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Serial: RA-14-0017
July 29, 2014

Ms. Cindy K. Bladley
Office of Administration
Mail Stop: 3WFN, 06-44M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: COMMENTS ON NEW DRAFT BRANCH TECHNICAL POSITION 8-9 "OPEN PHASE CONDITIONS IN ELECTRIC POWER SYSTEM" AND DRAFT REVISION 5 TO SECTION 8.1, "ELECTRIC POWER – INTRODUCTION," OF NUREG-0800, "STANDARD REVIEW PLAN FOR THE REVIEW OF SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS" (DOCKET ID NRC-2014-0131)

Dear Ms. Bladley:

The Nuclear Regulatory Commission, through the Federal Register Notice (79FR32580) and Docket ID: NRC-2014-0131, issued for public comment Draft Branch Technical Position (BTP) 8-9, "Open Phase Conditions in Electric Power System" and draft Revision 5 to Section 8.1, "Electric Power – Introduction," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants". This letter forwards for NRC consideration the enclosed table of comments on the draft BTP 8-9 on behalf of the Duke Energy nuclear fleet.

There are no regulatory commitments contained in this letter. If you have any questions concerning this letter, or require additional information, please contact Julie Olivier at 980-373-4045.

Sincerely,

Benjamin C. Waldrep, VP Nuclear
Corporate Governance and Operations Support

Enclosure: Duke Energy Comments

SUNSI Review Complete
Template = ADM – 013
E-RIDS= ADM-03
Add= J. DeMarge (JxD4)

Comments on Draft Branch Technical Position 8-9
"Open Phase Conditions in Electric Power System" (Docket ID NRC-2014-0131)

By Duke Energy

#	SECTION, PAGE, LINE #	COMMENT	PROPOSED RESOLUTION	BASIS FOR COMMENTS OR RESOLUTION
1	General	The term "open phase condition" is too vague for a technical document like the Branch Technical Position. As well, "condition" is used by itself in B.1.V.(1)a, b, and c, but is preceded by the with "accident condition" and it is not clear what "condition" is being referred to.	Globally replace the term "open phase condition" with "open phase fault" in the Branch Technical Position. Places where "condition" is used alone but is referring to an open phase fault, either substitute the full term "open phase fault" or just use the term "fault".	The ongoing research into analysis of an open phase revealed that it is analyzed like a fault analysis. This was especially revealed during the upgrading of the ETAP software. Although the NEI Initiative refers to an "open phase condition", the NEI Open Phase Guideline Document uses the more descriptive term "open phase fault".
2	General	Three terms are used in Section B to identify what is being protected: important-to-safety, Class 1E, and ESF. The use of all these terms when referring to a design for electrically separating specific equipment makes the Branch Technical Position unnecessarily confusing.	Throughout Section B, replace the term "important-to-safety " and "ESF" with "Class 1E".	When discussing the design of systems to address an open phase fault in Section B, the ultimate focus is ensuring the fault does not adversely affect the functioning of Class 1E SSCs. The design would do this by separating the fault from the Class 1E switchgear. This is similar to degraded grid relays that protect only Class 1E buses. The non-safety related design would separate at the switchyard breakers; the Class 1E design would separate at the breakers to the Class 1E switchgear. If the ultimate goal is separation of the Class 1E from the open phase fault, statements in Section B related to design should use the term "Class 1E" instead of "important-to-safety", "ESF", or others.
3	General	The term "important-to-safety" is used repeatedly throughout the document. Need to define what this term applies to.	Define "important-to-safety".	Defining this term will ensure compliance with the intent of the document.
4	B	Main transformers are not typically part of normal plant alignment to feed Class 1E buses from offsite power (backfeed). This is mainly done in Mode 5 and 6 while the unit is in an outage.	Add provision in Section B to allow exclusion of main transformer protection where backfeed is not part of normal plant alignment. Additional surveillances may be needed when in backfeed to ensure an open phase condition does not affect Class 1E buses.	Backfeeding the main transformers is not typically part of normal plant alignment and only occurs for limited periods of time (3-4 weeks over unit outage). Equipment loading during this operating period is usually in the low MVAs.

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5	B	Need to structure the BTP to clearly define the requirements for a Safety-Related Solution versus non-Safety Related solution.	Safety-Related Solution • Protection at the Class 1E buses alone is adequate in response to expected transients from an Open Phase Condition. • There is no requirement for open phase detection, only Class 1E bus protection against an Open Phase Condition. Non-Safety Related Solution • It is acceptable to use a single reliable technology to provide detection and protection on the high side of the transformer. Diversity is not required to address common cause software failures since failure of the device will not directly place the unit in an unanalyzed condition – multiple failures would be required. It is at the discretion of the licensee to provide redundant solutions with coincident logic to minimize spurious trips of the offsite power source.	The requirements for Safety-Related and non-Safety Related needs to be clear as well as how the solution integrates with the I&C requirements such as diversity and common cause failures.
6	B	Long-term requirements are not included	It is acceptable for the licensee to implement compensatory measures at any time that the protection system is not functional. These compensatory measures would be in place during circumstances such as troubleshooting, repair or transformer replacement where a monitoring period is needed prior to placing the trip circuitry into service.	There needs to be consideration for how we handle this requirement in the future.
7	B.(i)	The first sentence assumes a GDC-17 plant.	Eliminate discussion of two physically independent circuits.	The mention here of the detail that GDC-17 requires two circuits is not necessary to the point of the paragraph, which is to identify the types of open phase faults to be addressed.
8	B.1.I	Need to reword the sentence for clarity on what is required to be detected for sites planning to install safety-related relays on the Class 1E switchgear.	Reword the paragraph to read: "Under all operating electrical system configurations and loading conditions detection circuits should be able to identify the effects of an open phase fault which would prevent the functioning of Class 1E equipment."	A design that installs phase voltage imbalance relays on the Class 1E switchgear and fully protects the Class 1E equipment from phase imbalances, may not be able to detect all open phase faults on the high voltage side of an offsite power circuit. In this case, the "effects of an open phase fault which could prevent functioning of Class 1E equipment" is what could be detected.

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9	B.1.I	The paragraph states that open phase detection is required "unless it can be shown that the open phase condition does not prevent functioning of important-to-safety SSCs". **From Comment 10:** Recommend that the introductory paragraph of the Branch Technical Position be reworded as follows:	Add a specific clarification to exempt further action if function can be maintained. See comment 10 below. **From Comment 10:** Electric power from the transmission network to the onsite electric distribution system is supplied by two physically independent circuits. The design of the electrical system should address open circuit faults on high voltage side of the transformer(s) connecting the transmission system to the plant onsite electric distribution system. The design should address the following types of open circuits under both unloaded and loaded operating conditions of the transformer(s): • Any phase opened; • Any phase opened and solidly grounded; • Any phase opened and impedance grounded; • Any two phases opened; • Any two phases opened, one of which is solidly grounded; and • Any two phases opened, one of which is impedance grounded. If it can be shown that the open phase condition does not prevent functioning of Class 1E SSCs, no further action is required. Otherwise, the following criteria should be satisfied.	If continued function can be demonstrated, no further action of any kind is required. **From Comment 10:** For clarity and completeness

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10	B Introduction	Recommend that the introductory paragraph of the Branch Technical Position be reworded as follows: **From Comment 9:** The paragraph states that open phase detection is required "unless it can be shown that the open phase condition does not prevent functioning of important-to-safety SSCs".	Electric power from the transmission network to the onsite electric distribution system is supplied by two physically independent circuits. The design of the electrical system should address open circuit faults on high voltage side of the transformer(s) connecting the transmission system to the plant onsite electric distribution system. The design should address the following types of open circuits under both unloaded and loaded operating conditions of the transformer(s): • Any phase opened; • Any phase opened and solidly grounded; • Any phase opened and impedance grounded; • Any two phases opened; • Any two phases opened, one of which is solidly grounded; and • Any two phases opened, one of which is impedance grounded. If it can be shown that the open phase condition does not prevent functioning of Class 1E SSCs, no further action is required. Otherwise, the following criteria should be satisfied. **From Comment 9:** Add a specific clarification to exempt further action if function can be maintained.	For clarity and completeness (including Comment 9 above). **From Comment 9:** If continued function can be demonstrated, no further action of any kind is required.

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11	B.1.I	Recommend rewording as follows: **From Comment 9:** The paragraph states that open phase detection is required "unless it can be shown that the open phase condition does not prevent functioning of important-to-safety SSCs". **From Comment 10:** Recommend that the introductory paragraph of the Branch Technical Position be reworded as follows:	An open phase condition should be automatically detected and alarmed in the control room. Detection circuits for the open phase condition should be sensitive enough to identify an open phase condition under all operating electrical system configurations and loading conditions for which they are required to be operable. **From Comment 9:** Add a specific clarification to exempt further action if function can be maintained. **From Comment 10:** Electric power from the transmission network to the onsite electric distribution system is supplied by two physically independent circuits. The design of the electrical system should address open circuit faults on high voltage side of the transformer(s) connecting the transmission system to the plant onsite electric distribution system. The design should address the following types of open circuits under both unloaded and loaded operating conditions of the transformer(s): • Any phase opened; • Any phase opened and solidly grounded; • Any phase opened and impedance grounded; • Any two phases opened; • Any two phases opened, one of which is solidly grounded; and • Any two phases opened, one of which is impedance grounded. If it can be shown that the open phase condition does not prevent functioning of Class 1E SSCs, no further action is required. Otherwise, the following criteria should be satisfied.	For clarity and completeness (including Comments 9 and 10 above). **From Comment 9:** If continued function can be demonstrated, no further action of any kind is required. **From Comment 10:** For clarity and completeness

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12	B.1.II	This section applies to both non-safety related and Class 1E, yet the text provides details specific only to a non-safety related design.	Reword the paragraph to read: "The design of the actuation circuit should minimize misoperation, maloperation, and spurious actuation."	Dual sensors are not needed for a Class 1E design, which would be similar to the degraded voltage relay with two out of three logic built off individual phase potential transformers. Independent sensing for each relay in the 2/3 scheme is not required for Class 1E designs. Since the details of sensors and logic is discussed in separate Class 1E and non-Class 1E subsections in B.1.V(3), no information is lost by truncating this sentence.
13	B.1.II	A design with relays installed on the Class 1E switchgear would not need to coordinate with transmission system protective relays.	Reword the sentence to read: "These devices must be coordinated with other power system protective relays (short circuit fault protection, overcurrent relays, etc.)."	It appears this detail came out of the NEI Initiative, which does not address Class 1E installations. The sentence works just as well without the specifics of what other protective relays need to be coordinated with.
14	B.1.II	Paragraph B.1.II (Actuation Circuits) is, for all intents and purposes, the same subject matter as existing Paragraph B.1.V (Protective Actions).	Recommend combining the subject material into one section and deleting the other section.	For clarity and to ensure consistency.

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15	B.1.III	The first sentence assumes a GDC-17 plant. Need to account for non-GDC-17 plants. Having "detection" and "actuation" together in the sentence is confusing. It would also be helpful to add clearly what is being actuated for the Class 1E design. **From General Comment:** Three terms are used in Section B to identify what is being protected: important-to-safety, Class 1E, and ESF. The use of all these terms when referring to a design for electrically separating specific equipment makes the Branch Technical Position unnecessarily confusing.	Reword the sentence to read: "Class 1E detection at the Class 1E switchgear with actuation circuits that separate the open phase fault at the Class 1E switchgear incoming circuit breakers meets the applicable requirements of GDC 17 (or similar principal design criteria specified in the UFSAR)." **From General Comment:** Throughout Section B, replace the term "important-to-safety " and "ESF" with "Class 1E".	Include the qualifier for non-GDC-17 plants used in other areas of the Branch Technical Position. Use the term "Class 1E switchgear" instead of "ESF bus" (see General comment). Split detection and actuation in the sentence for clarity. **From General Comment:** When discussing the design of systems to address an open phase fault in Section B, the ultimate focus is ensuring the fault does not adversely affect the functioning of Class 1E SSCs. The design would do this by separating the fault from the Class 1E switchgear. This is similar to degraded grid relays that protect only Class 1E buses. The non-safety related design would separate at the switchyard breakers; the Class 1E design would separate at the breakers to the Class 1E switchgear. If the ultimate goal is separation of the Class 1E from the open phase fault, statements in Section B related to design should use the term "Class 1E" instead of "important-to-safety", "ESF", or others.

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16	B.1.III	The stated purpose of the draft BTP is to "address loss of one of the three phases of the independent circuits on the high voltage side of a transformer connecting an offsite power circuit to the transmission system under all operating electrical system configurations and loading conditions" (reference Paragraph B(i)). This is acknowledged to be a newly recognized design vulnerability and gap in Licensee design bases across the operating fleet. This identified failure location is explicitly in the non-safety portion of the plant auxiliary power distribution system. The safety related plant Class 1E buses are downstream of this location.	The BTP should explicitly acknowledge the infeasibility of downstream, safety-related circuits for open phase detection and protection as defined in the BTP.	The Industry has aggressively pursued technical solutions to this issue. NRC has publicly acknowledged the Industry's aggressive approach. Nonetheless, the Industry has not been able to identify any downstream detection systems that can detect the stated purpose of open phase "under all operating electrical system configurations and loading conditions". Systems based on devices such as the ABB 60Q, Phase Unbalance Relay, may add to and enhance load equipment protection, but they cannot detect open phases "under all operating electrical system configurations and loading conditions". This has been recently been demonstrated by the test TVA performed at their Bellefonte Station. As witnessed by NRC and reported at the June 4, 2014 Public Meeting, the voltage unbalance on the downstream bus was monitored as below 1% with light transformer load. This unbalance is within nominally accepted values. It would not be an appropriate setpoint to initiate either alarm or protection functions. Further, existing Paragraph B.1.I (Detection and Alarm) requires detection circuits address the "functioning of important-to-safety SSCs" (emphasis added). This ambiguously defined term inherently includes non-safety equipment upstream of the safety-related Class 1E buses. This upstream equipment cannot be addressed by downstream detection or protection.
17	B.1.III	In lieu of open phase detection, this newly recognized design vulnerability and gap in Licensee design bases might be alternatively defined and addressed by enhanced protection on the safety-related Class 1E buses similar to the sustained, degraded voltage protection systems.	The BTP should decouple the enhanced protection alternative from the explicit open phase detection / protection criteria.	While we are unaware of any cost benefit analysis of such an approach, a Licensee might voluntarily consider and approach the concern in this way.
18	B.1.III	Paragraph pertains to all the Detection, Alarm and Actuation (Protection) circuits.	Recommend promoting this subject to the position of the first subparagraph and renumbering the succeeding subparagraphs.	For clarity and to ensure consistency.

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19	B.1.IV	Paragraph pertains to documentation and not system requirements.	We recommend that Paragraph B.1.IV, Updated Final Safety Analysis Report, be moved down the text until after the discussion all technical criteria are completed.	For clarity and to ensure consistency.
20	B.1.V	This section references protection for ITS equipment. A Class 1E solution will not protect ITS equipment.	Clearly define equipment to be protected by a Non-Class 1E vs. a Class 1E solution. This should also be applied to section B.3, Considerations for Protective Devices for Alarm and Trip Functions.	A Class 1E solution will not protect ITS equipment. Applicability for Non-Class 1E systems vs. Class 1E systems should be defined to avoid installation of numerous systems.
21	B.1.V	Automatic protection needs to be defined.	Automatic protection is required for Safety-Related SSCs. For non-Safety Related SSCs, periodic surveillances, alarms or other means may be used.	The scope of equipment that needs to be protected by automatic actuation circuits needs to be clearly defined
22	B.1.V(1)	The subsection a, b, c, d seemed to be grouped with an "and" (a and b, c and d) yet they are all separated by semicolons.	If these groupings are on purpose, the purpose should be explained in the section.	
23	B.1.V(1)	Depending on the electrical system configuration and loading, the criteria of existing Paragraph B.1.V(1) (a. and b.) may not be met.	Recommend revising this paragraph to acknowledge the expected protective actions.	Plants which carry more than light load on their offsite power transformers during power operation (and all plants during starting up and shutting down), will have to apply a protective function to meet Criterion (c). This will typically be the trip of the affected offsite power transformer through its existing transformer protection. The onsite power supplies, i.e., the EDGs, will subsequently start. Non-safety related, important-to-safety equipment is typically not powered by the EDGs. Under Criterion (a), the function of the non-safety related, important-to-safety equipment will be interrupted until the equipment can be realigned and restarted. (Operation of the load protection is not expected. The equipment restart is specifically expected from the loss of the power supply.) Under Criterion (b), any plant that powers reactor coolant or reactor recirculation pumps from the affected transformer will likely suffer a plant trip transient.
24	B.1.V(1) a, b, c	ITS equipment function will be affected by actuation of Non-Class 1E protective devices. These loads are not generator backed. These protective features should protect ITS equipment from damage.	Revise section to remove implication that additional power sources (generators) would be required should actuation of protective features occur.	ITS equipment is typically not generator backed, and will not continue to function if offsite power is lost.

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25	B.1.V(1)/(2)	This is confusing to have different criteria and actions for whether or not an accident signal is present.	Eliminate the mention of whether an accident condition signal is or is not present. (1)a, b, c, d and (2)b (reworded) would apply to all designs at all times. Replace this section with the following: "The licensee/applicant should demonstrate that the following design requirements are met following an open phase fault. The analyses should include all design and licensing basis assumptions including single failure criterion. a. The function of Class 1E equipment is not adversely affected, b. An abnormal operating occurrence, transient, event, or accident (e.g., RCP seal failure) is not created as a result, c. Class 1E equipment is not damaged or prevented from operating due to the activation of protective devices, d. Safe Shutdown capability is not compromised for all operating and anticipated operational occurrences, and e. All design basis accident acceptance criteria and GDC-17 (or equivalent criteria) are met. If any of these cannot be met, a scheme to detect the open phase fault shall be implemented into the plant design. The design of the scheme shall include automatic detection of the fault and actuation of appropriate circuit breakers to separate the Class 1E equipment from the fault. Either the scheme or existing design features should be used to then ensure transfer of the Class 1E loads to alternate power sources to ensure that safety functions are preserved, as required by the current licensing bases."	The purpose for having this signal/no-signal language in the NEI Initiative was to allow the tripping activation circuit to be bypassed or not required unless the plant is in the middle of an accident. Initially this was specifically made to allow standby transformers not to have to detect an open- phase fault if the transformer was unloaded. This was needed at the time because the first design at a plant could not detect an open phase fault (OPF) on an energized but unloaded transformer. Now, a year or so later, technology has advanced and OPF protection schemes are available that make this detection possible. This logic was also built based on a specific plant design. It is time to rethink this section. The Bellefonte open phase test showed that it is possible for all equipment to be started and be fully functional given a specific type of OPF. If Bellefonte were an operating plant and they could demonstrate they still meet all the necessary criteria, it would be prudent to let them alarm only for these demonstrated faults, since no operations would be immediately at risk, and let operators provide an orderly path to restoration of the situation. Instead of this complex arrangement, a simpler setup is proposed that provides the basic criteria that should be met in all cases, no matter what. That is, when an OPF occurs, what functions need to be maintained and what situations do we make sure are not created by the OPF. It should be up to the plant to demonstrate what will happen when different OPFs occur and how they will maintain the critical functions listed in this section. Plant specific OPF protection schemes may or may not include logic integration with an accident signal. This greatly simplifies the layout of this section and will help users understand how to apply it to their designs and analyses.

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26	B.1.V(2)(b)	Paragraph essentially duplicates the discussion of continued function as discussed in Comment 9 above. **From Comment 9:** The paragraph states that open phase detection is required "unless it can be shown that the open phase condition does not prevent functioning of important-to-safety SSCs".	Recommend that this point be incorporated into the resolution of Comment 9 and be removed from here. **From Comment 9:** Add a specific clarification to exempt further action if function can be maintained.	For clarity and to ensure consistency. **From Comment 9:** If continued function can be demonstrated, no further action of any kind is required.
27	B.1.V(3)	It is confusing to discuss voltage and current "sensors" when talking about medium voltage or high voltage power system circuits.	Reword the sentence to read: "The voltage or current transformers used for open phase fault detection should be designed for..."	When talking about medium voltage or high voltage power system circuits these "sensors" are known to power system engineers as potential transformers (PTs) and current transformers (CTs). These more descriptive and familiar terms should be used in the Branch Technical Position.
28	B.1.V(3)	There is no section differentiation between the Class 1E subsection and the non-Class 1E subsection.	Add subsection numbers, and possibly even headings, to separate the Class 1E subsection and the non-Class 1E subsection.	Section numbers and headings will make it easier to locate specific materials in the Branch Technical Position and to refer to them in station documents.
29	B.1.V(3)	Paragraph B.1.V.(3) is not clearly structured. The first unnumbered introductory paragraph implies its applicability to the first set of Criteria (i.) through (vi.) apparently for the Class IE circuits. The second two unnumbered paragraphs appear similarly related to the second set of Criteria (i.) through (vi.) apparently for the non-Class IE circuits.	This paragraph should be clarified.	For clarity and to ensure consistency.
30	B.1.V(3)	We do not agree with the application of or reference to 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), "Protection Systems" as stated in the second, unnumbered paragraph of Paragraph B.1.V.	Remove all references to 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), "Protection Systems"	This has been addressed Industry-wide under separate cover.
31	B.1.V(3)	The small Roman numeral bullets in this paragraph appear to be explicit criteria for meeting the 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3) criteria.	While we do not agree with the application of or reference to 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), if it was the intent of the BTP to define these as acceptable methods of compliance, the BTP should so explicitly state.	For clarity and to ensure consistency.

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32	B.1.V(3)	The draft wording could imply that independent sensors are required to provide input to each coincident relay (logic) device. For a protective device such as the ABB 60Q that requires 3 phase voltages to determine unbalance, this could require 9 medium voltage potential transformers (PTs).	While we do not agree with the application of or reference to 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), recommend clarifying this paragraph to permit the use of common sensors to independent relay (logic) device.	While this is theoretically possible, space considerations inside the Class 1E buses make this many PTs highly impractical and potentially less reliable.
33	B.1.V(3)	The second set of Criteria (i.) through (vi.) (implicitly the non-safety circuits), Criteria (ii.) and (iii.) may not be consistent.	While we do not agree with the application of or reference to 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), recommend clarification as to the acceptable criterion.	Detection and alarm functions will be provided by the same devices (relays) as circuit actuation / protection. Independent dual detection and coincident logic per 10 CFR 50.55a (h)(2) or 10 CFR 50.55a(h)(3), "Protection Systems", are not the same.
34	B.1.V(3) Class 1E iv	It is not clearly stated what devices are being tripped. The sentence includes terms that are not the usual terms with discussing power system protection. The "setpoints" for protective relays includes the time delay limits.	Replace sentence with: "Whenever the open phase fault protective relay setpoints have been exceeded, automatic separation from the offsite power source should be initiated by opening the incoming Class 1E switchgear circuit breakers."	The circuit breakers to be opened upon actuation by the protective relays on the Class 1E buses should be stated for clarity. Since the action is protecting the Class 1E equipment, the incoming circuit breakers to the Class 1E switchgear would be opened to separate from the offsite power source. Terms normal to power system protection should be used to ensure clear understanding by the users of the Branch Technical Position.
35	B.1.V(3)iv	Is the intent of the statement to disconnect all 1E equipment from the open phase or disconnect all safety AND non-safety loads from the open phase?	The open phase protective devices should automatically isolate the safety bus	Based on Line 1 of the same section it appears the intent is to protect the loads fed from the Class 1E switchgear.
36	B.1.V(3)v	Why does testing and calibration need to occur at power.	Capability for test and calibration should be provided.	This type of maintenance is normally an outage activity to prevent spurious trips due to errors.
37	B.2.II	This section states "If open phase condition actuation circuits are required...". This section needs to define when these circuits would be required.	Define criteria to determine when actuation circuits would be required.	Define criteria to determine when actuation circuits would be required.
38	B.3	Heading and the lead-in sentence for this section does not really describe what is in it.	Replace the heading and lead-in sentence with: "Considerations for Supporting Analyses" "This section provides considerations related to the analyses that may be needed to support verification of the design of an open phase protection scheme:"	A cleaner heading and lead-in help understanding by the user of the Branch Technical Position.

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39	B.3	If a solution was presented that has protection at the Class 1E bus level that looks at the loads and is based upon their voltage unbalance capabilities and not specifically the open condition, what would be the Analysis Requirements?	Add additional section(s) for analysis requirements for Class 1E solution that is focused on Equipment Voltage Unbalance capabilities. This section would detail if full analysis (what is already called out for Open Phase Condition - Section 5.3) needed or analysis for settings for Relays at the Class 1E level.	If the solution at the Class 1E bus level focuses on Equipment Capabilities for Voltage Unbalance the cause of the unbalance could be more than just Open Phase. The solution would monitor for protection of the equipment and would not be focused specifically on Open Phase.
40	B.3.a.	In the last sentence, using "shall" is out of place when discussing items to consider and it may also unnecessarily restrict future analysis advancements.	Replace sentence with: "For transformers, the effects of an embedded winding, no-load current and losses, transformer type (core and shell), and inter-phase A, B, C mutual coupling, including zero-sequence should be included, or bounding parameters should be established."	The whole purpose of this section appears to be to provide information to help the user perform any needed analyses, so the information should not include prescriptive requirements. Also, methods for determining bounding parameters for analysis purposes may be developed in the future. Acknowledgement of this in the Branch Technical Position will not unduly restrict the user.
41	B.3.b.	Use of the adjective "major" is selecting only part of the population to protect and does not explain why partial protection is sufficient.	Replace sentence with: "Establish the capability of the Class 1E equipment to withstand unbalanced voltage/current conditions expected during various operating and loading conditions."	The word "major" should be deleted since it implies that only a portion of the population of equipment needs to be considered when determine withstand to phase imbalances. Also, here is a place where the subject should be Class 1E equipment rather than important-to-safety components, since a Class 1E scheme will only separate Class 1E equipment from the faulted offsite source.
42	B.3.c.	Establish the limitations of existing protective devices may not be necessary for all open phase protective schemes.	Replace sentence with: "Coordinate with existing protective devices for various operating and loading conditions with an open phase fault on each phase."	Changing the language to "coordinate with" will be clearer for what is needed. The limitations of the existing devices may or may not need to be determined. Also need to replace "condition" with "fault".