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November 7, 2017

AEP-NRC-2017-10
10 CFR 50.90

Docket Nos.: 50-315
50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Donald C. Cook Nuclear Plant, Units 1 and 2
Request for Deviation from National Fire Protection Association (NFPA) 805 Requirements

References:

1. Letter from M. H. Carlson, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC) Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, Docket Nos. 50-315 and 50-316, Request for License Amendment to Adopt National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)," AEP-NRC-2011-1, dated July 1, 2011, Agencywide Documents Access and Management System (ADAMS) Accession No. ML11188A145.
2. Letter from T. J. Wengert, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 And 2 – Issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c) (TAC Nos. ME6629 and ME6630)," dated October 24, 2013, ADAMS Accession No. ML13140A398.
3. NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition.

In accordance with the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations (10 CFR), Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, is submitting a request for a License Amendment Request (LAR) for Renewed Facility Operating Licenses DPR-58 and DPR-74.

By Reference 1, I&M, proposed to amend Renewed Facility Operating Licenses DPR-58 and DPR-74 to adopt a new fire protection program based on National Fire Protection Association (NFPA) Standard 805, in accordance with 10 CFR 50.48(a) and (c). By Reference 2, the U. S. Nuclear Regulatory Commission (NRC) issued Amendment No. 322 to Renewed Facility Operating License No. DPR-58 and Amendment No. 305 to Renewed Facility Operating License No. DPR-74 for CNP Units 1 and 2, respectively. The amendments revised the fire protection license

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condition in each unit's license, transitioning each unit's fire protection program to a risk-informed performance-based program based on Reference 3.

The proposed amendment would modify the fire protection license condition in each unit's license by incorporation of the resulting Safety Evaluation from this LAR to allow for deviation from NFPA 805 requirements.

Enclosure 1 to this letter provides an affirmation statement. Enclosure 2 provides an evaluation of the proposed change. Enclosures 3 and 4 provide existing Unit 1 and Unit 2 License pages, respectively, marked up to show the proposed changes. New clean Unit 1 and Unit 2 License pages with proposed changes incorporated will be provided to the NRC Licensing Project Manager when requested.

Approval of the proposed amendment is requested in accordance with the normal NRC review schedule for such changes. Once approved, the amendment will be implemented within 90 days. Copies of this letter are being transmitted to the Michigan Public Service Commission and Michigan Department of Environmental Quality, in accordance with the requirements of 10 CFR 50.91.

There are currently two additional LARs being planned by I&M to address recently identified fire protection nonconforming conditions, which have been entered into CNP's corrective action program. There are no new regulatory commitments made in this letter. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,



Q. Shane Lies
Site Vice President

JMT/ml

Enclosures:

1. Affirmation
2. Evaluation of the Proposed Changes
3. Donald C. Cook Nuclear Plant Unit 1 License Condition Pages Marked To Show Proposed Changes
4. Donald C. Cook Nuclear Plant Unit 2 License Condition Pages Marked To Show Proposed Changes

c: R. J. Ancona – MPSC
MDEQ – RMD/RPS
NRC Resident Inspector
C. D. Pederson, NRC Region III
J. K. Rankin, NRC Washington, D.C.
A. J. Williamson – AEP Ft. Wayne, w/o enclosures

Enclosure 1 to AEP-NRC-2017-10

AFFIRMATION

I, Q. Shane Lies, being duly sworn, state that I am the Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the U. S. 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.

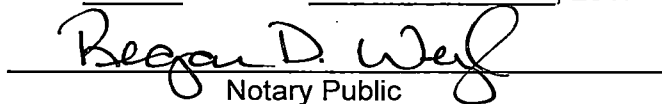
Indiana Michigan Power Company



Q. Shane Lies
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 7 DAY OF November, 2017



Notary Public

My Commission Expires 01/21/2018

Enclosure 2 to AEP-NRC-2017-10 Evaluation of Proposed Changes

Subject: Request for deviation from National Fire Protection Association 805 requirements to allow for currently installed non-plenum listed cables routed above suspended ceilings and to allow for currently installed thin wall electrical metallic tubing (EMT) and embedded/buried polyvinyl chloride (PVC) conduit.

1.0 SUMMARY DESCRIPTION

2.0 DETAILED DESCRIPTION

- 2.1 Request to use currently installed non-plenum listed cables above suspended ceilings
- 2.2 Request to use EMT and embedded/buried PVC conduit

3.0 TECHNICAL EVALUATION

- 3.1 Basis for the approval of request for this deviation for allowance for currently installed non-plenum listed cables routed above suspended ceilings
- 3.2 Basis for the approval of request for this deviation for use of EMT and embedded PVC conduit

4.0 REGULATORY EVALUATION

- 4.1 Applicable Regulatory Requirements/Criteria
- 4.2 Precedent
- 4.3 No Significant Hazards Consideration
- 4.4 Conclusions

5.0 ENVIRONMENTAL CONSIDERATION

6.0 REFERENCES

1.0 SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Facility Operating License Nos. DPR-58 and DPR-74 for Donald C. Cook Nuclear Plant (CNP), Units 1 and 2, respectively.

Indiana Michigan Power Company (I&M), the licensee for CNP Units 1 and 2, proposes to modify the fire protection license condition in each unit's license by incorporation of the resulting Safety Evaluation from this License Amendment Request (LAR).

The change in the fire protection license conditions would allow for deviation from National Fire Protection Association (NFPA) 805 requirements to allow for currently installed non-plenum listed cables routed above suspended ceilings and to allow for the use of thin wall electrical metallic tubing (EMT) and embedded/buried plastic conduit.

2.0 DETAILED DESCRIPTION

2.1 Request to use currently installed non-plenum listed cables above suspended ceilings

National Fire Protection Association Standard 805 (NFPA 805) 3.3.5.1 states:

"Wiring above suspended ceilings shall be kept to a minimum. Where installed, electrical wiring shall be listed for plenum use, routed in armored cable, routed in metallic conduit, or routed in cable trays with solid metal top and bottom covers."

The NFPA 805 Fire Protection Program Manual (NFPPM), Attachment 1 Compliance Statement and Compliance Basis statements for this section of NFPA 805 currently states:

Compliance Statement:

Complies by Previous NRC Approval

Compliance Basis:

By Reference 1, Attachment A, Page A-27, I&M requested transition of the following NFPA 805 deviation based on prior Nuclear Regulatory Commission (NRC) approval.

"The only locations containing Class I equipment with suspended ceilings are each of the control rooms. The ceiling in this case consists of acoustic metal tiles which are noncombustible, and plastic diffusers (egg crate) under the recessed fluorescent lighting. These diffusers meet the UL 25 flame spread requirements."

By Reference 2, Pages 32 and 33, the NRC approved I&M's requested deviation as acceptable.

"We conclude that the administrative controls [including controls on wiring above suspended ceilings], fire brigade equipment and training conform to the

recommendations of the National Fire Protection Association and Appendix A to Branch Technical Position 9.5-1 and are, therefore, acceptable.

The suspended ceiling configuration (i.e. noncombustible tiles with diffusers meeting UL 25 flame spread requirements), as approved by the NRC, is still installed at CNP. There have been no plant modifications or other changes that would invalidate the basis for approval. This configuration has not been changed."

The NRC approved the CNP NFPA 805 Fire Protection Program by Reference 2 which included the above deviation. All though there have been plant modifications made to the suspended ceiling configuration since the issuance off Reference 2, these modifications do not invalidate the basis for approval

Based on walk downs, it has been verified that most of the cables above suspended ceilings in the CNP power block are either enclosed in metal raceway or listed for plenum use in compliance with NFPA 805, Section 3.3.5.1. However, it is not confirmed with certainty that all of the cables that are not enclosed in metal raceways are listed for plenum use. This request is therefore based on the assumption that some population of the cables that are exposed are also not listed for plenum use. These cables are hereafter referred to as "unverified cables".

The cables above suspended ceilings are in the following areas and may not comply with the requirements of NFPA 805 Section 3.3.5.1:

Fire Analysis Area AA2

- Fire Zone 87 (Makeup Water Plant Office) – Fire Zone 87 is 12,834 square feet (sq ft) and protected by automatic sprinkler systems that alarm to the control room. The Makeup Water Plant Office is a 100 sq ft noncombustible building contained within the fire zone. The drop ceiling in the Makeup Water Plant Office is not a plenum space. There are no nuclear safety capability assessment (NSCA) cables in the Makeup Water Plant Office. The Makeup Water Plant Office is occupied shiftly by the Operations staff.
- Fire Zone 126 (Shift Manager's Office and Technical Support Center) – Fire Zone 126 is a 2,312 sq ft building that is separated from adjacent fire zones by rated fire assemblies. The building is protected by automatic fire detection and suppression that alarms to the control room. The suspended ceiling in the Technical Support Center is a plenum space. The suspended ceiling in the Shift Managers Office is not a plenum space. There are no NSCA cables in this Fire Zone. The Shift Managers office area is normally occupied by the Operations Shift Manager and Operations Shift Technical Advisor. The Technical Support Center is not normally occupied.
- Fire Zone 129 (Auxiliary Equipment Operator (AEO) Break Room, On-Line Laboratory, and Turbine office) – is a 53,279 sq ft fire zone and has a targeted automatic fire detection and manual suppression system under the Unit 1 Turbine Generator only.

- The AEO Break Room, is a 1,080 sq ft office area of noncombustible construction and contained within Fire Zone 129. This area is equipped with automatic fire detection that alarms to the control room. This area does not have a plenum space above the suspended ceiling and does not contain any NSCA equipment or cables. This area is routinely occupied by the AEO staff multiple times per shift.
- The Turbine Office is a 1,500 sq ft office area of noncombustible construction and contained within Fire Zone 129. This area is not equipped with automatic suppression or detection. This area does not have a plenum space above the suspended ceiling and does not contain any NSCA equipment or cables. This area is not normally occupied by Chemistry personnel.
- The On-Line Laboratory is a 500 sq ft office area of noncombustible construction and contained within Fire Zone 129. This area is not equipped with automatic suppression or detection. This area does not have a plenum space above the suspended ceiling and does not contain any NSCA equipment or cables. This area is occasionally occupied by Chemistry personnel.

Fire Analysis Area; AA36/42

- Fire Zone 43 (Turbine/Auxiliary Building Access (TRPAC) – Fire Zone 43 is a 4,630 sq ft office area that has automatic fire detection that alarms to the control room and is separated from adjacent fire zones by rated fire assemblies. The suspended ceiling in this fire zone is a plenum space. There are NSCA cables in this Fire Zone. This area is normally occupied by the Radiation Protection and Chemistry staff.

In accordance with the Fire Protection License Condition, I&M requests NRC approval for the use of currently installed non-plenum rated cable in suspended ceilings as an acceptable deviation from the requirements of NFPA 805, Chapter 3.

2.2 Request to use EMT and embedded/buried PVC conduit

NFPA 805 Section 3.3.5.2 states:

“Only metal tray and metal conduits shall be used for electrical raceways. Thin wall metallic tubing shall not be used for power, instrumentation, or control cables. Flexible metallic conduits shall only be used in short lengths to connect components.”

The NFPA 805 NFPPM, Attachment 1 Compliance Basis statement for this section of NFPA 805 currently states:

“All exposed electrical raceways are metal tray or metal conduit. In general, all cable is run through conduits or trays, with the exception of short cable air drops. The approximately 3 foot air drops align with the guidance of Section K.4 to NEI-04-02 (FAQ 06-0021) and are therefore acceptable.”

The NRC approved the CNP NFPA 805 Fire Protection Program by Reference 2.

Contrary to NFPA 805 requirements, I&M has used EMT extensively throughout the CNP power block. Per the CNP Engineering Specification for cables, ES-CABLE-0221-QCN, "Design and Installation Criteria for Cable, Trough and Conduit", all exposed rigid metal conduit 2" or smaller inside the plant (excluding Containment) is EMT, except as noted on drawings. Other sizes of EMT are not prohibited. EMT is used for power, instrumentation, and control cables.

Additionally, per ES-CABLE-0221-QCN (Section 3.3.2.3), some conduit used in structural slabs is polyvinyl chloride (PVC) which is a plastic and is nonmetallic.

In accordance with the Fire Protection License Condition, I&M requests NRC approval for the use of EMT and embedded/buried plastic conduit as an acceptable deviation from the requirements of NFPA 805, Chapter 3.

3.0 TECHNICAL EVALUATION

3.1 Basis for the approval of request for this deviation for allowance for currently installed non-plenum listed cables routed above suspended ceilings:

The basis provided below applies to all zones except when stated otherwise:

- Suspended ceiling finishes comply (with previous NRC approval, by Reference 2, Pages 32-33) with NFPA 805, Section 3.3.3, Interior Finishes. Their supports are noncombustible.
- All NSCA cables in Fire Zone 43 meet the criteria defined in Section 3.3.5.1 of NFPA 805. The population of unverified cabling consists of low-voltage communications and data network cables and has a low possibility of ignition and some fire resistive capability. Because it is low voltage, the cable is not susceptible to self-ignition and electrical shorts that could result in a fire in the enclosed space. Eliminating cables with the potential for shorts eliminates ignition sources, and therefore, the jacketing of cable is not relevant.
- CNP areas currently with suspended ceilings inside the NFPA 805 defined power block include office areas and do not affect risk significant fire scenarios. The use of non-plenum cables does not impact any NSCA performance based evaluations. Fire Zone 43 contains Variance From Deterministic Requirements (VFDRs) defined in the current license basis and a detailed evaluation is provided below.
- Exposed, non-plenum-rated electrical wiring located above suspended ceilings is minimal, is sufficiently dispersed, and adds limited combustible loading. CNP complies (with previous NRC approval, by Reference 2, Pages 32-33) to NFPA 805, Section 3.3.5.3, Electrical Cable Flame Propagation Limits. Although this is recognized as not equivalent to plenum rated cable, it does reflect that most non-plenum cables have some fire resistive capability.

- The NFPA 805 requirement to require plenum cable exceeds National Electrical Code (NFPA 70) requirements for cables not in plenum spaces. Original fire protection installation criteria did not mandate plenum cables in suspended ceiling spaces as required by NFPA 805 (2001). Non-plenum spaces have stagnant air versus flowing air in plenum areas in which smoke filled air can travel through to other locations of the plant. The Shift Manager Office (Fire Zone 126), Turbine office (Fire Zone 129), On line Lab (Fire Zone 129), AEO Break Room (Fire Zone 129) and Make up Plant (Fire Zone 87) locations do not contain plenum spaces.
- Based on walk downs and a review of CNP Technical Evaluations, no fixed ignition sources, per NUREG/CR-6850 (Reference 4), were identified in the area above the suspended ceilings.
- CNP modification procedures ensure that future cable installations above suspended ceilings will meet the requirements of NFPA 805 Section 3.3.5.1.
- Fire barriers prevent propagation of fires to adjacent fire areas. Areas above suspended ceilings do not cross established fire barriers.
- CNP procedures have been updated to specifically restrict the storage of combustible material, including extension cords above suspended ceilings.
- For areas located within Fire Zone 129, areas above suspended ceilings are not used as plenum spaces and do not contain any NSCA related equipment.
- There are no automatic suppression or detection systems within the suspended ceiling space for these locations. An automatic suppression system protects the exterior of the Makeup Water Plant office (it is an enclosure within Fire Zone 87). Ionization smoke detectors are installed below the ceilings in the AEO Break Room, the Shift Manager Office and Technical Support Center, and TRPAC (Fire Zone 129, Fire Zone 43, and Fire Zone 126). Fire barriers bound the Fire Areas comprising these zones. Hose streams are available throughout these Zones. These fire protection features, in combination with persons who routinely occupy these areas along with the dedicated fire brigade, are expected to detect and suppress fires prior to fire expanding and effecting cables/equipment in additional Fire Zones.

Fire Zone 43, TRPAC, has some NSCA considerations that were evaluated further. A supplemental evaluation of the fire protection features and impacts on the NSCA is provided below:

Fire Zone 43 is protected by an automatic fire detection system with detectors below the ceiling that alarm in the control room. There are no automatic fire suppression systems located in Fire Zone 43. Adjacent fire zones have a fire load classification of low (i.e., less than 1-hour fire severity), and most contain automatic detection and/or suppression systems that alarm in the control room. Manual hose stations and fire extinguishers provide manual firefighting capability.

Primary combustibles in Fire Zone 43 are Class A combustibles, (e.g., office furniture, plastics, paper, etc.)

For Fire Zone 43, Fire doors having a 3-hour rating are provided to adjacent Fire Area AA2 - Fire Zone 91. Fire doors having a 3-hour and 1 1/2-hour rating are provided to adjacent Fire Zone 44N. Penetrations in fire barriers between this Fire Zone and adjacent Fire Analysis Areas are provided with fire seals rated for the barrier. Walls, floors, and ceilings to adjacent fire areas are reinforced concrete with at least a 3-hour rating. Internal walls consist of metal stud 3/4 inches drywall panels, solid concrete block, or reinforced concrete. A reinforced concrete ceiling above the 24 inches x 48 inches and 24 inches x 24 inches chemical and moisture resistant Class A Underwriters Laboratories, Inc. (UL) acoustical tile suspended ceiling forms the approximate 1 foot-8 inches plenum area. Field inspection and review of the CNP heating, ventilation and air conditioning (HVAC) Installation Specification (ES-HVAC-0807-QCN) confirmed HVAC diffusers, louvers and dampers to be of galvanized metal construction.

Based on walk downs and above-ceiling surveys in these rooms, wiring above the suspended ceiling is kept to a minimum. The majority of unverified cabling present above the suspended ceilings consists of low-voltage communications and data network cables which are not prone to heat-generating overload faults. There are no fixed ignition sources above the suspended ceiling and combustible loading is limited. Furthermore, field inspection and review of CNP drawings show the majority of lighting cables are in flexible or metal conduit.

Fire Zone 43 is part of a larger fire analysis area AA36/42 that is comprised of Fire Zones 37, 43, 44A, 44B, 44C, 44D, 44E, 44F, 44G, 44H, 44N, and 44S. The Fire Safety Analysis performed for fire analysis area AA36/42 determined that the achievement of the nuclear safety and radioactive release performance criteria of NFPA 805 as required by 10 CFR 50.48(c) were met. The combustible loading classification for this fire area is LOW. A Genesis Solution Suite – Systems Assurance & Fire Protection Engineering – (SAFE®) software module is used to calculate the combustible loading of each fire zone. Fire Zone 43 is shown to have an Allowable Combustible Load of 370,400,000 British Thermal Units (BTU) and current Actual Combustible Load based on fixed combustibles (installed) of 306,262,427 BTU. This gives the fire zone a Fire Severity of 49.62 minutes which will be adequately contained by the fire protection features of Fire Zone 43. The SAFE software accounts for 790 cubic feet of electric cords and 175 feet of electric wiring located in Fire Zone 43.

Detailed fire modeling was performed for Fire Zone 43 as a subset of AA36/42 using guidance from NUREG/CR-6850 (Reference 4). The detailed fire modeling documents whole room burnout resulting from a transient fire scenario resulting in a loss of all targets in the fire zone. A fire risk evaluation was conducted in accordance with guidance provided by Nuclear Energy Institute (NEI) 04-02 (Reference 5) using a Fire Probabilistic Risk Assessment (FPRA) that was developed using guidance of NUREG/CR-6850 (Reference 4). Three VFDRs were identified during the NFPA 805 Transition in this Fire Zone. These VFDRs were evaluated as part of Compartment AA36/42 and it was determined that the risk, safety margin, and defense-in-depth met the acceptance criteria of NFPA 805 Section 4.2.4 with no further action required. There is no impact to this analysis due to the potential for minimal amounts of non-plenum exposed cables in the suspended ceiling.

Acceptance Criteria Evaluation:**Nuclear Safety and Radioactive Release Performance Criteria:**

The presence of non-plenum-rated cables above suspended ceilings in the identified locations does not adversely affect nuclear safety capability. In general, the wiring above the suspended ceilings is kept to a minimum. Additionally, the low-voltage communications and data network cables are not prone to heat-generating overload faults. In the unlikely event of a fire occurring in the area above the suspended ceiling, there will be no impact on the ability of CNP to achieve and maintain the nuclear safety performance criteria of NFPA 805.

The location of nonrated plenum wiring above suspended ceilings also has no impact on the radioactive release performance criteria. The radioactive release review was performed based on the potential location of radiological concerns and is independent of the type of wiring and locations of suspended ceilings. The radioactive release performance criteria are satisfied based on the determination of limiting radioactive release, which is not affected by the cables above suspended ceilings that do not comply with the requirements specified in Section 3.3.5.1 of NFPA 805.

Safety Margin and Defense-in-Depth:

Power, control, and instrumentation cables are already in use in the plenum space above the Unit 1 and Unit 2 Main Control Room and complies (with previous NRC approval, by Reference 2) with NFPA 805, Section 3.3.5.3, Electrical Cable Flame Propagation Limits. The FPRA uses historical fires and fire tests as the basis for many inputs, such as the ignition frequencies, the heat released from a fire, how fires will spread, and the probability that a circuit will be damaged in an adverse way. Therefore, the inherent safety margin present in the FPRA methods is acceptable because NRC-accepted methods are used to perform the FPRA. Deviations are evaluated against the methods and criteria for the overall internal events Probabilistic Risk Assessment (PRA) and FPRA model development for consistency, or confirmation of bounding treatment, to confirm that the safety margin inherent in the PRA model is unaffected.

The limited amount of low voltage communications/data cable above suspended ceilings is not susceptible to shorts that would result in a fire. Thus, their presence above suspended ceilings has no impact on the analytical methods used in the FPRA to evaluate potential fire scenarios. Therefore, the inherent safety margin in these methods remains unchanged.

The three elements of defense-in-depth are 1) prevent fires from starting, 2) rapidly detect, control and extinguish fires that do occur, thereby limiting damage, and 3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed. These elements are discussed below.

1) Prevent Fires from Starting:

The use of non-listed communication/data cables routed above the suspended ceilings does not impact the fire protection defense-in-depth. The cables do not pose an ignition hazard. Fire analysis supports the loss of all cables and equipment in the affected areas with no impact to the ability to meet the NFPA 805 performance goals.

2) Rapidly Detect, Control and Extinguish Fires that Do Occur Thereby Limiting Damage:

The cables above suspended ceilings will have no effect on the performance of area suppression or detection. Areas without automatic features are provided with manual suppression and fire brigade response to ensure any fire that does start is quickly controlled. Fire analysis has been performed to demonstrate any fire that does occur will be small and contained within the fire analysis area.

3) Provide Adequate Level of Fire Protection for Systems and Structures so that a Fire Will Not Prevent Essential Safety Functions from Being Performed:

There are no essential safety functions impacted by a fire in any of the affected fire zones, except for Fire Zone 43. For Fire Zone 43; the zone was modeled as whole room burnout with no loss in the ability to achieve or maintain the NFPA 805 Performance Goals.

Conclusion:

NRC approval is requested for the existence of unverified electrical wiring above suspended ceilings.

I&M determined that the performance based approach satisfies the following criteria:

- A. Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- B. Maintains safety margins; and
- C. Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire nuclear safety success paths).

3.2 Basis for the approval of request for this deviation for EMT and Plastic:

Regarding the use of EMT:

- The use of EMT was not prohibited by original Fire Protection Design Guidelines. EMT provides a method of routing and supporting cables and has been allowed since issuance of CNP's Cable Installation Specification (ES-CABLE-0221-QCN).
- EMT is impact resistant. EMT completely encases the enclosed cable and therefore provides protection against physical damage. EMT is noncombustible and, like rigid conduit, is not credited to prevent or delay fire damage or circuit failures.
- Most areas of the power block are not subject to severe physical damage due to heavy equipment movement. CNP equipment protection procedures further limit the potential for EMT (and equipment) damage during work evolutions. In the unlikely event that damage does occur, the condition would be expected to be entered into the Corrective Action Program (CAP) and would be evaluated promptly to determine potential adverse impacts and necessary repairs. EMT has been a basic conduit type for the life of plant at CNP and based on a review of CAP action requests, its presence has not adversely affected nuclear safety performance criteria, radiological release performance criteria, safety margin, or defense-in-depth. Damage to EMT is not likely to cause an unrecognized or immediate fire hazard.

- The CNP Cable Installation Specification provides for installation criteria to ensure that conduits are free of burrs, sharp edges, cracks, splits and wrinkles to prevent damage to cable.
- The CNP Cable Installation Specification limits installation of EMT in close proximity to equipment that may induce damage due to equipment vibration.
- The National Electrical Code (NEC) allows the use of EMT for both “exposed” and “concealed” work but the area must “not be subject to severe physical damage.” Per the NFPA Report on Proposals for Revision to NFPA 805-2001, Section 3.3.5.2 of NFPA 805 was revised for consistency with the NEC (NFPA 70) to remove the requirement prohibiting thin-wall EMT. The current edition of NFPA 805 (2015), retains this change. Although the current edition of NFPA 805 is not within the CNP Licensing Bases, the change to NFPA 805 was made by the NFPA Technical Committee on Fire Protection for Nuclear Facilities, which is made up of experts representing varied viewpoints and interests concerning nuclear facility fire protection, through a consensus standards development process.
- The CNP Cable Installation Specification has been revised to prohibit future installation of EMT, until such time that the NRC approves this request. Following NRC approval, I&M plans to revise the Cable Installation Specification to allow the use of EMT in areas that are not subject to severe physical damage to reflect the intent of the current NFPA 805 standard and to provide defense in depth.

Regarding the use of plastic conduit:

- The CNP Cable Installation Specification requires that all concrete encased nonmetallic conduit be plastic and that metallic conduit be used to extend plastic conduit runs out of the floor slabs with the plastic not extending past the concrete surface.
- The nonmetallic conduit in question is used in concrete embedded applications and buried configurations, thus providing physical protection and separation for the conduit.
- The plastic conduit embedded in concrete is not subject to direct flame/heat impingement from an external source which otherwise result in structural failure, contribution to fire load, and/or damage to the circuits contained within.
- Failure of circuits within embedded conduits resulting from a fire would not result in damage to external targets. Therefore, other circuits would not be exposed to the effects of a circuit failure in the embedded conduit.
- The NEC (NFPA 70), allows use of rigid nonmetallic conduit for underground and embedded applications.

- No performance based evaluations (i.e., use of fire modeling) were performed on VFDRs associated with embedded conduits during CNP's NFPA 805 transition on embedded conduit.

Acceptance Criteria Evaluation:**Nuclear Safety and Radioactive Release Performance Criteria:**

The use of EMT does not affect NFPA 805 credited success paths, as conduit type is not credited to withstand the effects of fire. Therefore, there is no impact on the nuclear safety performance criteria.

The use of nonmetallic conduit for raceways embedded in concrete is allowed by NFPA 70, NEC, and provides adequate physical and electrical protection for cables. The use of PVC conduit in embedded/buried locations does not affect nuclear safety, as the material in which conduits are run within an embedded location are not subject to the failure mechanisms that could potentially result in circuit damage or resultant damage to external targets. Therefore, there is no impact on the nuclear safety performance criteria.

The use of nonmetallic conduit in embedded/buried installations and EMT does not have any impact on the radiological release performance criteria. The radiological release review was performed based on the manual fire suppression capabilities in areas containing, or potentially containing, radioactive materials and is not dependent on the type of conduit material. The conduit material does not change the radiological release evaluation which concludes that potentially contaminated water is contained and smoke is monitored. The conduits do not add additional radiological materials to the area or challenge system boundaries.

Safety Margin and Defense-in-Depth:

EMT is noncombustible. Additionally, self-ignited cable fires contained within conduit are not postulated to spread beyond the conduit. Precautions and limitations on use and installation ensure that these materials do not impact the analysis of the fire event. Therefore, the inherent safety margin and conservatisms in these analysis methods remain unchanged.

Embedded nonmetallic conduit is protected from mechanical damage and from damage resulting from either an exposure fire or from a fire within the conduit impacting other targets. The areas with plastic conduit have been analyzed in their current configuration. Precautions and limitations on use ensure that these materials do not impact the analysis of the fire event. Therefore, the inherent safety margin and conservatisms in these analysis methods remain unchanged.

The three elements of defense-in-depth are 1) prevent fires from starting, 2) rapidly detect, control and extinguish fires that do occur, thereby limiting damage, and 3) provide adequate level of fire protection for systems and structures so that a fire will not prevent essential safety functions from being performed. These elements are discussed below.

1) Prevent Fires from Starting:

The use of EMT and embedded/buried plastic conduit does not create ignition sources and does not impact fire prevention. The EMT and embedded plastic conduit have been in use since original plant construction, are allowed by the NEC, and do not increase the potential for a fire to start.

2) Rapidly Detect, Control and Extinguish Fires that Do Occur Thereby Limiting Damage:

The EMT and embedded plastic conduit have no impact on the ability of the automatic suppression or detection systems to perform their functions. Portable fire extinguishers and hose reel stations are available for manual firefighting activities by the site fire brigade and are unaffected by the presence of EMT and embedded/buried plastic conduit such that if a fire was to occur, the damage from the fire would be limited. EMT is impact resistant and noncombustible and provides a similar level of cable protection during a fire as rigid conduit.

3) Provide Adequate Level of Fire Protection for Systems and Structures so that a Fire Will Not Prevent Essential Safety Functions from Being Performed:

The use of EMT and embedded/buried plastic conduit do not result in compromising automatic fire suppression functions, manual fire suppression functions, or post-fire safe shutdown capability and will not prevent essential safety functions from being performed.

Conclusion:

NRC approval is requested for use of EMT conduit and embedded/buried plastic conduit for power, controls and instrumentation cables which is prohibited by Section 3.3.5.2 of NFPA 805 (2001).

I&M determined that the performance based approach satisfies the following criteria:

- A. Satisfies the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- B. Maintains safety margins; and
- C. Maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire nuclear safety success paths).

4.0 REGULATORY EVALUATION**4.1 Applicable Regulatory Requirements/Criteria****Regulatory Requirements**

The proposed amendment is intended to modify the license condition for CNP Unit 1 and Unit 2 to permit deviations from NFPA 805 requirements to allow for currently installed non-plenum listed cables routed above suspended ceilings and to allow for the use of EMT and embedded/buried PVC conduit.

On July 16, 2004, the NRC amended 10 CFR 50.48, Fire Protection, to add a new subsection, 10 CFR 50.48(c), which establishes alternative fire protection requirements. 10 CFR 50.48 endorses, with exceptions, NFPA 805, as a voluntary alternative for

demonstrating compliance with 10 CFR 50.48 Section (b), Appendix R, and Section (f), Decommissioning.

The voluntary adoption of 10 CFR 50.48(c) by I&M does not eliminate the need to comply with 10 CFR 50.48(a) and to the Plant Specific Design Criteria (PSDC) listed below.

As described in Updated Final Safety Analysis Report, Section 1.4, the PSDC define the principal criteria and safety objectives for the CNP design. The following PSDC are relevant to the proposed amendment:

PSDC CRITERION 3 Fire Protection

A reactor facility shall be designed to ensure that the probability of events such as fires and explosions and the potential consequences of such events will not result in undue risk to the health and safety of the public. Noncombustible and fire resistant materials shall be used throughout the facility wherever necessary to preclude such risk, particularly in areas containing critical portions of the facility such as containment, control room, and components of engineered safety features.

Primary emphasis is directed at minimizing the risk of fire by use of thermal insulation and adhesives which do not support combustion, flame retardant wiring, adequate overload and short circuit protection, and the elimination of combustible trim and furnishings. The facility is equipped with protection systems for controlling fires, which might originate in plant equipment. The containment and auxiliary building ventilation systems can be operated from the control room of the corresponding unit as required to limit the potential consequences of fire. Critical areas of the containment, the control room and the areas containing components of engineered safety features, have detectors to alert the control room of the possibility of fire so that prompt action may be taken to prevent significant damage.

The proposed changes to allow for the deviation do not allow for any physical changes in the plant. The deviations being requested are for currently installed and future installations of equipment in the plant which have already been evaluated and which continue to meet all of the PSDC requirements. The proposed changes are consistent with the above regulatory requirements and criteria. Therefore, the proposed changes will assure safe operation by continuing to meet applicable regulations and requirements.

4.2 Precedents

The NRC has approved similar license amendment requests to allow for deviations from NFPA 805 requirements to allow for currently installed non-plenum listed cables routed above suspended ceilings and to allow for the use of EMT and embedded/buried plastic conduit as follows:

1. Letter from Mahesh L. Chawla (NRC) to Robert Coffey (NextEra Energy Point Beach, LLC), "Point Beach Nuclear Plant, Units 1 and 2 - Issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c). (CAC Nos. MF2372 and MF2373)," dated September 8, 2016, (ADAMS Accession Number ML16196A093).

2. Letter from Siva P. Lingam (NRC) to Edward D. Halpin (Pacific Gas and Electric Company), "Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c) (CAC Nos. MF2333 and MF2334)," dated April 14, 2016, (ADAMS Accession Number ML16035A441).
3. Letter from Bob Martin (NRC) to Steven D. Capps (Duke Energy Carolinas, LLC), "McGuire Nuclear Station, Units 1 and 2 - Issuance of Amendments Regarding National Fire Protection Association Standard (NFPA) 805 (CAC Nos. MF2934 and MF2935)," dated December 6, 2016, (ADAMS Accession Number ML16077A135).
4. Letter from Michael Mahoney (NRC) to Tom Simril (Duke Energy Carolinas, LLC), "Catawba Nuclear Station, Units 1 and 2 - Issuance of Amendments Regarding National Fire Protection Association Standard NFPA 805 (CAC Nos. MF2936 and MF2937)," dated February 8, 2017, (ADAMS Accession Number ML16137A308).

4.3 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, is requesting amendments to Facility Operating License Nos. DPR-58 and DPR-74 for CNP, Units 1 and 2, respectively.

The proposed changes will modify the fire protection license condition in each unit's license, to incorporate the resulting Safety Evaluation of this License Amendment Request. The change in the fire protection license conditions would allow for deviation from National Fire Protection Association (NFPA) 805 requirements to allow for currently installed non-plenum listed cables routed above suspended ceilings and to allow for currently installed thin wall electrical metallic tubing (EMT) and embedded/buried polyvinyl chloride (PVC) conduit.

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

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

Response: No.

The use of EMT and embedded/buried PVC does not create ignition sources and does not impact fire prevention. The EMT and embedded PVC have been in use since original plant construction, are allowed by the National Electrical Code and are not expected to increase the potential for a fire to start.

The prior introduction of non-listed communication/data cables routed above suspended ceilings does not create ignition sources and does not impact fire prevention. Cable installation procedures are utilized to prevent the future installation of new cables that are noncompliant. Also, the communication/data cables routed above suspended ceilings do

not result in compromising automatic fire suppression functions, manual fire suppression functions, fire protection for systems and structures, or post-fire safe shutdown capability.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

The proposed changes do allow future physical changes to the facility that deviate from NFPA 805 requirements. However, the proposed changes do not alter any assumptions made in the safety analyses, nor do they involve any changes to plant procedures for ensuring that the plant is operated within analyzed limits. As such, no new failure modes or mechanisms that could cause a new or different kind of accident from any previously evaluated are being introduced.

Therefore, 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 amendment involve a significant reduction in margin of safety?

Response: No.

The proposed changes do not alter the manner in which safety limits or limiting safety system settings are determined. No changes to instrument/system actuation setpoints are involved. The safety analysis acceptance criteria are not affected by this change and the proposed changes will not permit plant operation in a configuration outside the design basis.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, I&M concludes that the proposed amendments do not involve a 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.

4.4 Conclusions

In conclusion, 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, 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.

5.0 ENVIRONMENTAL CONSIDERATION

I&M has evaluated the proposed amendments for environmental considerations. The review has resulted in the determination 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. Also, the proposed amendments do 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 amendments meet the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendments.

6.0 REFERENCES

1. Letter from M. H. Carlson, Indiana Michigan Power Company, I&M, to NRC Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, Docket Nos. 50-315 and 50-316, Request for License Amendment to Adopt National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)," AEP-NRC-2011-1, dated July 1, 2011, Agencywide Documents Access and Management System (ADAMS) Accession No. ML11188A145.
2. Letter from T. J. Wengert, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 And 2 – Issuance of Amendments Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c) (TAC Nos. ME6629 and ME6630)," dated October 24, 2013, ADAMS Accession No. ML13140A398.
3. NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition.
4. NUREG/CR-6850, EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities – Final Report.
5. NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c), Rev. 2, ADAMS Accession No. ML060880050

Enclosure 3 to AEP-NRC-2017-10

**Donald C. Cook Nuclear Plant Unit 1 License Condition
Pages Marked To Show Proposed Changes**

May 1, 2013, June 21, 2013, and September 16, 2013, and as approved in the Safety Evaluation dated October 24, 2013, and as supplemented in Safety Evaluation dated XX/XX/XXXX. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

(a) Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated; be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed Fire PRA (FPRA) model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

1. Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.
2. Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1×10^{-7} /year (yr) for CDF and less than 1×10^{-8} /yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

(b) Other Changes that May Be Made Without Prior NRC Approval

1. Changes to NFPA 805, Chapter 3, Fundamental Fire Protection Program and Design Elements

Prior NRC review and approval are not required for changes to the NFPA 805, Chapter 3, fundamental fire protection program elements and design requirements for which an engineering evaluation demonstrates that the alternative to the Chapter 3 element is functionally equivalent or adequate for the hazard. The licensee may use an engineering evaluation to demonstrate that a change to an NFPA 805, Chapter 3, element is functionally equivalent to the corresponding technical requirement. A qualified fire protection engineer shall perform the engineering evaluation and conclude that the change has not affected the functionality of the component,

Enclosure 4 to AEP-NRC-2017-10

**Donald C. Cook Nuclear Plant Unit 2 License Condition
Pages Marked To Show Proposed Changes**

residual heat removal, safety injection and boron injection systems in accordance with the specifications of Section XI of the American Society of Mechanical Engineers Code. In addition, prior to completion of the first inservice testing interval, test connections which allow individual leak testing of the charging pump system discharge check valves shall be installed and the check valves shall be leak tested. The tests shall be repeated at the conclusion of each subsequent inservice inspection interval.

- (d) Deleted by Amendment No. 39
- (e) Deleted by Amendment No. 5
- (f) Deleted by Amendment No. 2
- (g) Deleted by Amendment No. 60
- (h) Deleted by Amendment No. 63
- (i) Deleted by Amendment No. 19
- (j) Power Operation with Fewer than Four Reactor Coolant Pumps in Operation

Indiana Michigan Power Company shall not operate the reactor at power levels above P-7 (as defined in Table 3.3.1-1 of Specification 3.3.1 of Appendix A to this renewed operating license) with fewer than four reactor coolant loops in operation until safety analyses for fewer than four loop operation have been submitted and approval for fewer than four loop operation at power levels above P-7 has been granted by the Commission by Amendment of this license.

- (k) Deleted by Amendment No. 16
- (l) Deleted by Amendment No. 63
- (m) Deleted by Amendment No. 19
- (n) Deleted by Amendment No. 28
- (o) Fire Protection Program

Indiana Michigan Power Company shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee's amendment request dated July 1, 2011, as supplemented by letters dated September 2, 2011, April 27, 2012, June 29, 2012, August 9, 2012, October 15, 2012, November 9, 2012, January 14, 2013, February 1, 2013, May 1, 2013, June 21, 2013, and September 16, 2013, and as approved in the Safety Evaluation dated October 24, 2013, and as supplemented in Safety Evaluation dated XX/XX/XXXX. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would,