for your comment.

TFSP has considered your proposal but the Members collectively agree that the requirement to separate protection system cables into separate trenches is mandatory.

The suggested mitigation measures are valuable practices but collectively do not provide the same level of reliability as separate trenches. In addition, the lack of historical events of a single entity should not be the basis to conclude that such an event has not occurred to other entities.

The redundancy requirement in the Directory has been established for BPS facilities identified by the performance testing included in criteria A-10 to overcome the single point of failure with the goal to ensure BPS protection reliability independent of geography, population density, and environment.

**Question #2:**

*Are there any cost effective alternatives to achieving a similar or greater level of NPCC BPS reliability, system resilience and performance than provided by the criteria as described in the table?*



*No*

*If you answered “Yes,” please provide examples as well as any technical information or justification(s) that support your conclusions.*

As a recommendation, in addition to addressing each of the risks identified in Directory 4 with a set of mandatory design criteria, alternatively allow entities to mitigate the risk the design criteria are meant to address, through other means or technologies.

NB Power recognizes that there may be other criteria requirements within the directory, which, for other entities fall a similar situation NB Power has described. NB Power suggests that a modification to the applicability clause would both simplify that section, as well as allow for the entity to bring forward other approaches to address a criteria requirement.

**Alternative #1:**

**Existing Wording**

1.6.2.1 New Facilities

These criteria shall apply to all new **Bulk Power System (BPS)** facilities.

1.6.2.2 Existing Facilities

It is the responsibility of individual companies to assess the **protection systems** at existing facilities and to make modifications which are required to meet the intent of these criteria as follows.

#### 1.6.2.2.1 Facilities found lacking two batteries or **elements** lacking two independent sets of **protective relays**

If an entity becomes aware of an existing facility that lacks an independent battery for each **protection group**, or an **element** that lacks two independent sets of **protective relays**, a mitigation plan to meet the requirements of this Directory must be submitted to TFSP within six months. The mitigation plan shall correct these deficiencies within three years. Justification for a longer timeframe must be approved by TFSP.1

#### 1.6.2.2.2 Planned Renewal or Upgrade to Existing BPS Facilities

It is recognized that there may be portions of the **bulk power system**, which existed prior to each member's adoption of the *Bulk Power System Protection Criteria* (Directory 4 and its predecessor Document A-5) that do not meet these criteria. If **protection systems** or sub-systems of these facilities are replaced as part of a planned renewal or upgrade to the facility and do not meet all of these criteria, then an assessment shall be conducted for those criteria that are not met. The result of this assessment shall be reported to TFSP. It is recommended this reporting be in accordance with the procedure stipulated in Appendix B of this Directory and using the appropriate portion of the “**Protection System Review forms**”, for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

#### 1.6.2.2.3 Facility Classification Upgraded to **Bulk Power System**.

These criteria apply to all existing facilities which become classified as **bulk power system**. A mitigation plan shall be submitted to TFSP for review to bring such a facility into compliance with these criteria.

Where the owner of the **protection system** has determined that the cost and risks involved to implement physical separation, as per Section 5.12, cannot be justified, the reason for this determination and an assessment shall be reported to the TFSP. It is recommended this reporting be in accordance with the procedure stipulated in Appendix B of this Directory and using the appropriate portion of the “**Protection System Review forms**”, for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

#### 1.6.2.2.4 Additions to **Bulk Power System** Facilities

If a **bulk power system element** is added to an existing **bulk power system** facility that is recognized under Section 1.6.2.2.1, Planned Renewal or Upgrade to Existing Facilities, these criteria apply to the **protection systems** for the new **element**.

#### 1.6.2.2.5 Unplanned In-kind Replacement of **Bulk Power System** Equipment

If a **bulk power system** element (e.g., breaker, transformer, capacitor bank, reactor, etc.) or a **protective relay** is replaced “in kind” as a result of an unplanned event, then it is not required to upgrade the associated **protection system** to comply with these criteria.

#### 1.6.2.2.6 Change in **Bulk Power System** Facility Status

When a facility was originally on the **BPS** list of April 2007 and has been shown to be non-**BPS** but later was determined to be **BPS** again, Section 1.6.2.2.1 would apply.

### **Proposed Wording**

#### 1.6.2 Facilities

It is the responsibility of individual companies to assess the protection systems at facilities and to design the protection systems to meet the intent of these criteria. If protection systems or sub - systems of these do not meet all of these criteria, then an assessment shall be conducted for those criteria that are not met. The result of this assessment shall be reported to TFSP. It is recommended this reporting be in accordance with the procedure stipulated in Appendix B of this Directory and using the appropriate portion of the “**Protection System** Review forms” , for review and disposition by the TFSP, or in a form consistent with the intent of the procedure .

#### 1.6.2.1 Facilities found lacking two batteries or **elements** lacking two independent sets of **protective relays**

If an entity becomes aware of an existing facility that lacks an independent battery for each **protection group**, or an **element** that lacks two independent sets of **protective relays**, a mitigation plan to meet the requirements of this Directory must be submitted to TFSP within six months. The mitigation plan shall correct these deficiencies within three years. Justification for a longer timeframe must be approved by TFSP.1

#### 1.6.2.2 Unplanned In-kind Replacement of **Bulk Power System** Equipment

If a **bulk power system** element (e.g., breaker, transformer, capacitor bank, reactor, etc.) or a **protective relay** is replaced “in kind” as a result of an unplanned event, then it is not required to comply with these criteria.

### **Further Discussion of Alternative #1 Proposed rewording:**

It is NB Power's assertion that this modification would both strengthen the directory as there would be no locations for which the task force would not have the opportunity to review the protection systems present in the NPCC footprint while still allowing an entity to fully describe a situation (local or otherwise) that may impact the design being put forward. Whether a facility is new or existing, added to the **BPS** list or reclassified has little impact on the entities obligation to perform a cost analysis on that facility to determine the most appropriate design decisions while still complying with the intent of the Directory.

The intent of this proposal is to allow the entity the latitude to consider the protection design in the context of the entities situation without being overly prescriptive, while still requiring the entity to give justifications for those decisions.

## Alternative #2

### **Existing Wording**

5.12.5 Cabling for separate **protection groups** and teleprotections protecting the same system **element** shall be physically separated. This can be accomplished by being in different raceways, trays, trenches, etc. Cable separation shall be achieved up to the breaker control cabinet or equipment control cabinet.

5.12.6 In the event a common raceway is used, cabling for separate **protection groups** protecting the same element shall be separated by a non-flammable barrier

### **Proposed Wording**

5.12.5 Cabling for separate **protection groups** and teleprotections protecting the same system **element** shall be physically separated. This can be accomplished by being in different raceways, trays, trenches, etc. Cable separation shall be achieved up to the breaker control cabinet or equipment control cabinet.

5.12.6 In the event a common raceway is used, an analysis must be conducted to analyze the risk of a common mode failure and the mitigations that the entity is proposing presented. Mitigations can include but are not limited to:

1. Cabling for separate protection groups protecting the same element separated by a non-flammable barrier.
2. Restricting trenches within entity-controlled areas.
3. Separation of power and control cables.
4. Real time monitoring and annunciation of signal integrity.

### **Further Discussion of Alternative #2 Proposed rewording:**

Although this alternative allows for the task force to consider other alternatives than those prescribed for the cable separation, it does not open up the directory for an entity to mitigate other areas which may cause unwarranted expenditures. However, it may be considered a precedent on a go forward basis, where entities can initiate Directory revisions on the basis of cost effectiveness review.

**TFSP Response:**

Thank you for your comment.

TFSP understand your concerns with respect to addition to BPS facilities. TFSP has revised section 1.6.2.2.4 to allow exception request which will align this requirement with the other requirements under 1.6.2.2. TFSP believes this mitigates the issue without weakening the applicability of the Directory.

The following was added: *“If protection systems or sub-systems of these facilities are added as part of a planned renewal or upgrade to the facility and do not meet all of these criteria, then an assessment shall be conducted for those criteria that are not met.”*