UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE SAFETY PARAMETER DISPLAY SYSTEM

INDIANA MICHIGAN POWER COMPANY

D. C. COOK NUCLEAR, UNITS 1 AND 2

DOCKET NOS. 50-315 AND 50-316

1.0 POSITION

Item I.D.2, "Plant Safety Parameter Display Console," of Task I.D., "Control Room Design," of the "NRC Action Plan Developed as a Result of the TMI-2 Accident," (NUREG-0660) states that operating reactor licensees and applicants for operating licenses will be required to install a Safety Parameter Display System (SPDS) that will display to operating personnel a minimum set of parameters which define the safety status of the plant. Supplement 1 to NUREG-0737 confirmed and clarified the SPDS requirement in NUREG-0660. In accordance with NUREG-0737, Supplement 1, each licensee or applicant is required to submit a safety analysis describing the basis on which the selected parameters are sufficient to assess the safety status of each identified function for a wide range of events including symptoms of severe accidents. Licensees and applicants were also required to submit their specific implementation plans for SPDS.

2.0 INTRODUCTION

Generic Letter 89-06 (GL-89-06), "Task Action Plan Item I.D.2-Safety Parameter Display System--10 CFR §50.54(f)," along with NUREG-1342, "A Status Report Regarding Industry Implementation of Safety Parameter Display Systems," was issued to all licensees on April 12, 1989. GL-89-06 requested all licensees to furnish one of the following:

1. Certification that the SPDS fully meets the requirements of NUREG-0737, Supplement 1, taking into account the information provided in NUREG-1342.

2. Certification that the SPDS will be modified to fully meet the requirements of NUREG-0737, Supplement 1, taking into account the information provided in NUREG-1342. The implementation schedule for the modifications shall be provided.

3. If a certification cannot be provided, the licensee shall provide a discussion of the reasons for that finding and a discussion of the compensatory action the licensee intends to take or has taken.

NUREG-1342 describes methods used by some licensees and applicants to implement SPDS requirements in a manner found acceptable by the staff. NUREG-1342 also described SPDS features that the staff found unacceptable and gives the reasons for finding them unacceptable.

By letter dated August 1, 1989, Indiana Michigan Power Company, licensee for D. C. Cook Units 1 and 2, responded to GL-89-06. In the letter, the licensee stated that, based on the vintage of SPDS, they could not certify that the SPDS meets all the requirements of NUREG-0737, Supplement 1, considering the information provided in NUREG-1342. The licensee further stated that while the SPDS does not meet all of the requirements of NUREG-0737, they believe they have demonstrated an SPDS adequate to the post accident needs of the operator.

A telephone conference was held between the NRC and the licensee on December 11, 1989. During the telephone conference, the staff and the licensee discussed the implementation status of the D. C. Cook SPDS. Based on the results of the conference call, the staff determined that an on-site audit of the SPDS would be necessary to determine if the SPDS adequately satisfied the requirements of NUREG-0737, Supplement 1.

An on-site audit was conducted by the staff on February 21-22, 1990. The audit team determined that the SPDS satisfied five of the eight requirements of NUREG-0737, Supplement 1. A summary of the audit findings were issued to the licensee on April 6, 1990. The licensee responded to the audit team's findings in a letter dated May 9, 1990.

3.0 EVALUATION

The staff's evaluation of the D. C. Cook SPDS follows. The evaluation is based on the previously identified documentation and the audit conducted in February 1990.

3.1 The SPDS Should Provide a Concise Display of Critical Plant Variable to Control Room Operators

The physical location of displayed information, the technical organization within the SPDS displays, and the on-going modifications of the SPDS radiation monitoring and containment isolation status display systems were reviewed during the on-site audit. Based on this review, the licensee's SPDS will meet the NUREG-0737, Supplement 1 requirement for a concise display when the on-going modifications are completed.

3.2 The SPDS Should Rapidly and Reliably Aid the Control Room Operators in Determining the Safety Status of the Plant

Based on the review of the licensee's reliability data and the observations made during the on-site audit, the licensee has satisfied the Supplement 1 to NUREG-0737 requirement for a rapid and reliable SPDS.

3.3 The SPDS Shall be Located Convenient to Control Room Operators

The SPDS work space reviewed during the audit was found to be conveniently located to support the SPDS users during emergency operation. Therefore, licensee's SPDS meets the NUREG-0737, Supplement 1 requirement for a convenient location.

3.4 The SPDS Will Continuously Display Information to Determine Safety Status with Respect to Five Safety Functions

The two top level, iconic displays on the SPDS monitor provide operators continuous information about the five safety functions identified in NUREG-0737, Supplement 1. The SPDS monitor does not provide any visual or audible cues to alert operators to a change in status for the five functions when lower level displays are in use. Therefore, the NUREG-0737, Supplement 1 requirement for a continuous display has not been satisfied. However, in a letter dated May 9, 1990, responding to the staff's audit findings, the licensee stated that the SPDS will be modified to provide a dedicated display of the SPDS top level, iconic displays. This modification, scheduled to be implemented during each Unit's 1990 refueling outage will satisfy the NUREG-0737, Supplement 1 requirement for a continuous display of information about critical plant variables.

3.5 Procedures Should Be Developed and Operators Trained With and Without the SPDS Available

SPDS operators interviewed during the audit, demonstrated their capabilities on the use of the SPDS. The operators did not know, in all instances, what the numerical values were for the high and low alarm set points for each safety function on the narrow and wide range iconic displays. In the May 9, 1990, response to the audit findings, the licensee stated that the numerical values for the iconic display alarm set points and the general philosophy on how these values were selected will be incorporated into operator requalification training beginning in the third quarter of 1990. This commitment to give operators additional training on the SPDS iconic display alarm set points will satisfy the Supplement 1 to NUREG-0737 requirement for procedures and training with and without SPDS.

3.6 The SPDS Shall Be Designated to Incorporate Accepted Human Factors Principles

The audit of the SPDS determined that the Unit 1 SPDS high T_{avg} alarm set point was inconsistent with the amended D. C. Cook Technical Specifications value. In addition, the SPDS alarm for the Unit 2 steam generator low level reactor trip set point was incorrectly set at the Unit 1 value. The audit also found that the numerical values for the high and low level alarm set points on each safety function spoke of the two top level, iconic displays were not shown. Also, some alarm set points were either anticipatory values or system capacity values.

The licensee's May 9, 1990, response to the audit findings stated that the incorrect SPSDS alarm set points had been corrected. The response also provided a discussion on the rational used to not display SPDS alarm set points on the iconic displays. The staff finds that the licensee's action taken to correct the SPDS deficiencies and the discussion on alarm set points not displayed, satisfied the NUREG-0737, Supplement 1 requirement for the design of the SPDS to incorporate accepted human factors principles.

3.7 The Minimum Information Provided Shall Be Sufficient to Provide Information to Plant Operators About Five Functions: Reactivity Control, Reactor Core Cooling and Heat Removal From The Primary System, Reactor Coolant System Integrity, Radioactivity Control, and Containment Conditions

Based on the review of the licensee's response to GL-89-06 and the audit conducted on February 21 - 22, 1990, the staff concludes that the SPDS satisfies the Supplement 1 requirement to provide information about five safety functions.

3.8 The SPDS Shall Be Suitably Isolated From Electrical and Electronic Interference with Equipment and Sensors That Are Used for Safety Systems

In a Safety Evaluation Report dated August 12, 1985, the staff determined that this NUREG-0737, Supplement 1 requirement was satisfied.

4.0 CONCLUSION

The staff audit of the D. C. Cook SPDS concluded that five of the eight NUREG-0737, Supplement 1 requirements were satisfied. Based on the licensee's response to the audit findings, the staff concludes that upon satisfactory completion of planned changes to the SPDS, the three remaining open requirements would be satisfied. The staff may confirm, by an inspection, that the corrective actions have been completely and properly implemented.