Indiana Michigan
Power Company
500 Circle Drive
Buchanan, MI 49107 1395

INDIANA MICHIGAN POWER

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Donald C. Cook Nuclear Plant Units 1 and 2
RESPONSE TO NUCLEAR REGULATORY COMMISSION GENERIC LETTER 2003-01: CONTROL ROOM HABITABILITY

By Generic Letter 2003-01, "Control Room Habitability," dated June 12, 2003, the Nuclear Regulatory Commission (NRC) requested that nuclear power plant licensees submit information demonstrating that the control rooms at their facilities comply with their current licensing and design bases and applicable regulatory requirements, and that suitable design, maintenance and testing control measures are in place for maintaining this compliance. This letter provides the requested information for Donald C. Cook Nuclear Plant (CNP), Unit 1 and Unit 2. The requested information is summarized as follows:

- Indiana Michigan Power Company (I&M) considers that the CNP Unit 1 and Unit 2 control rooms meet applicable habitability regulatory requirements, and that control room habitability systems are designed, constructed and operated in accordance with the CNP design and licensing basis.
- I&M determined a value for control room unfiltered inleakage using tracer gas testing in 1999. The current licensing and design basis analyses of the potential radiological dose to control room personnel is based on the results of that testing. These analyses were reviewed by the NRC as part of its approval of the use of an alternative source term in accordance with 10 CFR 50.67.
- I&M does not use compensatory measures to ensure control room habitability.

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- I&M commits to change the CNP Technical Specifications to include periodic reverification of the unfiltered inleakage value. The schedule for submittal of the proposed change will be consistent with industry efforts to establish NRC approved generic control room habitability technical specifications.

Attachment 1 to this letter provides a description of the principal control room habitability structures and systems at CNP and provides responses to the specific items of information requested in the generic letter. Attachment 2 identifies the commitment made in this letter.

Should you have any questions, please contact Mr. Brian D. Mann, Acting Manager of Regulatory Affairs, at (269) 697-5806.

Sincerely,

John A. Zwolinski
Director of Design Engineering and Regulatory Affairs

Attachments

1. Response to Nuclear Regulatory Commission Generic Letter 2003-01
2. Regulatory Commitments

JW/rdw

c: J. L. Caldwell, w/o attachments
K. D. Curry, Ft. Wayne AEP, w/o attachments
J. T. King, MPSC, w/o attachments
MDEQ – WHMD/HWRPS, w/o attachments
NRC Resident Inspector
M. A. Shuaibi, NRC Washington, DC

bc: M. J. Finissi
D. W. Jenkins, w/o attachments
J. N. Jensen, w/o attachments
B. D. Mann, w/o attachments
M. K. Nazar, w/o attachments
J. E. Newmiller
D. J. Poupard
T. R. Satyan-Sharma
M. K. Scarpello, w/o attachments
T. K. Woods
J. A. Zwolinski

ATTACHMENT 1 TO AEP:NRC:3054-15

RESPONSE TO NUCLEAR REGULATORY COMMISSION
GENERIC LETTER 2003-01

In Generic Letter 2003-01, "Control Room Habitability," dated June 12, 2003, the Nuclear Regulatory Commission (NRC) requested that nuclear power plant licensees submit information demonstrating that the control rooms at their facilities comply with their current licensing and design bases and applicable regulatory requirements, and that suitable design, maintenance and testing control measures are in place for maintaining this compliance. This attachment provides a description of the principal control room habitability structures and systems at Donald C. Cook Nuclear Plant (CNP), and responses to the specific items of information requested in the generic letter. Documents referenced below are identified at the end of this attachment.

CNP Control Room Habitability Structures and Systems

The principal control room habitability structures, systems and components at CNP are those that comprise the control room envelope (designated as the control room envelope/pressure boundary in the CNP TS) and those that provide ventilation for the control room envelope. A general description of these structures, systems and components is provided below. Specific information is provided in subsequent sections of this attachment as necessary to address NRC requests for information.

Control Room Envelope

Unit 1 and Unit 2 have separate but similar control room envelopes. Each unit's control room envelope consists of its control room, control room heating, ventilation, and air conditioning (HVAC) equipment room, and plant process computer room. The control rooms for Unit 1 and Unit 2 are adjacent to each other on the 633 foot elevation of the Auxiliary Building, with normal access from the turbine building. The control room HVAC equipment room and the plant process computer room for each unit are adjacent to each other, on the 650 foot elevation, directly above the associated unit's control room. The plant grade elevation is 608 feet. The walls, floors, and ceilings of each unit's control room envelope is constructed of reinforced concrete.

Ventilation Systems

Unit 1 and Unit 2 have separate and essentially identical control room ventilation provisions. Each unit is provided with two separate ventilation systems. Both systems are located in the unit's control room HVAC equipment room, and are, therefore, contained within the unit's control room envelope. One of the two ventilation systems provides heating, cooling, and ventilation during normal operation. This system is designated as the control room air conditioning system (CRACS) in Technical Specification (TS) 3/4.7.5.2. The CRACS draws outside air through a single intake located in an external wall of the unit's control room HVAC equipment room. The outside air passes through two motor-operated isolation dampers arranged in series. The outside air is then combined with a fixed portion of recirculated air from the

control room. The combined outside and recirculated air passes through one of two parallel, flow paths. Each of these flow paths contains a roughing filter, a medium efficiency filter, cooling coils, a fan, a heating element, and a humidifier. The air from these flow paths is discharged through the control room HVAC equipment room floor to the control room below. The system maintains the control room at a slightly positive pressure with respect to the atmosphere to inhibit entry of dust and dirt during normal operation.

The other ventilation system provides control room recirculation and pressurization with filtered air during emergency operation. The system is not in service during normal operation. This system is designated as the control room emergency ventilation system (CREVS) in TS 3/4.7.5.1. When actuated, the CREVS draws outside air through its own single intake located in an outside wall of the unit's control room HVAC room. The outside air passes through one of two motor-operated isolation dampers installed in parallel, each having 100 percent design flow capacity. The outside air is then combined with a fixed portion of recirculated air from the control room. The combined outside and recirculated air passes through a roughing filter, a high efficiency particulate air (HEPA) filter which removes radioactive particulates, and a charcoal adsorber which removes radioactive iodine. The air then enters the suction of the two CREVS fans installed in parallel. The air discharged by the fan(s) is directed through the control room HVAC equipment room floor to the control room below. The system maintains the control room at a positive pressure of at least 1/16 inch water gauge with respect to the atmosphere.

Emergency Mode of Operation

A safety injection signal from either unit or a high radiation signal from a unit's control room radiation monitor automatically initiates closure of the two series isolation dampers in that unit's CRACS, initiates opening of one of the unit's two parallel CREVS intake isolation dampers to a pre-set position, and initiates starting of both of the unit's CREVS fans. (Only one fan is needed and procedures direct operators to secure one fan upon automatic initiation of the system.) With these actions, the CRACS functions solely as a recirculation system, and the CREVS pressurizes the control room envelope to inhibit inleakage while removing contaminants from both the pressurization air and the recirculated air.

Fire Mode of Operation

The CREVS also has a mode of operation that is automatically initiated by a fire in the cable vaults located directly below the control room. In this mode the CREVS fans start and the intake isolation damper opens. The CREVS recirculation damper closes and the system functions solely as a pressurization system to inhibit the entry of smoke and carbon dioxide (from fire suppression systems) into the control rooms. The CRACS functions solely as a recirculation system.

NRC Requested Information Item 1

Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs [control room habitability systems] are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases.

Response to Item 1

As described in the response to NRC Requested Information Item 3, CNP was not designed to meet the general design criterion (GDC) of Appendix A to 10 CFR 50. However, the CNP Unit 1 and Unit 2 control rooms currently meet the requirements of GDC 19, and are designed, constructed, configured, operated, and maintained in accordance with the associated CNP design and licensing bases. Compliance with other design criteria is discussed in the response to NRC Requested Information Item 3.

The design and licensing basis with respect to compliance with GDC 19 is documented in three license amendments issued in October and November 2001, and November 2002 (References 1, 2, and 3), and the associated correspondence (References 4 through 15). These amendments and correspondence document the following:

- NRC approval for use of an alternative source term (AST), described in NUREG-1465 (Reference 16), for calculating the doses to personnel in the control room.
- NRC review of analyses performed using the AST to determine the doses to control room personnel from the design basis accidents and events applicable to CNP.
- Indiana Michigan Power Company's (I&M) resolution of 99 historic CNP-specific and generic control room habitability issues. The issues involved compliance with licensing bases, control room inleakage, system and component design, radiological and chemical hazard analyses, definition of control room envelope, technical specifications, procedures, training, compensatory measures, and system and component testing.
- NRC approval of TS changes to separate the CREVS emergency pressurization and filtration functional requirements from the CRACS temperature control function, define the control room envelope and add an associated Action requirement, expand the CREVS TS applicability requirements and associated actions to include, "during the movement of irradiated fuel assemblies," clarify CREVS train designations, and incorporate the recommendations for laboratory testing of charcoal described in Generic Letter 99-02 (Reference 17).

The control room dose analyses using the AST demonstrate that the limits of GDC 19 would be met for the design basis accidents and events applicable to CNP. The inputs and assumptions used in these analyses include values for unfiltered inleakage determined by tracer gas testing as described in response to Item 1.a below. This and other inputs and assumptions are documented in Attachment B to Attachment 6 to Reference 4. Attachment B lists 139 items, including design, operating, test, TS, and proceduralized parameters, that are the inputs and assumptions

for the radiological analyses. As part of the implementation of the final control room habitability amendment (Reference 3) in December 2002, each item listed in Attachment B was reviewed to assure that there were no changes in the information that would invalidate the analyses. Implementation also included significant changes to the Updated Final Safety Analysis Report (UFSAR) to incorporate descriptions of the analyses. Inclusion of these descriptions in the UFSAR has provided ongoing assurance that changes that may affect the inputs and assumptions for the analyses are reviewed in accordance with 10 CFR 50.59, and that the control room habitability system design, configuration, operation, and maintenance will remain in accordance with the CNP licensing basis with respect to compliance with GDC 19.

NRC Requested Information Item 1(a)

Emphasis should be placed on confirming:

That the most limiting unfiltered inleakage into your CRE [control room envelope] (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

Response to Item 1(a)

The values assumed in the current design basis radiological analyses for control room habitability are greater than or equal to the most limiting measured unfiltered inleakage, filtered inleakage (filtered makeup), and normal makeup into the CNP Unit 1 and Unit 2 control room envelopes.

Unfiltered Inleakage

Unfiltered inleakage is the amount of outside air that enters the control room envelope through unfiltered leakage pathways when the CREVS is operating in the emergency mode. The amount of unfiltered inleakage into the Unit 1 and Unit 2 control room envelopes was measured using tracer gas tests during June 1999. The test boundary consisted of the control room envelope. The tracer gas testing used concentration buildup and steady state tests to quantify the unfiltered inleakage. The test procedure was based on the methodology described in ASTM E741-93 (Reference 18).

The current NRC guidance for performing such tests is contained in Regulatory Guide (RG) 1.197 (Reference 19) which was issued after the CNP tests were performed. The CNP tests differed in some respects from that guidance. The principal differences were as follows:

- The CNP tests were based on the 1993 edition of ASTM E741, rather than the 2000 edition endorsed by the RG. However, the two editions are functionally identical.
- The CNP tests measured the rate at which air entered the control room, whereas strict adherence to ASTM E741 would measure the control room air turnover rate. However, the

CNP test method aligned more closely with the objective of quantifying inleakage as stated in Section 1.1 of the RG.

- The CNP tests did not include an allowance of 10 cubic feet per minute (cfm) for control room ingress and egress as specified in Section 2.5 of the RG. However, the unfiltered inleakage value determined by the CNP tests did include an uncertainty value of 49 cfm which is not required by Section 1.4 of the RG.

The tracer gas test results for the Unit 2 control room showed a nominal unfiltered inleakage of 49 cfm, with a 95 percent confidence limit that the actual inleakage was within plus or minus 49 cfm of the 49 cfm value. Therefore, the maximum expected Unit 2 control room unfiltered inleakage as determined by the test is 98 cfm, with a confidence level of 95 percent.

The tracer gas test results for the Unit 1 control room showed a nominal unfiltered inleakage of 144 cfm with 95 percent confidence that the actual inleakage was between 120 and 168 cfm. However, the majority of the inleakage that occurred during the Unit 1 test was through a CRACS intake damper that was leaking excessively. Measurements using tracer gas determined the nominal inleakage through this intake damper to be 107 cfm with 95 percent confidence that the actual flow rate was between 79 and 135 cfm. Assuming the minimum measured flow rate through the failed damper of 79 cfm, and the maximum measured unfiltered inleakage for Unit 1 of 168 cfm, then the maximum unfiltered inleakage from sources other than the failed intake damper would be 89 cfm. Subsequent to the tracer gas testing, the single CRACS intake dampers on each unit was replaced with two dampers in series. Each of the two series dampers is leak tested periodically, with an acceptance criteria of less than or equal to 5 cfm leakage. Adding the procedurally-allowed limit of 5 cfm to the conservative estimate of unfiltered inleakage from sources other than the failed intake damper brings the total to 94 cfm (89 plus 5), which is still below the 98 cfm maximum unfiltered inleakage determined for the Unit 2 control room. Therefore, the Unit 2 unfiltered inleakage test results bound the Unit 1 unfiltered inleakage value following the installation of redundant CRACS intake dampers on Unit 1.

Filtered Makeup

Filtered makeup is the amount of outside air drawn through the HEPA and charcoal filters into the control room envelope when the CREVS is operating in the emergency mode. The amount of filtered makeup can be measured without performing tracer gas testing. TS Surveillance Requirement 4.7.5.1.e.3 for both Unit 1 and Unit 2 requires that, at least once per 18 months, the amount of filtered makeup be verified to be less than or equal to 1000 cfm.

Normal Makeup

Normal makeup is the amount of outside air drawn into the control room envelope when the CRACS is operating in the normal mode and the CREVS is not operating. This air does not pass through HEPA and charcoal filters. The amount of normal makeup can be measured without performing tracer gas testing. Although not required by the CNP TS, I&M measures normal makeup in conjunction with the testing required every 18 months by TS Surveillance

Requirement 4.7.5.1.e. The CNP procedure used to measure normal makeup flow specifies a maximum limit of 960 cfm.

Values Assumed in Radiological Analyses for Control Room Habitability

As described in the response to Item 1, the current control room dose analyses are those that were reviewed by the NRC as part of the approval to use the AST. These analyses consist of individual analyses of nine accidents and events identified in the UFSAR. In some of these accidents and events, the CREVS and the CRACS would shift to the emergency mode. For this condition:

- A value of 98 cfm for unfiltered inleakage was assumed, which is the maximum value determined by tracer gas testing,
- A value of 1000 cfm per fan for filtered makeup was assumed, which is the maximum value allowed by TS Surveillance Requirement 4.7.5.1.e.3.

In some of these accidents and events, the CREVS would not actuate and the CRACS would remain in the normal mode. For this condition:

- A value of 1000 cfm for normal makeup was assumed, which is more conservative than the limit of 960 cfm specified in the CNP test procedures.

Therefore, the measured values for the flow of outside air entering the control room envelope for both conditions are no more than the values assumed in the design basis control room habitability radiological analyses.

NRC Requested Information Item 1(b)

[Emphasis should be placed on confirming:]

That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

Response to Item 1(b)

I&M conservatively uses the value for normal makeup, rather than unfiltered inleakage, in the assessments that quantify the concentration of hazardous chemicals in the control room that would result from a postulated release. I&M has confirmed that reactor control capability would be maintained from the alternate shutdown panel in the event of smoke.

Hazardous Chemical Assessments

I&M performed an evaluation of onsite sources of toxic gas for potential hazards to control room habitability in 1991. In that evaluation, no operator action to shift CRACS to the emergency mode or actuate the CREVS was credited. It was assumed that the toxic gases entered the control room via the CRACS normal makeup flow. The only potentially significant hazard identified in the evaluation resulted from hydrazine stored on site. I&M is updating the hydrazine hazard evaluation to reflect changes in quantities stored in the turbine building and reflect the current increased CRACS normal makeup flow. The updated evaluation will retain the assumption that the CRACS remains in the normal mode and that the CREVS does not actuate. This update will be completed during the first quarter of 2004. Preliminary evaluation of changes in the quantity and/or location of potential chemical hazards other than hydrazine indicate that control room concentrations would continue to be well below established limits. I&M will complete a formal update of the evaluation of potential onsite hazards from chemicals other than hydrazine prior to the end of 2004. For those hazards that require quantification of the potential chemical concentrations in the control room, the update will include the assumption that the toxic gases enter the control room via the normal makeup flow.

In 1999 - 2000, I&M performed an evaluation of offsite sources of toxic gas for potential hazards to control room habitability in accordance with RGs 1.78 and 1.95 (References 20 and 21). The evaluation determined that 1) there were no chemicals stored in fixed locations near the site that, due to their quantity, properties, and location, would pose a threat to control room operators, 2) the risk from chemicals on the nearby interstate highway and railroads was sufficiently low to preclude further evaluation, and 3) that a barge accident involving hazardous material was not credible due to the absence of major shipping lanes or significant ports near the plant. Based on these determinations, it was not necessary to quantify potential chemical concentrations in the control room and, therefore, not necessary to assume a value for inleakage or normal makeup. I&M will update the evaluation of offsite sources of toxic gas prior to the end of 2004. I&M anticipates quantification of potential chemical concentrations in the control room will be unnecessary. However, if quantification of the potential concentrations is necessary, the update will include the assumption that the toxic gases enter the control room via the normal makeup flow.

Reactor Control Capability in the Event of Smoke.

I&M has confirmed, in accordance with RG 1.196 (Reference 22), that the reactor control capability can be maintained from either the control room or from alternate shutdown locations in the event of smoke. Regulatory Position 2.6 of RG 1.196 recommends performance of a qualitative assessment of the ability to manage smoke infiltration in the control room, and endorses Appendix E of NEI 99-03 (Reference 23), with certain modifications, as an acceptable method for performing the qualitative assessment. The modified assessment items of Appendix E of NEI 99-03 and a description of how each item is addressed at CNP are provided below.

- Verify that the remote shutdown panels or controls are not located within the control room habitability envelope. The Unit 1 and Unit 2 local shutdown indication (LSI) panels and manual component manipulations needed for remote shutdown are located outside the control room envelope. The LSI panels are located in the auxiliary building. The individual alternate shutdown components are located in the auxiliary building and turbine building.
- Verify that the remote shutdown panels or controls and the control room are adequately separated by distance, or appropriate fire barriers, such that a single credible fire/smoke event in one area could not affect the habitability of the other. The LSIs and manual component manipulations are all located in fire zones other than the control room fire zone, and at sufficient distance from the control room such that their habitability would not be affected by a single credible fire/smoke event in the control room.
- Verify that a credible fire/smoke event does not exist that could affect control room habitability while simultaneously blocking the normal egress path to the remote shutdown panels or controls. If not, verify that an alternate egress path exists and that it is addressed in plant procedures. Although desirable, this guidance does not require that the alternate route be equipped with emergency lighting to specifically cover this scenario. The Unit 1 and Unit 2 control rooms each have doors leading to the turbine deck, providing normal egress, and to the Auxiliary Building, providing alternate egress. Although procedures do not specify a specific egress path, operators are aware of both the normal and alternate paths.
- Verify that sufficient procedural guidance exists to mitigate credible fire/smoke events. Fire/smoke response procedures should contain provisions to manually align ventilation systems to exhaust smoke away from the control room when practical. Operation of the CREVS in the fire mode would inhibit smoke inleakage. Operation of the CRACS in the normal mode or operation of the CREVS in the emergency mode in accordance with the operating procedures for these systems would provide a continuous supply of fresh air to the control rooms. Smoke ejectors are maintained on the site fire truck and can be used if the CRACS and CREVS are not available.
- Verify that a sufficient number of control room operators per shift are qualified in the use [of] self-contained breathing apparatus (SCBA) to safely shut-down the plant. Certain success paths to achieve the stated goal above may require the limited use of SCBA. All on-shift operators are required to maintain SCBA qualification as part of emergency preparedness provisions.
- Verify that the appropriate SCBA and smoke removal equipment are available and properly staged. The minimum combined manning for both control rooms required by operating procedures during Modes 1 through 4 is eight individuals. In accordance with CNP emergency preparedness procedures, a minimum of 14 SCBAs and 10 spare air bottles are available in or near the control rooms. Each SCBA or bottle contains a minimum of approximately one-half hour supply of air. Therefore, the minimum combined manning for both control rooms could be maintained for approximately 1½ hours using the immediately available SCBAs and spare bottles. This would provide time to clear the smoke using smoke ejectors that are available on the station fire truck and in a fire protection equipment storage cage located in the Turbine Building. Additionally, temporary blowers are available from the CNP Maintenance Department Tool Crib.

- Verify that initial and continuing training is performed to ensure familiarity with the success paths discussed in this appendix [to NEI 99-03]. Operators receive initial and continuing training on the procedure for shutting down the unit using the alternate shutdown instrumentation and controls. The extent of the continuing training is determined by an operations curriculum development committee using a systems approach to training in accordance with 10 CFR 50.120. Emergency response personnel receive training on the use of smoke ejectors.
- If the assessment determines that a potential situation exists where a success path is not assured, the condition should be entered into the plant's corrective action process to ensure an appropriate resolution. As described above, no potential situation where a success path is not assured has been identified.

NRC Requested Information Item 1(c)

[Emphasis should be placed on confirming:]

That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

Response to Item 1(c)

The CNP TS contain a differential pressure Surveillance Requirement to demonstrate control room envelope integrity at least once per 18 months, and do not require periodic re-verification of the unfiltered inleakage value. I&M is monitoring the NRC review of Technical Specification Task Force (TSTF) -448, Revision 1 (Reference 24). TSTF-448 modifies the Improved Standard TS to include Surveillance Requirements to periodically determine unfiltered inleakage using an integrated test such as that specified in ASTM E741 or, under certain conditions, using individual component testing. I&M considers that TSTF-448, Revision 1, provides an acceptable basis for similar changes to the CNP TS. Within one year following NRC approval of TSTF-448, I&M will determine the applicability of the approved TSTF to CNP and submit a license amendment request to require periodic measurement of unfiltered control room envelope inleakage. Since tracer gas testing has already been performed, I&M anticipates that no modifications to the CNP control room envelope will be needed to demonstrate compliance with new TS Surveillance Requirements.

I&M considers that the following conditions provide a reasonable degree of assurance that the value for unfiltered inleakage, previously determined by tracer gas testing and assumed in the radiological analyses of the dose to control room personnel, will remain valid until the CNP TS are changed to require periodic re-verification of the unfiltered inleakage value.

- The two potential unrecognized contamination pathways identified in the "Background" section of Generic Letter 2003-01 do not exist at CNP. These potential pathways are control room ventilation system suction ductwork that is located outside the control room envelope, and pressurized ducts that traverse a lower pressure control room envelope en route to another plant area. The first potential pathway does not exist at CNP because, for both units, the CREVS and the CRACS are entirely contained within the control room envelope. The second potential pathway does not exist at CNP because there are no ducts from other systems that traverse the control room envelope of either unit. Therefore, the existing differential pressure TS Surveillance Requirement provides an indicator of control room envelope integrity.
- The only portion of the CRACS that forms part of the control room envelope is the duct work between the intake opening in the control room HVAC equipment room wall and the two isolation dampers arranged in series. This portion of the duct work is leak tested in conjunction with the 18 month CREVS TS Surveillance Requirements.
- CNP procedures require that control room envelope doors be inspected for proper position and apparent damage every 24 hours, and control room envelope door seals be inspected for apparent damage every 3 months.
- Fire seals are a part of the control room envelope. CNP procedures require that ten percent of all fire seals in each unit be inspected for damage or deterioration every 18 months. If unacceptable seals are identified, an additional ten percent is inspected until a ten percent sample shows no discrepancies.
- CNP procedures establish measures for controlling openings in the control room envelope, and for implementing administrative controls and compensatory measures in accordance with the TS.

NRC Requested Information Item 2

> If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.

Response to Item 2

There are no compensatory actions, such as use of potassium-iodide pills or SCBAs, credited in the analyses that demonstrate control room habitability with respect to radiological or chemical hazards at CNP. I&M plans to continue staging SCBAs near the control room and qualifying operators in their use as described above under "Reactor Control Capability in the Event of Smoke."

NRC Requested Information Item 3

If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements.

Response to Item 3

As described in Section 1.4 of the UFSAR, CNP was designed and constructed to meet the intent of the draft GDC published by the Atomic Energy Commission on July 11, 1967. The application of the proposed GDC to CNP was discussed in Appendix H to the original Final Safety Analysis Report (FSAR), which was filed before the final GDC were published. Appendix H was subsequently removed from the FSAR when the UFSAR was developed. The current Plant Specific Design Criteria (PSDC) are described in Section 1.4 of the UFSAR. The CNP Unit 1 and Unit 2 control room envelopes, CREVS, and CRACS, comply with the applicable PSDC. The applicable PSDC are identified below, along with a description of how compliance is achieved.

<u>PSDC 1 - Quality Standards</u>:

Those structures, systems and components of reactor facilities which are essential to the prevention, or the mitigation of the consequences, of nuclear accidents which could cause undue risk to the health and safety of the public shall be identified and then designed, fabricated, and erected to quality standards that reflect the importance of the safety function to be performed. Where generally recognized codes and standards pertaining to design, materials, fabrication, and inspection are used, they shall be identified. Where adherence to such codes or standards does not suffice to assure a quality product in keeping with the safety function, they shall be supplemented or modified as necessary. Quality assurance programs, test procedures, and inspection acceptance criteria to be used shall be identified. An indication of the applicability of codes, standards, quality assurance programs, test procedures, and inspection acceptance criteria used is required.

Design standards and criteria for the control room envelope, CREVS and CRACS are described in UFSAR Sections 1.4 ("Plant Specific Design Criteria"), 2.6.2 ("Initial Studies"), 2.8.3 ("Wind Loading Design"), 2.9 ("Plant Design Criteria for Structures and Equipment"), 7.7 ("Operating Control Stations"), and 9.10 ("Control Room Ventilation System"). The control room envelope, the CREVS, and the portion of the CRACS from the intake opening to, and including, the two series intake isolation dampers are classified as Seismic Class I as described in Section 2.9.1 of the UFSAR. The CREVS and the above described portion of the CRACS are classified as safety related. The CNP Quality Assurance Program Description (QAPD) applies to activities affecting safety-related functions of such structures, systems and components. The QAPD is the highest tier document that implements the requirements of 10 CFR 50 Appendix B

at CNP. Lower tier procedures specify test procedures, and inspection acceptance criteria applicable to the control room envelope, CREVS, and CRACS.

PSDC 2 - Performance Standards:

> Those structures, systems and components of reactor facilities which are essential to the prevention, or to the mitigation of the consequences, of nuclear accidents which could cause undue risk to the health and safety of the public shall be designed, fabricated, and erected to performance standards that enable such structures, systems and components to withstand, without undue risk to the health and safety of the public, the forces that might reasonably be imposed by the occurrence of an extraordinary natural phenomenon such as earthquake, tornado, flooding condition, high wind, or heavy ice. The design bases established shall reflect: (a) appropriate consideration of the most severe of these natural phenomena that have been officially recorded at the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design.

As described above, the Unit 1 and Unit 2 control room envelopes, CREVS, and portions of the CRACS are classified as Seismic Class I and are located in the Auxiliary Building. UFSAR Section 2.9.5 describes the seismic and tornado design criteria for the Auxiliary Building. UFSAR Section 2.9.6 describes the design criteria for Seismic Class 1 equipment. The lowest elevation of the Unit 1 and Unit 2 control room envelopes is 633 feet. This elevation is well above the elevation of the maximum expected seiche plus a 3 foot safety margin, 594.5 feet, as described in UFSAR Section 2.6.2. This elevation is also well above the elevation of the maximum expected flood from internal sources, 574 feet, as described in UFSAR Section 14.4.2.7. UFSAR Section 2.8.3 describes the wind loading design for the Auxiliary Building.

PSDC 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. Non-combustible 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.

The control room envelope for each unit consists of the unit's control room, control room HVAC equipment room, and plant process computer room. As described in the CNP Fire Hazards Analysis, the walls, floors, ceilings, doors and access openings to adjacent fire areas in these rooms are rated as 3 hour fire barriers, with certain exceptions. Those exceptions have been evaluated and found to be acceptable. The fire loading in these rooms has been evaluated with respect to fire resistance and found to be acceptable. Penetrations between the control room envelope and adjacent fire areas are provided with fire seals. All rooms in the control room

envelope have fire detection and automatic and/or manual (or backup) fire suppression as described in the CNP Fire Hazards Analysis.

PSDC 4 - Sharing of Systems:

> Reactor facilities may share systems or components if it can be shown that such sharing will not result in undue risk to the health and safety of the public.

Unit 1 and Unit 2 have separate and independent control room envelopes, CREVS, and CRACS. The only shared component is the reinforced concrete wall that separates the Unit 1 and Unit 2 control room envelopes. This does not affect the independence of each unit.

PSDC 5 - Records Requirements:

> The reactor licensee shall be responsible for assuring the maintenance, throughout the life of the reactor, of records of the design, fabrication, and construction of major components of the plant essential to avoid undue risk to the health and safety of the public.

Regarding initial construction records, I&M, or its authorized representative, and Westinghouse Electric Corporation have retained documentation of the design, fabrication and construction of essential plant components, including those involved in control room habitability. These records verify the high quality and performance standards applicable to such essential plant components. A complete set of as-built facility plant and system diagrams, including arrangement plans and structural plans, and records of initial tests and operation are maintained throughout the life of the plant. A set of all the quality assurance data generated during fabrication and erection of the essential components of the plant, as defined by the initial quality assurance program, is retained.

Control of design fabrication and construction records for the structures, systems and components that comprise the CREVS, CRACS, and control room envelope is specified by requirements of Section B.15 of the QAPD, and the procedures that implement those requirements.

PSDC 11 - Control Room:

> The facility shall be provided with a control room from which actions to maintain safe operational status of the plant can be controlled. Adequate radiation protection shall be provided to permit continuous occupancy of the control room under any credible post-accident condition or as an alternative, access to other areas of the facility as necessary to shutdown and maintain safe control of the facility without excessive radiation exposures of personnel.

The requirements of this PSDC are bounded by the requirements of GDC 19 of Appendix A to 10 CFR 50. Compliance with GDC 19 is described in the responses to Items 1, 1(a), and 1(b).

PSDC 40 - Missile Protection:

> Adequate protection for the engineered safety features, the failure of which would result in undue risk to the health and safety of the public, shall be provided against dynamic effects and missiles that might result from plant equipment failures.

The Unit 1 and Unit 2 control room envelopes, are classified as Seismic Class I. As described in the UFSAR Section 1.4 description of compliance with PSDC 40, Seismic Class I structures are designed to withstand missiles originating from tornados and turbine blade failures. Additionally, walk downs conducted in 2000 determined that there is no high energy piping located close enough (within ten pipe diameters) to threaten the Unit 1 or 2 control room envelopes, CREVS, or CRACS.

References for this Attachment

1. Letter from J. F. Stang, NRC, to R. P. Powers, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Issuance of Amendments (TAC Nos. MA9394 and MA9395)," dated October 24, 2001

2. Letter from J. F. Stang, NRC, to R. P. Powers, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Issuance of Amendments (TAC Nos. MA9394 and MA9395)," dated November 13, 2001

3. Letter from J. F. Stang, NRC, to A. C. Bakken III, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Issuance of Amendments (TAC Nos. MB5318 and MB5319)," dated November 14, 2002

4. Letter from R. P. Powers, I&M, to NRC Document Control Desk, "License Amendment Request for Control Room Habitability and Generic Letter 99-02 Requirements," C0600-13, dated June 12, 2000

5. Letter from M. W. Rencheck, I&M, to NRC Document Control Desk, "Supplemental Information on License Amendment Request for Control Room Habitability," C1100-01, dated November 7, 2000

6. Letter from J. F. Stang, NRC, to R. P. Powers, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Request for Additional Information, License Amendment Request for Control Room Habitability, (TAC Nos. MA9394 and MA9395)," dated March 29, 2001

7. Letter from M. W. Rencheck, I&M, to NRC Document Control Desk, "Partial Response to Nuclear Regulatory Commission Request for Additional Information Regarding License Amendment Request for Control Room Habitability, (TAC Nos. MA9394 and MA9395)," C0601-03, dated June 19, 2001

8. Letter from J. F. Stang, NRC, to R. P. Powers, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Request for Additional Information, License Amendment Request for Control Room Habitability (TAC Nos. MA9394 and MA9395)," dated August 16, 2001

9. Letter from M. W. Rencheck, I&M, to NRC Document Control Desk, "Final Response to Nuclear Regulatory Commission Request for Additional Information Regarding License Amendment Request for Control Room Habitability (TAC Nos. MA9394 and MA9395)," C0801-02, dated August 17, 2001

10. Letter from S. A. Greenlee, I&M, to NRC Document Control Desk, "Notification of Extension of a commitment Due Date," C0901-08, dated September 14, 2001

11. Letter from A. C. Bakken III, I&M, to NRC Document Control Desk, "Partial Response to Second Nuclear Regulatory Commission Request for Additional Information Regarding License Amendment Request for Control Room Habitability," C0102-04, dated January 15, 2002

12. Letter from J. E. Pollock, I&M, to NRC Document Control Desk, "Final Response to Second Nuclear Regulatory Commission Request for Additional Information and Verbal Concerns Regarding License Amendment Request for Control Room Habitability," AEP:NRC:2075, dated June 5, 2002

13. Letter from J. E. Pollock, I&M, to NRC Document Control Desk, "Supplement to License Amendment Request Regarding Control Room Habitability," AEP:NRC:2075-01, dated September 20, 2002

14. Letter from A. C. Bakken III, I&M, to NRC Document Control Desk, "Second Supplement to License Amendment Request Regarding Control Room Habitability," AEP:NRC:2075-02, dated November 13, 2002

15. Letter from J. F. Stang, NRC, to A. C. Bakken III, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Request for Withholding Information From Public Disclosure (TAC Nos. MB5318 and MB5319)," dated November 14, 2002

16. NUREG-1465, "Accident Source Terms for Light Water Nuclear Power Plants," dated February 1995

17. NRC Generic Letter (GL) 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated June 3, 1999

18. ASTM Standard E741-93, "Standard Test Method for Determining Air Change Rate in a Single Zone by Means of a Tracer Gas Dilution,"

19. Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," dated May 2003

20. Regulatory Guide 1.78, "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a postulated Hazardous Chemical Release," dated June 1974

21. Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," Revision 1, dated January 1977

22. Regulatory Guide 1.196, "Control Room Habitability at Light Water Nuclear Power Reactors," dated May 2003

23. Nuclear Energy Institute document NEI 99-03, "Control Room Habitability Assessment Guide," dated June 2001

24. Technical Specification Task Force Improved Standard Technical Specification Change Traveler, TSTF-448, Revision 1, dated August 18, 2003

ATTACHMENT 2 TO AEP:NRC:3054-15

REGULATORY COMMITMENTS

The following table identifies those actions committed to by Indiana Michigan Power Company (I&M) in this document. Any other actions discussed in this submittal represent intended or planned actions by I&M. They are described to the Nuclear Regulatory Commission (NRC) for the NRC's information and are not regulatory commitments.

Commitment	Date
I&M will update the control room hydrazine hazard evaluation to reflect changes in quantities stored in the turbine building and reflect the current control room air conditioning system (CRACS) normal makeup flow. The updated evaluation will retain the assumption that the CRACS remains in the normal mode and that the control room emergency ventilation system does not actuate.	March 31, 2004
I&M will update the evaluation of hazards from onsite chemicals other than hydrazine. For those hazards that require quantification of the potential chemical concentrations in the control room, the update will include the assumption that the toxic gases enter the control room via the normal makeup flow.	December 31, 2004
I&M will update the evaluation of offsite sources of toxic gas. If it is necessary to quantify the potential chemical concentrations in the control room, the update will include the assumption that the toxic gases enter the control room via the normal makeup flow.	December 31, 2004
I&M will determine the applicability of the NRC approved TSTF-448 to Donald C. Cook Nuclear Plant and submit a license amendment request to require periodic measurement of unfiltered control room envelope inleakage.	Within one year following NRC approval of Technical Specification Task Force-448