U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-002/93002(DRSS)

Docket No. 50-002 License No. R-28

Licensee: University of Michigan

Facility Name: Ford Nuclear Reactor

Inspection At: Phoenix Memorial Laboratory, Ann Arbor, Michigan

Inspection Conducted: March 25 - 26, 1993

Inspectors: J. Arildsen
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Approved By: C. Cox, Team Leader — Date: 4/12/93

Approved By: J. W. McCormick-Barger, Chief
Emergency Preparedness and
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Inspection Summary

Inspection on March 25 - 26, 1993 (Report No. 50-002/93002(DRSS))
Areas Inspected: Announced reactive team inspection to review actions concerning the March 24, 1993 overpower event (92700).
Results: The event was the result of personnel error involving three apparent violations. One apparent violation was the operation of the facility in excess of the 2 megawatt (thermal) license limit and two cases of an apparent violation by the operators for not completely following OP-101, Reactor Startup, as required by Technical Specification 6.4.1. Weaknesses identified included: a lack of understanding by operators about power range indications and the methods used to maintain the operating limits; a reluctance by some operators to ask questions when uncertain; poor communications between the shift supervisor and the console operator during the event; and the effectiveness of previous corrective actions. Two unresolved items were also identified. One unresolved item was regarding the facility's practice of counting time spent by senior reactor operators on shift in the capacity of reactor operators as time for maintaining senior reactor operator licenses active per 10 CFR 55.53. The other unresolved item involved the non-conservative approach the licensee used in determining at what power level safety channel ion chambers were adjusted.

DETAILS

1. Persons Contacted

University of Michigan

*R. F. Fleming, Director, Michigan Memorial-Phoenix Project
*R. R. Burn, Nuclear Reactor Laboratory Manager
*G. M. Cook, Assistant Manager for Reactor Operations
*P. Simpson, Assistant Manager, Research Support Activities
L. Slay, Senior Reactor Operator
C. Weger, Senior Reactor Operator
S. Emerson, Senior Reactor Operator
R. Kirchner, Senior Reactor Operator
*A. Jackson, Health Physicist

Other members of the operations staff were contacted during the course of the inspection.

*Denotes those attending the exit meeting on March 26, 1993.

2. General

This inspection, which was held on March 25-26, 1993, was conducted to inspect the overpower event which occurred on March 24, 1993. The inspection consisted of reviewing applicable records and logs from the event, reviewing procedures, interviewing operations personnel, reviewing corrective actions, and conducting a walk-through and human factors review of the event sequence from both a performance and operational perspective.

3. License Event Reports (92700)

(Open) LER 93-01: Operation of the Ford Nuclear Reactor (FNR) in excess of the 2 megawatt (thermal) (MW) license power limit.

On March 24, 1993, the operating crew, two senior reactor operators (SROs), at the FNR was conducting a routine start up. At 1 MW (50% power) the operating crew conducted a calorimetric determination to assess actual thermal power. The calorimetric determination found that thermal power was 1.15 MW. However, the linear level compensated ion chamber indicated 1 MW by reading 100% in the 1 MW range. At that point the operating crew should have adjusted the linear level setpoint, used for automatic power control, to 86% which, while in the automatic rod control mode, would have automatically reduced actual power to 1 MW. However, the operating crew continued to raise reactor power to 2 MW (100% power) as indicated by 100% on the linear level indications in the 2 MW range. That resulted in an actual power level of 2.3 MW (115% power). At that point, the operating crew recognized that there was something wrong so they called in the off-shift SRO to help analyze the situation. The off-shift SRO arrived and had just started to review the

calorimetric data when the Assistant Manager for Reactor Operations arrived. The Assistant Manager for Reactor Operations ascertained that the power level limit was exceeded and had the operating crew immediately reduce power to 1 MW. The linear level setpoint was then adjusted and 2 MW operations resumed. The event resulted in the licensed 2 MW limit being exceeded by 15% for approximately 10 minutes. The operation of the FNR at 2.3 MW is an apparent violation of the R-28 license authorization to operate the facility at power levels not in excess of two megawatts (thermal) (50-002/93002-01).

The operating crew's actions indicated that the primary cause of the event was a lack of understanding about the different power level indications and operating bands that the operating crew was to maintain. The operating crew should have recognized that if 100% indicated linear level power in the 1 MW range was 1.15 MW, as determined by the calorimeter, then 100% indicated linear level power in the 2 MW range would be 2.3 MW. The calorimeter at 1 MW determined that the linear level setpoint needed to be reduced to 86% which is the percent power that the control rod would then try to maintain while in automatic control. (This facility designates the low worth rod used for fine reactivity control as the control rod. It is typically worth 0.4% delta k/k. The rods used for shutting down the reactor are designated as shim rods.) This setpoint would result in the reactor power being automatically reduced to 1 MW actual power level. Then, when the linear level is moved to the 2 MW range, this setpoint would maintain an actual 2 MW power level. The shift supervisor of the operating crew became confused about when to adjust the linear level setpoint to 86% after the calorimeter because an operating band of 95% to 105% was required by procedures when operating steady state at 2 MW. However, operating at steady state power does not occur until after the linear level ion chamber is adjusted to indicate actual 100% power within the 95%-105% power level indication band. This confusion demonstrated the lack of understanding of the operating bands. By procedure, the operating crew was required to adjust the linear level setpoint to 86% at 1 MW then raise reactor power to 2 MW. At 2 MW, as verified by the core differential temperature (delta T), the linear level ion chamber would then be adjusted so that the linear level setpoint could then be raised to be in the 95% to 105% band. This lack of understanding may have been part of a generic weakness identified by NRC operator examiners in December 1992 when examining candidates for SRO licenses at the FNR. The examiners identified the generic weakness during the operating exam concerning the difficulty that each of the candidates exhibited when asked to explain the relationship between the reactor instrument readings (in percent power) and the actual reactor power (in megawatts thermal).

Contributing to the lack of understanding was the failure of the operating crew to completely use or review OP-101 "Reactor Startup" prior to or during the startup evolution. Step 5.1 required the console operator to review the startup procedure before using the procedure. Step 5.36 directed the operators, after the calorimeter, to set the corrected linear level setpoint and adjust the linear level ion chamber

as necessary to establish 2 MW actual power with the linear level setpoint between 95% to 105%. While Step 5.36 of OP-101 was not clear on stating that the linear level setpoint be adjusted at 1 MW before raising power, the step combined with the expected level of operator knowledge should have prevented the overpower event. By not reviewing OP-101 prior to starting the reactor, the operating crew failed to follow Step 5.1 and Step 5.36. The failure to follow those two steps of OP-101 are apparent violations of Technical Specification 6.4.1 which requires that written procedures for reactor startup shall be followed (50-002/93002-02a and -02b).

Another contributing factor to the event was an apparent reluctance by the operators to request help when a question arose and a reluctance by the console operator to challenge the shift supervisor when the console operator recognized something was wrong. When the question arose about at what power level the linear setpoint should be adjusted, they chose to proceed to 2 MW indicated power. It appeared that based on his past performance, the shift supervisor was afraid to seek help from his management. Before calling the off-shift SRO, the console operator recognized that the reactor was at 2.3 MW but indicated in his interview that he was reluctant to raise the issue based on his experience of being chastised by shift supervisors when questioning their actions. Interviews with other operators indicated that some of the less experienced operators may have felt intimidated by the senior operators at times.

Communications between the shift supervisor and the console operator was another contributing factor. After calculating the 86% setpoint from the calorimeter, the shift supervisor asked the console operator if he should lower the linear level setpoint to 86%. The console operator was taking logs at the time and thought the shift supervisor was asking about the 95% to 105% band at 2 MW steady state. He answered no, that the band was 95% to 105%. Then the shift supervisor asked at what power level were the ion chambers adjusted. The console operator replied that most shift supervisors adjusted the chambers at 2 MW. The console operator also indicated in the interview with the inspectors that at times in the conversation it was not clear if the shift supervisor was discussing linear level setpoint adjustments or linear level ion chamber adjustments which also contributed to the confusion.

Based on the overpower event, it appears that some of the corrective actions taken for several events identified in 1992 were not effective in preventing the occurrence of the overpower event. For example:

- Not following or reviewing procedures and poor communications were contributing factors for the fuel handling violation in 1992. As a result, Step 5.1 was added to OP-101 but this was one of the two steps not followed in the overpower event.

- Another event on July 22, 1992 involved operators leaving the Shim Range Defeated Scram Interlock in a by-passed position. Contributing to that event was a human factors problem regarding a

step on the Startup Checklist which involved a number of operator actions. That step led an operator to overlook the action for returning the interlock to active, but initialling the one step as complete. The corrective actions from that event included reviewing all of the operating procedures to identify steps involving a number of actions that should be reduced to several smaller steps. After the overpower event on March 24, 1993, Step 5.36 in OP-101 was identified as needing a revision that should have been identified by the review initiated by the July 22, 1992 event in that the step contained several operator actions that should have been contained in separate steps.

- In response to the weakness identified in December 1992 by NRC operator examiners, the Reactor Manager wrote a memorandum to his operating staff explaining the power indications, how they interacted, when to adjust the linear level setpoint, and when to adjust ion chambers to maintain operating bands. All licensed operators signed a required reading sheet indicating they had read and understood the memorandum. One operator interviewed did not recall reading the memorandum and if the two operators involved in the overpower event had understood the memorandum, the event should not have occurred. The Reactor Manager did not incorporate the operating concepts described in his memorandum into OP-101 "Reactor Startup" which, had the startup procedure been changed, may have also precluded this event.

Another concern identified by the inspectors was that there was two prior opportunities to identify the operators' power level indications knowledge weakness demonstrated by the overpower event. The first opportunity, as discussed above, was when the NRC operator examiners identified the generic weakness in December 1992. The other opportunity was in February 1993 when the shift supervisor from the overpower event was on shift and became confused on how to lower the linear level setpoint while maintaining the 95% to 105% band. The shift supervisor, the assigned console operator, and an operator trainee were discussing methods to adjust the linear level setpoint when the Assistant Manager for Reactor Operations entered the control room. The operators requested guidance from the Assistant Manager for Reactor Operations. However, the Assistant Manager for Reactor Operations responded that the operators needed to be able to figure that problem out for themselves then left the control room without following up. These two opportunities identified a lack of knowledge level expected of licensed operators and that licensee management failed to take effective corrective actions to address the knowledge level problem.

In reviewing the different operating limits for the power range instrumentation, the inspectors identified a concern regarding the non-conservative approach the licensee was taking in waiting to adjust the safety channel ion chambers at the 2 MW level. The licensee was routinely starting up with all the ion chambers left in an equilibrium xenon position from the previous shutdown. Therefore the ion chambers would read a power level lower than actual power because the xenon free

safety and control rod positions would shadow the ion chambers from more neutron flux. The safety channels provide a high power scram with a setpoint of 2.4 MW. With the two safety channel ion chambers reading lower than actual power, then the actual power that would result in a high power scram would routinely be greater than the 2.4 MW during startup. The setpoint would not be 2.4 MW until the safety channel ion chambers were adjusted at the 2 MW level to maintain a required 1.9 MW to 2.1 MW operating band. To address the concern about the non-conservative approach on adjusting the ion chambers, the licensee modified its procedures to instruct operators to adjust the ion chambers a 1 MW. The Office of Nuclear Reactor Regulation (NRR) will review the safety significance and generic non-power reactor aspects of the non-conservative approach the licensee uses towards adjusting the ion chambers. This question will be tracked as an unresolved item (Unresolved Item No. 50-002/93002-03).

Interviews with the operations staff identified a concern in the method by which the facility kept track of SRO on-shift time in maintaining SRO licenses active. 10 CFR 55.53(e) states that for test and research reactors, the licensee shall actively perform the functions of an operator or senior operator for a minimum of four hours per calendar quarter. With the exception of staff SRO, the FNR did not track on-shift time for licensed operators. The facility assumed that licensed operators on shift assignments would receive at least four hours in the control room and did not track the distinction between operator or senior operator time. Therefore, the licensee was unable to readily determine if all the SROs had maintained their licenses active by performing the functions of a senior operator for a minimum of four hours per calendar quarter. Review of shift logs indicated that licensed console and supervising operators were required to sign the log respectively for each reactivity manipulation performed. The log entries made a distinction between a reactor operator and senior reactor operator. The question arose as to whether an SRO could count time spent as a reactor operator towards the four hours needed to maintain his/her SRO license active. To resolve the immediate concern, the licensee provided six hours of remedial training to all SROs with questionable license status in accordance with 10 CFR 55.53(f). NRR will review the specific question and generic non-power reactor aspects concerning counting reactor operating time towards minimum SRO on-shift time to maintain an SRO license active. This question will be tracked as an unresolved item (Unresolved Item No. 50-002/93002-04).

4. Exit Interview (30703)

The inspectors met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on March 26, 1993. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.

Two-Year Trial Program for Conducting Open Enforcement Conferences; Policy Statement

AGENCY: Nuclear Regulatory Commission.

ACTION: Policy statement.

SUMMARY: The Nuclear Regulatory Commission (NRC) is issuing this policy statement on the implementation of a two-year trial program to allow selected enforcement conferences to be open to attendance by all members of the general public. This policy statement describes the two-year trial program and informs the public of how to get information on upcoming open enforcement conferences.

DATES: This trial program is effective on July 10, 1992, while comments on the program are being received. Submit comments on or before the completion of the trial program scheduled for July 11, 1992. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Send comments to: The Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, ATTN: Docketing and Service Branch.

Hand deliver comments to: One White Flint North, 11555 Rockville Pike, Rockville, MD between 7:45 a.m. to 4:15 p.m., Federal workdays.

Copies of comments may be examined at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC

FOR FURTHER INFORMATION CONTACT: James Lieberman, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555 (301-504-2741).

SUPPLEMENTARY INFORMATION:

Background

The NRC's current policy on enforcement conferences is addressed in Section V of the latest revision to the "General Statement of Policy and Procedure for Enforcement Actions." (Enforcement Policy) 10 CFR part 2, appendix C that was published on February 18, 1992 (57 FR 5791). The Enforcement Policy states that, "enforcement conferences will not normally be open to the public." However, the Commission has decided to implement a trial program to determine whether to maintain the current policy with regard to enforcement conferences or to adopt a new policy that would allow most enforcement conferences to be open to attendance by all members of the public.

Policy Statement

Position

The NRC is implementing a two-year trial program to allow public observation of selected enforcement conferences. The NRC will monitor the program and determine whether to establish a permanent policy for conducting open enforcement conferences based on an assessment of the following criteria:

(1) Whether the fact that the conference was open impacted the NRC's ability to conduct a meaningful conference and/or implement the NRC's enforcement program;

(2) Whether the open conference impacted the licensee's participation in the conference;

(3) Whether the NRC expended a significant amount of resources in making the conference public; and

(4) The extent of public interest in opening the enforcement conference.

I. Criteria For Selecting Open Enforcement Conferences

Enforcement conferences will not be open to the public if the enforcement action being contemplated—

(1) Would be taken against an individual, or if the action, though not taken against an individual, turns on whether an individual has committed wrongdoing;

(2) Involves significant personnel failures where the NRC has requested that the individual(s) involved be present at the conference;

(3) Is based on the findings of an NRC Office of Investigations (OI) report; or

(4) Involves safeguards information, Privacy Act information, or other information which could be considered proprietary.

Enforcement conferences involving medical misadministrations or overexposures will be open assuming the conference can be conducted without disclosing the exposed individual's name. In addition, enforcement conferences will not be open to the public if the conference will be conducted by telephone or the conference will be conducted at a relatively small licensee's facility. Finally, with the approval of the Executive Director for Operations, enforcement conferences will not be open to the public in special cases where good cause has been shown after balancing the benefit of public observation against the potential impact on the agency's enforcement action in a particular case.

The NRC will strive to conduct open enforcement conferences during the two-year trial program in accordance with the following three goals:

(1) Approximately 25 percent of all eligible enforcement conferences conducted by the NRC will be open for public observation;

(2) At least one open enforcement conference will be conducted in each of the regional offices; and

(3) Open enforcement conferences will be conducted with a variety of the types of licensees.

To avoid potential bias in the selection process and to attempt to meet the three goals stated above, every fourth eligible enforcement conference involving one of three categories of licensees will normally be open to the public during the trial program. However, in cases where there is an ongoing adjudicatory proceeding with one or more intervenors, enforcement conferences involving issues related to the subject matter of the ongoing adjudication may also be opened. For the purposes of this trial program, the three categories of licensees will be commercial operating reactors, hospitals, and other licensees, which will consist of the remaining types of licensees.

II. Announcing Open Enforcement Conferences

As soon as it is determined that an enforcement conference will be open to public observation, the NRC will orally notify the licensee that the enforcement conference will be open to public observation as part of the agency's trial program and send the licensee a copy of this Federal Register notice that outlines the program. Licensees will be asked to estimate the number of participants it will bring to the enforcement conference so that the NRC can schedule an appropriately sized conference room. The NRC will also notify appropriate State liaison officers that an enforcement conference has been scheduled and that it is open to public observation.

The NRC intends to announce open enforcement conferences to the public normally at least 10 working days in advance of the enforcement conference through the following mechanisms:

(1) Notices posted in the Public Document Room;

(2) Toll-free telephone messages; and

(3) Toll-free electronic bulletin board messages.

Pending establishment of the toll-free message systems, the public may call (301) 492-0732 to obtain a recording of upcoming open enforcement conferences. The NRC will issue another Federal Register notice after the toll-free message systems are established.

To assist the NRC in making appropriate arrangements to support public observation of enforcement conferences, individuals interested in attending a particular enforcement conference should notify the individual identified in the meeting notice announcing the open enforcement conference no later than five business days prior to the enforcement conference.

III. Conduct of Open Enforcement Conferences

In accordance with current practice, enforcement conferences will continue to normally be held at the NRC regional offices. Members of the public will be allowed access to the NRC regional offices to attend open enforcement conferences in accordance with the "Standard Operating Procedures For Providing Security Support For NRC Hearings And Meetings" published November 1, 1991 (56 FR 56251). These procedures provide that visitors may be subject to personnel screening, that signs, banners, posters, etc., not larger than 18" be permitted, and that disruptive persons may be removed.

Each regional office will continue to conduct the enforcement conference proceedings in accordance with regional practice. The enforcement conference will continue to be a meeting between the NRC and the licensee. While the enforcement conference is open for public observation, it is not open for public participation.

Persons attending open enforcement conferences are reminded that (1) the apparent violations discussed at open enforcement conferences are subject to further review and may be subject to change prior to any resulting enforcement action and (2) the statements of views or expressions of opinion made by NRC employees at open enforcement conferences or the lack thereof, are not intended to represent final determinations or beliefs.

In addition to providing comments on the agency's trial program in accordance with the guidance in this notice, persons attending open enforcement conferences will be provided an opportunity to submit written comments anonymously to the regional office. These comments will subsequently be forwarded to the Director of the Office of Enforcement for review and consideration.

Dated at Rockville, MD, this 7th day of July 1992.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

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Corrections

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NUCLEAR REGULATORY COMMISSION

Two-Year Trial Program for Conducting Open Enforcement Conferences; Policy Statement

Correction

In notice document 92-16233 beginning on page 30762 in the issue of Friday, July, 10, 1992, on page 30762, in the second column, under DATES, beginning in the fifth line, "July 11, 1992" should read "July 11, 1994".

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