Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
616-465-5901

AEP
INDIANA MICHIGAN POWER

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U.S. Nuclear Regulatory Commission
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Donald C. Cook Nuclear Plant Units 1 and 2
CHANGES TO POST-ACCIDENT SAMPLING SYSTEM COMMITMENTS

Indiana Michigan Power Company (I&M), the Licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, has implemented changes to post-accident sampling (PAS) system commitments. The purpose of this submittal is to provide notification of the changed commitments. No NRC response or action is requested.

The licensing basis for the PAS system was established in correspondence between I&M and the NRC in response to NUREG-0737, "Clarification of TMI [Three Mile Island] Action Plan Requirements." I&M provided details of the PAS system to demonstrate compliance with NUREG-0737, Item II.B.3, "Post accident sampling capability."

The changes addressed in this letter are provided to reflect changes to the design, testing, analytical equipment and methods, and maintenance of the PAS system since the earlier submittals and to distinguish the analytical instrumentation uncertainty limits from actual uncertainty values measured by validation testing. These changes are consistent with the CNP Updated Final Safety Analysis Report and Technical Specifications. The commitment changes are summarized as follows:

1. The testing frequency of the containment sump sampling equipment is clarified to be once every refueling cycle vice once every six months.
2. The lower limit of detection for chloride in undiluted samples is changed from 0.01 parts per million (ppm) to 0.05 ppm.
3. The distinction between recommended instrument accuracy limits and actual instrument uncertainty values measured by validation testing is

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clarified. This activity also includes incorporating the recommended accuracy limits and instrument ranges into the UFSAR.

4. The analytical equipment and methods used for the boron and dissolved oxygen analyses are changed.
5. Labor resources other than contractors may be used to implement the preventive maintenance program for the PAS system.

The changes have been reviewed in accordance with the requirements of 10 CFR 50.59, and determined to not involve an unreviewed safety question. A detailed description of these changes is provided in Attachment 1. Attachment 2 contains a summary of new and revised I&M commitments made in this submittal.

Should you have any questions, please contact Mr. Robert C. Godley, Director of Regulatory Affairs, at (616) 466-2698.

Sincerely,

M. W. Rencheck
Vice President

Attachment

c: J. E. Dyer
MDEQ – DW & RPD, w/o attachments
NRC Resident Inspector
R. Whale, w/o attachments

ATTACHMENT 1 TO C0100-04

Summary

Indiana Michigan Power Company (I&M), the Licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, has implemented changes to the post-accident sampling (PAS) system as described below. The changes to the PAS system commitments resolve discrepancies that were identified by the plant functional area reviews during the current plant shutdown. Each discrepancy has been reviewed and determined not to be reportable in accordance with the requirements of 10 CFR 50.72 and 10 CFR 50.73. These changes do not prevent the PAS system from providing samples to determine the degree of core damage, verify boron concentration, and assess the corrosion potential of post-accident reactor coolant under degraded core conditions following a loss-of-coolant accident.

The licensing basis for the PAS system was established in correspondence between I&M and the NRC in response to NUREG-0737, "Clarification of [Three Mile Island] TMI Action Plan Requirements." I&M provided details of the PAS system and program to the NRC to demonstrate compliance with the NUREG-0737, Item II.B.3, "Post accident sampling capability." This attachment describes changes to the design, testing, analytical equipment and methods, and maintenance of the PAS system since the earlier submittals. These changes also distinguish the analytical instrumentation uncertainty limits from actual uncertainty values measured by validation testing. These changes are consistent with the Updated Final Safety Analysis Report (UFSAR) and Technical Specifications.

Commitment Change Process

The commitment changes described below were reviewed in accordance with I&M's commitment management program, which is based on the Nuclear Energy Institute (NEI) guidance on managing NRC commitments (Reference 9). The changes have been evaluated against Figures A-1 and A-3 of the NEI guidance document. The five commitment changes were reviewed in accordance with 10 CFR 50.59 and determined to not involve an unreviewed safety question. Additionally, these changes were evaluated against the NEI guidance document criterion pertaining to commitments necessary to achieve compliance with an obligation and the criterion pertaining to commitments used as the basis for an NRC safety evaluation. In accordance with the NEI guidance, NRC approval is not required for implementation. This submittal constitutes the follow-up NRC notification letter recommended by the NEI guidance document.

Background

NUREG-0737 was published in November 1980 to provide clarification of the requirements identified in NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term

Recommendations," Section 2.1.8.a, "Improved Post-Accident Sampling Capability." By Reference 1, the NRC provided additional guidance for the PAS system requirements and requested documentation on I&M's method of satisfying the criteria presented in the guidance. By References 2, 4, 6, and 7, I&M provided a complete and detailed description of the PAS system. This information provided the basis for the preliminary PAS system evaluation (Reference 3) and the safety evaluation reports (SERs) for the PAS system (Reference 5) and Regulatory Guide 1.97 instrumentation (Reference 8).

Description and Analysis of Changes to the PAS System Licensing Basis

1. Containment Sump Sample Points Testing Frequency

The PAS quality assurance procedure requires containment sump sample points to be tested once every refueling outage. This testing frequency is not consistent with Criterion 5 of the PAS system SER (Reference 5) which states that equipment used in post-accident sampling and analysis is tested approximately every six months. Therefore, the testing frequency of the containment sump sampling equipment is clarified to be once every refueling cycle vice once every six months.

The six-month testing frequency was initially addressed in the NUREG-0737, Item II.B.3 clarification letter (Reference 1). Although limitations on the portions of the PAS system associated with containment sump sampling prevent such testing during power operations, a review of I&M submittals pre-dating the SER did not identify any requested deviations from the recommended testing frequency. However, the review also did not identify any I&M commitments to test PAS equipment on a six-month frequency.

Flow verification of the containment sump sample point can only be performed when water can be added to the containment sump. Containment sump testing on a six-month frequency would require either an at-power containment entry or a semi-annual maintenance outage specifically for performance of this activity. The former option would not be desirable based on I&M's efforts to satisfy as low as reasonably achievable (ALARA) considerations. The latter option would not be justified based on the minimal potential safety benefits of testing this equipment compared to the detrimental impacts of implementing mid-cycle outages. Accordingly, periodic testing of the containment sump sample point is specified on a refueling outage frequency. Other liquid sample points are tested on a semi-annual frequency whenever PAS system availability is required. Considering the physical constraints to testing with the plant at-power and the availability of other sample points, I&M considers this change to be appropriate.

2. Limit of Detection (LOD) for Chloride Concentration in Undiluted Samples

Regulatory Guide 1.97 recommends the range of measurement for chloride content to be 0 to 20 parts per million (ppm). By Reference 7, I&M identified deviations from the guidance provided in Regulatory Guide 1.97. Deviation Number DV-17 noted that I&M's PAS system would measure undiluted samples through a range of 0.01 to 20 ppm. The PAS system, including the 0.01 ppm chloride content lower limit, was approved by Reference 8. Although the analyzer used for this application is still capable of detecting 0.01 ppm in a chloride standard, recent work with chloride samples in the post-accident matrix specified in Reference 1 established a new LOD of 0.05 ppm for undiluted samples. The amount of dilution needed to eliminate matrix interferences results in chloride being below LOD when the initial chloride concentration is less than 0.05 ppm. Therefore, the LOD for chloride in undiluted samples is changed from 0.01 ppm to 0.05 ppm.

3. Instrument Accuracy and Uncertainty

NRC guidance to meet the NUREG-0737 PAS requirements (Reference 1) includes accuracy criteria for the analytical equipment used to measure pH, boron, dissolved oxygen, and dissolved hydrogen. Measured uncertainty values for the analyzers used at CNP were provided to the NRC by References 2, 4, and 7. These uncertainty values represented the actual performance of analytical equipment. Since the acceptance criteria were not specified in any I&M submittals, the measured uncertainty values may have been interpreted as the acceptance criteria for this equipment. It was not the intent of these submittals to represent the measured uncertainty values as the future acceptance criteria for this equipment, but rather to illustrate how the proposed equipment meets the regulatory guidance. Therefore, the distinction between recommended instrument accuracy limits and actual instrument uncertainty values measured by validation testing is clarified.

To eliminate confusion regarding the analyzer uncertainty acceptance criteria, the PAS instrumentation ranges and accuracy limits will be incorporated in the UFSAR. Table 1 duplicates the information to be incorporated in UFSAR Section 9.6.2.2, "Post-Accident Sampling System." The accuracy limits presented in Table 1 are equivalent to the NRC guidance for NUREG-0737 PAS system requirements provided in Reference 1. The accuracy for the analytical method is based on a standard concentration using the NRC post-accident test matrix, where applicable (i.e., boron and chloride). Additionally, Table 1 presents the accuracy limits for the chloride analyses, as this information was not addressed in previous submittals. Table 1 also identifies the range of the analytical measurements presented in Reference 7, which provides I&M's most recent response to Regulatory Guide 1.97, Revision 3 "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions during and Following an Accident". The instrument accuracy limits and ranges presented in Table 1 are used as the basis for determining the

acceptability of modifications to the PAS analytical equipment as well as forming the basis for validation testing of new analytical equipment.

4. Analytical Equipment/Methods for Boron and Dissolved Oxygen Analysis

References 4 and 6 identify the fluoroborate selective ion electrode as the boron analysis method. Subsequently, I&M adopted an ion chromatography method for boron analyses. References 2 and 6 indicate that dissolved oxygen is measured by the polarographic method using a Yellow Spring Instrument Company analyzer. Subsequently, an Orbisphere analyzer was adopted for dissolved oxygen analyses.

References 2, 4, and 6 were submitted to demonstrate that the PAS system equipment met the performance criteria specified in NUREG-0737 and subsequent NRC guidelines clarifying these criteria. These letters described the analytical equipment used at the time of submittal. I&M now considers much of the detail provided in these submittals to be beyond the level of detail necessary to demonstrate the PAS system capability. Specifically, equipment makes and model numbers represent details that may be regarded as extraneous information. The specific equipment type and method for the boron and dissolved oxygen analyses are not specified in the NRC guidance for PAS systems or in the SER that approved the PAS system. As replacement parts and components become obsolete, original plant equipment must be replaced. Future changes to the PAS analyzers or the analytical processes associated with the PAS system will continue to be performed in accordance with the requirements of 10 CFR 50.59.

5. Preventive Maintenance (PM) Program Labor Resource

Reference 5 states that "A PAS preventive maintenance program has been developed and will be performed every six months by an outside contractor." Reference 5 describes the personnel used for the PM program at the time of submittal; however, I&M subsequently determined that this preventive maintenance activity may be conducted using non-contracted labor resources (i.e., I&M plant personnel). NRC guidance on the NUREG-0737 PAS systems does not specify the type of resources to be employed for the performance of the PM program. In the future, I&M retains the option to use any labor resource for maintenance activities associated with the PAS system, provided the applicable training and qualification requirements are met.

References

(1) Letter from S. A. Varga, NRC, to J. Dolan, I&M, "NUREG-0737 Item II.B.3 Post Accident Sampling System," dated June 30, 1982.

(2) Letter from R. S. Hunter, I&M, to H. R. Denton, NRC, "NUREG-0737 Item II.B.3 – Post Accident Sampling System," correspondence AEP:NRC:0716A, dated November 5, 1982.

(3) Letter from S. A. Varga, NRC, to J. Dolan, I&M, "Order Confirming Commitments on Post-TMI Related Items," dated March 14, 1983.

(4) Letter from M. P. Alexich, I&M, to H. R. Denton, NRC, "NUREG-0737, Item II.B.3 Post Accident Sampling System (PASS)," correspondence AEP:NRC:0678H, dated August 2, 1984.

(5) Letter from S. A. Varga, NRC, to J. Dolan, I&M, "Safety Evaluation for the Post Accident Sampling System (NUREG-0737, Item II.B.3)," dated April 11, 1985.

(6) Letter from M. P. Alexich, I&M, to H. R. Denton, NRC, "NUREG-0737 Section II.B.3 Post-Accident Sampling System," correspondence AEP:NRC:0678V, dated June 27, 1986.

(7) Letter from M. P. Alexich, I&M, to U. S. Nuclear Regulatory Commission, "Regulatory Guide 1.97, Revision 3," correspondence AEP:NRC:0773AB, dated October 5, 1988.

(8) Letter from J. G. Giitter, NRC, to M. P. Alexich, I&M, "Transmittal of Safety Evaluation on D. C. Cook Conformance to Regulatory Guide 1.97," dated September 11, 1989.

(9) Nuclear Energy Institute, "Guideline for Managing NRC Commitments," Revision 2, December 19, 1995.

Table 1
Post-Accident Sampling System Licensing Basis
Reactor Coolant System Chemical Analyses

Analysis	Accuracy (1) (4)	Range (2)
Boron	± 50 ppm < 1000 ppm ± 5% > 1000 ppm	375 – 2000 ppm (diluted) 0.375 – 2.0 ppm (undiluted)
Dissolved Hydrogen	± 5 cc/kg < 50 cc/kg ± 10% > 50 cc/kg	0 – 2000 cc/kg
Dissolved Oxygen	± 0.05 ppm < 0.5 ppm ± 10% 0.5 – 20 ppm	0 – 20 ppm
pH	± 0.3: pH 5 – 9 ± 0.5: pH < 5 or pH > 9	pH 1 - 13
Chloride	± 0.05 ppm < 0.5 ppm ± 10% > 0.5 ppm	10 – 20,000 ppm (diluted) 0.05 – 20 ppm (undiluted)(3)

Notes

(1) Based on NRC guidance for NUREG-0737, Item II.B.3, Post accident Sampling Capability, dated June 30, 1982.

(2) Based on submittal AEP:NRC:0773AB for Regulatory Guide 1.97, Revision 3, dated October 5, 1988.

(3) Based on laboratory testing of NRC matrix chloride samples to determine lower limit of detection for undiluted samples.

(4) Where applicable, the accuracy for the analytical method is based on a standard concentration using the NRC post-accident test matrix specified in the NRC guidance for NUREG-0737, Item II.B.3, dated June 30, 1982.

ATTACHMENT 2 TO C0100-04

COMMITMENTS

The following table identifies those actions committed to by Indiana Michigan Power Company (I&M) in this submittal. Other actions discussed in the 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	Completion Date
To eliminate confusion regarding the analyzer uncertainty acceptance criteria, the PAS instrumentation ranges and accuracy limits will be incorporated in the UFSAR. Table 1 duplicates the information that will be incorporated in UFSAR Section 9.6.2.2, "Post-Accident Sampling System."	As required by 10 CFR 50.71(e)
REVISED COMMITMENT: The testing frequency of the containment sump sampling equipment is clarified to be once every refueling cycle vice once every six months.	Ongoing
REVISED COMMITMENT: A PAS preventive maintenance program has been developed and will be performed every six months.	Ongoing