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INDIANA MICHIGAN POWER

October 16, 2002
AEP:NRC:2332
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

SUBJECT: Donald C. Cook Nuclear Plant Unit 2
Docket No. 50-316
License Amendment Request to Revise Loss-of-Voltage and Degraded Voltage Setpoints

REFERENCE:
1. Letter from R. C. Godley, Indiana Michigan Power Company, to U. S. Nuclear Regulatory Commission Document Control Desk, "Short Term and Planned Long Term Enhancements to the Electrical Distribution System, (TAC Nos. MA6799 and MA6800)," submittal C0500-06, dated May 4, 2000

2. Letter from John F Stang, Nuclear Regulatory Commission, to A. Christopher Bakken III, Indiana Michigan Power Company, "Donald C. Cook Nuclear Plant, Unit 1 – Issuance of Amendment (TAC No. MB3499)," dated April 19, 2002

Dear Sir or Madam

Pursuant to 10 CFR 50.90, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant Unit 2, proposes to amend Appendix A, Technical Specifications (TS), of Facility Operating License DPR-74. I&M proposes to revise TS Table 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints." The proposed changes are part of a planned design change to replace the existing 4160 volt (4kV) offsite power transformers, loss-of-voltage relays, and degraded voltage relays with

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components of an improved design to increase the reliability of offsite power for safety-related equipment. The TS changes are as follows:

- I&M proposes to change the 4kV bus loss-of-voltage trip setpoint and allowable values for both the motor driven auxiliary feedwater pumps and the loss-of-power functional units. I&M proposes to change the 4kV bus degraded voltage trip setpoint, time delay, and allowable values for the loss-of-power functional unit.

- I&M proposes to revise the TS 3/4.3.1 and 3/4.3.2 bases to explain the applicability of the time delay associated with the 4kV bus degraded voltage trip setpoint.

- I&M proposes to make format changes to the affected TS page that improve appearance but are not intended to introduce other changes. These format changes have already been made to the affected TS bases page.

Enclosure 1 provides an oath and affirmation affidavit. Enclosure 2 provides a detailed description and safety analysis to support the proposed changes, including the 10 CFR 50 92(c) evaluation, which concludes that no significant hazard is involved, and the environmental assessment. Attachment 1 provides the marked up TS pages Attachment 2 provides the proposed TS pages with the changes incorporated.

I&M requests approval of this request by February 1, 2003, to support installation of a planned design change. I&M requests implementation prior to the start of Operating Cycle 14. U. S. Nuclear Regulatory Commission (NRC) approval of this request is a necessary prerequisite for I&M to fulfill its commitment in Reference 1 that stated, "A re-evaluation of the electrical distribution systems [*sic*] design and licensing bases will be completed during the development of the modifications to install the auto load tap change transformers. . . . License Amendment requests and/or additional modifications identified from this review will be timed for implementation in coordination with NRC, as necessary, to correspond to the installation of the transformers " This request is similar to the request approved for Unit 1 in Reference 2.

No pending amendment requests affect the TS pages that are submitted in this request. If any future submittals affect these TS pages, I&M will coordinate the changes to the pages with the NRC Project Manager to ensure proper TS page control when the associated license amendment requests are approved.

This amendment request contains no new commitments. Should you have any questions, please contact Mr. Brian A. McIntyre, Manager of Regulatory Affairs, at (269) 697-5806.

Sincerely,

J. E. Pollock
Site Vice President

RV/bjb

Enclosures:
1 Affidavit
2 Evaluation of the Proposed Changes

Attachments
1 Technical Specification Pages Marked To Show Proposed Changes
2 Proposed Technical Specification Pages

c: K. D. Curry, Ft. Wayne AEP, w/o enclosures/attachments
J. E. Dyer, NRC Region III
MDEQ – DW & RPD, w/o enclosures/attachments
NRC Resident Inspector
J. F. Stang, Jr., NRC Washington, DC
R. Whale, MPSC, w/o enclosures/attachments

bc: A. C. Bakken III
D. M. Burgoyne
M. J. Finissi
S. A. Greenlee
D. W. Jenkins, w/o enclosures/attachments
J. A. Kobyra, w/o enclosures/attachments
B. A. McIntyre, w/o enclosures/attachments
J. E. Pollock
M. K. Scarpello, w/o enclosures/attachments
T. R. Stephens
T. K. Woods, w/o enclosures/attachments

AFFIRMATION

I, J. E. Pollock, being duly sworn, state that I am Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

American Electric Power Service Corporation

J. E. Pollock
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 11e DAY OF October, 2002

Jennifer L Kernosky
Notary Public

My Commission Expires 5/26/05

JENNIFER L KERNOSKY
Notary Public, Berrien County, Michigan
My Commission Expires May 26, 2005

Application for Amendment
License Amendment Request to Revise Loss-of-Voltage and Degraded Voltage Setpoints

1.0 DESCRIPTION

Pursuant to 10 CFR 50.90, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Unit 2, proposes to amend Appendix A, Technical Specifications (TS), of Facility Operating License DPR-74. I&M proposes to revise TS Table 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints." The proposed changes are part of a planned design change to replace the existing 4160 volt (4kV) offsite power transformers, loss-of-voltage relays, and degraded voltage relays with components of an improved design to increase the reliability of offsite power for safety-related equipment.

2.0 PROPOSED CHANGE

I&M proposes to revise TS Table 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints," to lower the 4kV bus loss-of-voltage trip setpoint and allowable values for the motor driven auxiliary feedwater pumps and the loss-of-power functional units. The proposed trip setpoint is 3241 volts with allowable values of greater than or equal to 3195 volts and less than or equal to 3280 volts.

I&M proposes to revise TS Table 3.3-4 to raise the 4kV bus degraded voltage trip setpoint and allowable values, and to decrease the time delay for the loss-of-power functional unit. The proposed trip setpoint is 3959 volts with allowable values of greater than or equal to 3910 volts and less than or equal to 4000 volts. The proposed time delay for the degraded voltage trip is 9 seconds ± 0.25 seconds. The proposed time delay will apply only when a steam generator level low-low or a safety injection signal is present.

I&M proposes to revise the TSs 3/4.3.1 and 3/4.3.2 bases to explain why the proposed time delay only applies when a steam generator low-low level or a safety injection signal is present.

In addition, I&M proposes four types of format changes to the revised TS Page 3/4 3-25a. The types of changes to be applied are:

1. Allowable values are presented as a range and minor wording changes have been made for improved readability.

2. Reformat the header to include numbered first and second tier TS section titles and a full-width single line to separate the header section titles from the page text

3. Reformat the footer to include "Page (page number)" center page, "AMENDMENT (past amendment numbers, with strikethrough, and ending with the current amendment number)" on the right side of the page, and a full-width single line to separate the footer from the page text.

4. Change the font.

3.0 BACKGROUND

The 4kV electrical distribution system provides power to the station auxiliaries. During operation, the 4kV buses are energized from the main generator through the unit auxiliary transformers. During startup or shutdown, the 4kV buses are energized from the preferred offsite power source through the reserve auxiliary transformers.

Loss of voltage to the 4kV buses is sensed by the loss-of-voltage relays. Upon sensing a loss of voltage, the master relays automatically start the emergency generators, trip the normal feed circuit breakers for the 4kV buses, and trip motor feeder breakers and 480 volt and 600 volt breakers.

In order to prevent an unexpected degradation of the offsite power grid from reducing the safety bus voltage beyond equipment ratings while the preferred offsite power source is in use, special relaying has been installed to disconnect the safety buses and automatically transfer them to the site emergency generators. The setpoint and time delay settings established for these relays are chosen to avoid spurious tripping from an adequate offsite power grid during transient voltage disturbances.

TS Table 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints," specifies the 4kV-bus loss-of-voltage trip setpoint for the motor-driven auxiliary feedwater (AFW) pumps and the loss-of-power functional units. Presently, the loss-of-voltage trip setpoint specified is 3280 volts with a two-second time delay, and the allowable value is 3280 ± 120 volts with a 2 ± 0.2 second time delay. This table also specifies the 4kV bus degraded voltage trip setpoint for the loss-of-power functional unit. The degraded voltage trip setpoint is presently specified as 3638 volts with a 2.0-minute time delay, and the allowable value is 3638 ± 60 volts with a 2.0-minute ± 6-second time delay.

The current setpoints were based on an electrical auxiliary bus voltage analysis that considered the auxiliary system loading for the operating period from 1985-1990. The results of that study were based on a nominal (100%) bus voltage. This analysis indicated a minimum possible steady-state bus voltage of 92.7%, and the minimum transient bus voltage of 87.3%.

The maximum 4kV bus degraded voltage trip setpoint allowable value is 3698 volts, which is 92.45% of nominal bus voltage. This setpoint is below the minimum conservatively calculated steady-state bus voltage of 92.7%, and was selected to avoid spurious actuation of the degraded grid voltage relays.

The maximum 4kV bus loss-of-voltage trip setpoint allowable value is 3400 volts, which is 85% of the nominal bus voltage. This setpoint is below the minimum calculated transient bus voltage of 87.3% and was selected to avoid spurious actuation of the loss-of-voltage relays.

The present 4kV bus loss-of-voltage setpoint ranges are based on an engineering review of "as found" undervoltage relay calibration data collected between June 1981 and June 1988 together with the results of a voltage requirements analysis. The results of the engineering review showed that the loss-of-voltage relay "as found" trip setpoints had been within ±3% of the nominal trip setpoint in all but a few calibrations. As such, the allowable values span of ±120 volts (±3%) was selected for the 4kV bus loss-of-voltage relays.

The 4kV bus degraded voltage relays range of ±60 volts (±1.5%) was selected such that this range, coupled with an increased calibration frequency, would allow the present relays to remain within the range of allowable values.

The two-minute time delay in the degraded voltage protection circuit is based on being long enough to prevent disconnecting the offsite power source due to short, inconsequential grid disturbances or voltage dips caused by starting large motors. It is also based on being short enough to prevent failures of the safety-related equipment due to running with inadequate voltage.

4.0 TECHNICAL ANALYSIS

The proposed TS changes are part of a planned design change to replace the existing 4kV offsite power transformers (reserve auxiliary transformers [RATs]) and degraded voltage relays with components of an improved design. These changes are needed to increase the reliability of offsite power for safety-related equipment. The design change and TS change also address a post-restart commitment to the Nuclear Regulatory Commission (NRC). This commitment was to re-evaluate the electrical distribution system's design and licensing basis during the development of the modifications to install auto-load tap change transformers, and to time license amendment requests identified during this review so implementation can correspond to the installation of the transformers.

The existing RATs do not have auto-load tap changers. The planned design change will replace the existing RATs with load tap changing transformers. When the new RATs are used to provide auxiliary power, they will sense changes in grid voltage, and will automatically change taps to maintain the appropriate voltage at the 4kV buses.

The proposed TS revision allows the degraded voltage and loss-of-voltage relay setpoints to be changed to fully benefit from the improved protection provided by the planned design change. Due to inaccuracies inherent in the existing degraded voltage relays and their associated potential transformer circuits, the relays have a wide tolerance. Consequently, spurious trips could occur if the existing relays were set any higher. The design change will replace the degraded voltage relays with relays of an improved design, allowing the degraded voltage trip setting to be increased to maintain voltage above the analytical limit, 3902 volts. The analytical limit is the value at which all safety-related loads have sufficient voltage to perform their intended safety function

The design change will also replace the loss-of-voltage relays with relays of an improved design. This allows the loss-of-voltage relay setpoints to be low enough to prevent spurious tripping, while still maintaining voltage high enough to ensure all safety-related loads have sufficient voltage to perform their intended safety function.

The proposed loss-of-voltage relay setpoint and the range of allowable values are based on ensuring the setting is low enough to prevent spurious actuation during the voltage transient caused by motor starting conditions, yet high enough to ensure safety-related equipment will perform as required by the safety analysis. The criteria used to determine the setpoint included:

- Preventing running Class 1E motors from stalling.
- Ensuring any load can be started without damaging loads that are already running.
- Preventing load shedding due to thermal overloads/relaying.

The proposed loss-of-voltage setpoint value, 3241 volts, is equal to 78% of 4160 volts with an allowable value range of 3195 volts to 3280 volts (77% to 79% of 4160 volts). The setpoint value is higher than the value suggested in the bases for NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 2, dated April 30, 2001, (e.g., 75% of 4160 volts), but it is based on a plant-specific calculation.

The time delay for the loss-of-voltage relay is maintained at 2 seconds with a tolerance of ± 0.2 seconds. The 2-second time delay was chosen to bypass short duration system voltage drops and to function in sufficient time to allow the protective actions initiated by the loss-of-voltage relay to meet the accident analysis equipment start times.

The proposed degraded voltage setpoint is based on a voltage response analysis. It was selected to ensure all safety-related loads have sufficient voltage to perform their intended safety function. The criteria used to determine the setpoint included:

- Providing degraded voltage and time delay setpoints that support the voltage requirements of the Class 1E loads at all onsite system distribution levels (i.e., 4kV and 600V).
- Providing minimum continuous running voltage (nominally 90% of nameplate) to Class 1E motors on the emergency buses.

Although the analytical limit was determined to be 3902 volts, a higher value of 3910 volts is used to bound the low end of the allowable value range for the degraded voltage setpoint and to provide margin for future load changes.

The proposed time delay for the degraded voltage relay is based on setting the delay short enough to allow safety-related equipment to operate within the assumptions of the safety analysis, but long enough to avoid spurious operation of the relay. The proposed 9-second time delay only applies when a safety injection signal or a steam generator low-low level signal is present. This time delay supports the safety analysis assumptions for safety-related equipment operation The time delay associated with the voltage changes by the new automatic load tap changing transformers has been considered in the proposed 9-second delay determination.

The longer degraded voltage time delay remains the present value of 2 minutes, and is applicable during non-accident conditions. It will continue to prevent unnecessary disconnecting of the offsite power source due to short, inconsequential grid disturbances and prevent unnecessary challenges to safety systems of the unit.

The proposed setpoint and time delay values were determined by a plant-specific calculation using the methodology provided in, "IEEE Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations," IEEE Std 741-1997. The calculation considers the errors associated with the circuit that monitors the voltage at the 4kV safety-related switchgear. It also reflects factors associated with the design change, which includes replacing the existing relays with new relays furnished with internal harmonic filters. The accuracy of the relays and associated components, as well as the tolerances associated with setting the relays, have been considered.

In addition to the protection provided by the loss-of-voltage relays and the degraded voltage relays, I&M has established provisions to monitor and maintain adequate switchyard voltages and to respond in the event that the switchyard voltages drop below the minimum acceptable levels. For added assurance that all essential loads can adequately perform their design functions, an interface agreement between the American

Electric Power (AEP) Energy Delivery and Customer Relations Group and the AEP Nuclear Generation Group has been developed, a real-time switchyard voltage monitoring computer program has been developed, and response procedures have been developed.

The interface agreement provides guidance to ensure that the organizations responsible for operation, maintenance, and engineering consider the impact of their activities on facilities located at CNP and on the AEP transmission system. Specifically, the interface agreement contains a provision that system control center personnel monitor system conditions to ensure that adequate voltage levels to support the CNP in the event of an accident are maintained.

Switchyard voltages are monitored on the CNP Online Load Flow (CKOLF) computer program, which is a real-time state-estimator/load-flow computer program. CKOLF determines the expected voltage levels at the switchyard assuming a CNP one-unit trip (if only one unit is operating) or a CNP two-unit trip (if both units are operating). The program provides an alarm to the AEP Transmission Coordinator (AEPTC) if the expected switchyard voltage is not within the acceptable limits. A special operating procedure, "Cook Nuclear Plant Transmission/Auxiliary Voltage Operating Guide," is followed by the APTEC. This procedure provides directions for the AEPTC to respond to switchyard voltage conditions outside of the limits acceptable to CNP as indicated by an alarm. The APTEC's required actions include notifying CNP Unit Supervisors of the switchyard voltage conditions and also taking immediate compensatory actions to restore voltage levels with acceptable limits. Additionally, CNP has an operating procedure, "Degraded Offsite AC Voltage Response," that provides directions for responding to degraded switchyard voltage conditions.

The proposed bases change explains that the proposed time delay for the 4kV bus degraded voltage setpoint presented in the TS is to protect the plant during situations addressed in the safety analysis in Chapter 14 of the Updated Final Safety Analysis Report. A longer time delay that is not included in the TS will apply when neither a steam generator low-low level nor a safety injection signal is present. The longer degraded voltage time delay will be included in an owner-controlled document instead of the TS. This is consistent with NUREG-1431, Revision 2, and its bases.

The proposed changes allow the loss-of-voltage relays and the degraded voltage relays to act in concert to assure that electrical equipment powered by the 4kV bus will perform its safety function if a loss-of-offsite power or a degraded voltage condition were to occur. The changes to the setpoints and the time delays together with the interface agreement assure that the electrical equipment is capable of performing its function to meet the requirements of the accident analyses.

The proposed format changes are for improved readability, consistency with NUREG-1431, Revision 2, and improved appearance. The format changes are not intended to introduce other changes.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

I&M has evaluated whether or not a significant hazards consideration is involved with the proposed change by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated?

Response: No

Probability of Occurrence of an Accident Previously Evaluated

The proposed changes to the degraded voltage and loss-of-voltage setpoints and time delay affect when an emergency bus that is experiencing low or degraded voltage will trip from offsite power and shift to an emergency diesel generator. While the setpoints that initiate this action will be modified, the function remains the same. The setpoints have been analyzed to ensure spurious trips will be avoided. The proposed changes will not significantly affect any accident initiators or precursors. The format changes are intended to improve readability, consistency with NUREG-1431, Revision 2, and appearance. In addition, they do not alter any requirements. The bases change provides explanatory information only. Thus, the probability of occurrence of an accident previously evaluated is not significantly increased.

Consequences of an Accident Previously Evaluated

The proposed changes to the degraded voltage and loss-of-voltage setpoints and time delay affect when an emergency bus that is experiencing low or degraded voltage will trip from offsite power and shift to an emergency diesel generator. While the setpoints that initiate this action will be modified, they are bounded by the current safety analysis. The function of the plant equipment remains the same. The proposed changes improve the reliability of safety-related equipment to operate as designed. The format changes are intended to improve

readability, consistency with NUREG-1431, Revision 2, and appearance. In addition, they do not alter any requirements. The bases change provides explanatory information only. Thus, the consequences of an accident previously analyzed are not significantly increased.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed changes to the degraded voltage and loss-of-voltage setpoints and time delay do not affect existing or introduce any new accident precursors or modes of operation. The relays will continue to detect undervoltage conditions and transfer safety loads to the emergency diesel generators at a voltage level adequate to ensure proper safety equipment performance and to prevent equipment damage. The function of the relays remains the same. The format changes are intended to improve readability, consistency with NUREG-1431, Revision 2, and appearance. In addition, they do not alter any requirements. The bases change provides explanatory information only. Thus, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The proposed changes will allow all safety-related loads to have sufficient voltage to perform their intended safety function while ensuring spurious trips are avoided. Thus, the results of the accident analyses will not be affected as the input assumptions are protected The format changes are intended to improve readability, consistency with NUREG-1431, Revision 2, and appearance. In addition, they do not alter any requirements. The bases change provides explanatory information only. Thus, the proposed changes do not involve a significant reduction in a margin of safety.

In summary, based upon the above evaluation, I&M has concluded that the proposed changes involve no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

Branch Technical Position PSB-1 provides guidance for the development of degraded voltage relay setpoints and time delays. The value for the degraded voltage setpoint and time delay is to be determined from an analysis of the voltage requirements of the Class 1E loads at all onsite distribution levels. Additionally, two time delays, one associated with the occurrence of a safety injection actuation signal and the other associated with only a degraded voltage condition, are to be developed.

UFSAR Chapter 8 provides a description of the CNP 4kV system. CNP electrical systems are designed to ensure a supply of electrical power to all essential plant equipment during normal operation and under abnormal conditions. The plant electrical systems are redundant and include an onsite, independent, and automatically starting emergency power source, which is available to supply power to essential auxiliaries if both the normal power source and the preferred offsite power source are unavailable.

The loss-of-voltage relay setting and the degraded voltage setting, together with their associated time delays, assure that power will be available to operate the required emergency loads. The values for the settings and time delays have been chosen to assure that required safety-related equipment will be powered from the emergency power source in the event that offsite power is unavailable. Additionally, the settings prevent disconnecting from the preferred power source during momentary offsite power transients.

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, the CNP updated final safety analysis report, and approved methodologies, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATIONS

I&M has evaluated this license amendment request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. I&M has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance

requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared concerning the proposed amendment.

7.0 REFERENCES

1. Letter from Gordon E. Edison, NRC, to David A. Cristian, Virginia Electric and Power Company, "Surry Units 1 and 2 – Issuance of Amendments Re: Degraded Voltage and Loss of Voltage Setting Limits (TAC Nos. MA8520 and MA8521), dated March 12, 2001.

2. Letter from John F. Stang, NRC, to A. Christopher Bakken III, I&M, "Donald C. Cook Nuclear Plant, Unit 1 – Issuance of Amendment (TAC No. MB2499)," dated April 19, 2002.

8.0 PRECEDENCE

This submittal is similar to a license amendment that was approved by the NRC for Surrey Power Station Units 1 and 2 on March 12, 2001, (Reference 1), and it is similar to a CNP Unit 1 amendment that was approved on April 19, 2002, (Reference 2).

Attachment 1 to AEP:NRC:2332

TECHNICAL SPECIFICATIONS PAGES
MARKED TO SHOW PROPOSED CHANGES

REVISED PAGES
UNIT 2

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TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS		
a. Steam Generator Water Level-- Low-Low	Greater than or equal to 21% of narrow range instrument span each steam generator	Greater than or equal to 19.2% of narrow range instrument span each steam generator
b. 4 kV Bus Loss of Voltage	~~3280~~3241 volts with a ~~2 second delay~~time delay of 2 seconds	~~3280 ± 120 volts with a 2 ± 0.2 second delay~~≥ 3195 volts and ≤ 3280 volts with a time delay of 2 ± 0.2 seconds
c. Safety Injection	Not Applicable	Not Applicable
d. Loss of Main Feedwater Pumps	Not Applicable	Not Applicable
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS		
a. Steam Generator Water Level -- Low-Low	Greater than or equal to 21% of narrow range instrument span each steam generator	Greater than or equal to 19.2% of narrow range instrument span each steam generator
b. Reactor Coolant Pump Bus Undervoltage	Greater than or equal to 2750 Volts -- each bus	Greater than or equal to 2725 Volts -- each bus
8. LOSS OF POWER		
a. 4 kV Bus Loss of Voltage	~~3280 volts with a 2 second delay~~3241 volts with a time delay of 2 seconds	~~3280 ± 120 volts with a 2 ± 0.2 second delay~~≥ 3195 volts and ≤ 3280 volts with a time delay of 2 ± 0.2 seconds
b. 4 kV Bus Degraded Voltage	~~3638 volts with a 2.0 minute time delay~~3959 volts with a time delay of 9 seconds when a steam generator water level low-low or a safety injection signal is present	~~3638 ± 60 volts with a 2.0 minute ± 6 second time delay~~≥ 3910 volts and ≤ 4000 volts with a time delay of 9 ± 0.25 seconds when a steam generator water level low-low or a safety injection signal is present

3/4.3.1 and 3/4.3.2 PROTECTIVE AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION

The OPERABILITY of the protective and ESF instrumentation systems and interlocks ensure that 1) the associated ESF action and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof exceeds its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundance and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses.

Protection has been provided for main feedwater system malfunctions in MODES 3 and 4. This protection is required when main feedpumps are aligned to feed steam generators in MODES 3 and 4. The availability of feedwater isolation on high-high steam generator level terminates the addition of cold water to the steam generators in any main feedwater system malfunction. The total volume that can be added to the steam generators by the main feedwater system in MODES 3 and 4 is limited by this safeguards actuation and the fact that feedwater isolation on low T_{avg} setpoint coincident with reactor trip can only be cleared above the low-low steam generator level trip setpoint.

The restrictions associated with bypassing ESF trip functions below either P-11 or P-12 provide protection against an increase in steam flow transient and are consistent with assumptions made in the safety analysis.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The measurement of response time at the specified frequencies provides assurance that the protective and ESF action function associated with each channel is completed within the time limit assumed in the accident analyses.

Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either 1) in place, onsite or offsite test measurements or 2) utilizing replacement sensors with certified response times.

REACTOR TRIP SYSTEM RESPONSE TIME testing is only required for those functional units specified in UFSAR Table 7.2-6, "Reactor Trip System Instrumentation Response Times." ENGINEERED SAFETY FEATURES RESPONSE TIME testing is only required for those functional units specified in UFSAR Table 7.2-7, "Engineered Safety Features Response Times." These response time limits were previously included in the Technical Specifications but were relocated to the UFSAR by license amendments 202 (U1) and 187 (U2).

The 9-second time delay associated with the 4kv bus degraded voltage trip setpoints and allowable values in functional Unit 8.b of technical specification Table 3.3-4 is set short enough to allow safety-related equipment to operate within the assumptions of the safety analysis, but long enough to prevent spurious operation of the degraded voltage relays. A longer degraded voltage time delay applies when neither a steam generator water level low-low nor a safety injection signal is present, but it is defined in an owner-controlled document. This is consistent with NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 2, and its Bases.

Attachment 2 to AEP:NRC:2332

PROPOSED TECHNICAL SPECIFICATIONS PAGES

REVISED PAGES
UNIT 2

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TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS		
a. Steam Generator Water Level-- Low-Low	Greater than or equal to 21% of narrow range instrument span each steam generator	Greater than or equal to 19.2% of narrow range instrument span each steam generator
b. 4 kV Bus Loss of Voltage	3241 volts with a time delay of 2 seconds	$\geq$ 3195 volts and $\leq$ 3280 volts with a time delay of 2 $\pm$ 0.2 seconds
c. Safety Injection	Not Applicable	Not Applicable
d. Loss of Main Feedwater Pumps	Not Applicable	Not Applicable
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS		
a. Steam Generator Water Level -- Low-Low	Greater than or equal to 21% of narrow range instrument span each steam generator	Greater than or equal to 19.2% of narrow range instrument span each steam generator
b. Reactor Coolant Pump Bus Undervoltage	Greater than or equal to 2750 Volts - - each bus	Greater than or equal to 2725 Volts -- each bus
8. LOSS OF POWER		
a. 4 kV Bus Loss of Voltage	3241 volts with a time delay of 2 seconds	$\geq$ 3195 volts and $\leq$ 3280 volts with a time delay of 2 $\pm$ 0.2 seconds
b. 4 kV Bus Degraded Voltage	3959 volts with a time delay of 9 seconds when a steam generator water level low-low or a safety injection signal is present	$\geq$ 3910 volts and $\leq$ 4000 volts with a time delay of 9 $\pm$ 0.25 seconds when a steam generator water level low-low or a safety injection signal is present

3/4.3.1 and 3/4.3.2 PROTECTIVE AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION

The OPERABILITY of the protective and ESF instrumentation systems and interlocks ensure that 1) the associated ESF action and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof exceeds its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundance and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses.

Protection has been provided for main feedwater system malfunctions in MODES 3 and 4. This protection is required when main feedpumps are aligned to feed steam generators in MODES 3 and 4. The availability of feedwater isolation on high-high steam generator level terminates the addition of cold water to the steam generators in any main feedwater system malfunction. The total volume that can be added to the steam generators by the main feedwater system in MODES 3 and 4 is limited by this safeguards actuation and the fact that feedwater isolation on low T_{avg} setpoint coincident with reactor trip can only be cleared above the low-low steam generator level trip setpoint.

The restrictions associated with bypassing ESF trip functions below either P-11 or P-12 provide protection against an increase in steam flow transient and are consistent with assumptions made in the safety analysis.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The measurement of response time at the specified frequencies provides assurance that the protective and ESF action function associated with each channel is completed within the time limit assumed in the accident analyses.

Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either 1) in place, onsite or offsite test measurements or 2) utilizing replacement sensors with certified response times.

REACTOR TRIP SYSTEM RESPONSE TIME testing is only required for those functional units specified in UFSAR Table 7.2-6, "Reactor Trip System Instrumentation Response Times." ENGINEERED SAFETY FEATURES RESPONSE TIME testing is only required for those functional units specified in UFSAR Table 7.2-7, "Engineered Safety Features Response Times." These response time limits were previously included in the Technical Specifications but were relocated to the UFSAR by license amendments 202 (U1) and 187 (U2).

The 9-second time delay associated with the 4kv bus degraded voltage trip setpoints and allowable values in functional Unit 8.b of technical specification Table 3.3-4 is set short enough to allow safety-related equipment to operate within the assumptions of the safety analysis, but long enough to prevent spurious operation of the degraded voltage relays. A longer time delay applies when neither a steam generator low-low level nor a safety injection signal is present, but it is defined in an owner-controlled document. This is consistent with NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 2, and its Bases.