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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT - CONTROL ROD LIFTED FROM CORE DURING REACTOR HEAD LIFT

At the request of NRC Region III management, we are providing the results of our review of the event of the failure to uncouple one of the 45 control rods prior to removal of the reactor vessel head. This letter describes discussions with the NRC on June 18, 1993 and relates the lessons learned and our intended corrective actions.

At 1250 hours Tuesday June 15, 1993 while performing the Reactor Vessel Head Lift Procedure, it was identified that Control Rod No. 39 was still coupled to its control rod drive and was suspended from the reactor vessel head. The head lift was suspended at this point and a voluntary report was made to the NRC. A recovery plan was then developed by an interdisciplinary team of Reactor and Systems Engineers, Operators, Health Physics Personnel, and the Refueling Vendor. The plan was successfully implemented and at 1320 hours on June 16, 1993 the reactor vessel head was back on the reactor vessel flange and Control Rod No. 39 was uncoupled.

A review of the circumstances that led up to the failure to uncouple the control rod provided several lessons learned:

1. The crew of operators who performed the uncoupling evolution were not well organized for the evolution despite having had mock-up training prior to performing the job. Performing the job with two teams (the same as February 1992) increased the level of coordination required to perform the job. The pre-job brief could have been more thorough and emphasized the complications of two crews working together. Improved preparation on part of the crew could have reduced the coordination issues associated with the evolution and improved the performance of the crew.

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2. The operators performing the rod uncoupling apparently felt pressure to complete the evolution quickly, even though stating they were not under pressure. This led to a missed opportunity to take the time to correct several problems that they discovered at the start of the evolution, such as only having one pen and one copy of the procedure for the two teams performing the work.

3. Although a Shift Supervisor was present for the majority of the evolution and directed the operators to correct some of the problems that they had not corrected themselves, he failed to recognize the overall shortcomings of the process. If he had recognized the inadequacy of the process and ensured the operators were adequately documenting their work as it progressed, the failure to uncouple the rod may not have happened.

4. The communications between the operators on the reactor vessel head and the control room were not in accordance with the procedure in that they did not report each control rod uncoupled as it was completed. Instead they maintained the record at the work site. The means by which they maintained this record was not well defined and the procedure did not provide good documentation of the completion of the evolution. This contributed to the failure to uncouple the rod.

5. The Control Rod Uncoupling Procedure also did not provide the level of verification necessary to ensure that all of the control rods had been uncoupled. Over several years, this procedure had undergone a series of modifications to improve the process and reduce the radiation exposure received performing this job. Through this series of revisions the level of verification and its effectiveness were reduced.

6. The completed control rod uncoupling procedure was reviewed and signed by the Shift Supervisor on the following shift as being complete at 1110 hours on June 10, 1993. Performance of this procedure is clearly documented in the Shift Supervisor log book on pages dated June 10, 1993. His review of the completed procedure showed that all of the control rods had been marked off as being uncoupled. After signing the procedure, he placed the procedure in the out-basket for forwarding to document control. Five days later, on June 15, when it was discovered that Rod No. 39 was not uncoupled, an attempt was made to review the completed uncoupling procedure; however, the procedure could not be found, indicating a breakdown in the control of documentation.

7. One other lesson learned in this event involved the head lift procedure. In that procedure there are provisions for visually checking that all the control rods are clear of the reactor vessel head after the head has been raised 8 to 12 inches off the vessel flange. This check failed to identify that Rod No. 39 was still connected to the head and was being withdrawn from the upper guide structure as the vessel head was being raised. After the inspection was performed per the procedure, the reactor vessel head was raised to approximately 7 feet above the reactor

vessel flange. It was at this time that Rod No. 39 was discovered suspended from the reactor vessel head. In reviewing this aspect of the event, it appears that a visual inspection at the height specified in the procedure is not adequate to detect a coupled rod due to other interferences, poor visibility, and adverse radiological conditions.

CORRECTIVE ACTIONS

Based on our review of the control rod uncoupling problem and upcoming outage activities, we have identified the following corrective actions:

1. The Upper Guide Structure Lift had previously been classified as an Infrequently Performed evolution to provide additional management attention. The planned pre-job briefing for the Upper Guide Structure lift will include the specific lessons learned from the rod uncoupling event and the Reactor Head lift. We will specifically cover proper procedural usage, the need to effectively coordinate activities, and proper communications with the Control Room. Plant Management will be directly involved in this briefing.

2. Operations Department personnel will be briefed on lessons learned from this control rod uncoupling event prior to involvement in fuel movements.

   a. Control Operator and Auxiliary Operator briefings will emphasize the need to effectively coordinate activities, proper procedural usage, proper communications with the Control Room, and proper documentation of fuel movement. Additionally, the operators will be reminded that if concerns arise, the evolution should be stopped and the concerns resolved prior to continuing.

   b. Operations supervisory personnel briefings will include the need to perform thorough pre-job briefings, the need to effectively coordinate activities, proper procedural usage, proper communications with the Control Room, proper control of documentation, and the appropriate amount of supervisory and management involvement in activities. Particular emphasis will be placed on the supervisory and management responsibility to resolve concerns regarding the evolution.

3. Management monitoring of core alteration activities is provided on a periodic basis by Operations Department management personnel, Outage Shift Management personnel, and independent monitoring by Nuclear Plant Assessment Department personnel.

4. All other plant supervisory personnel will be briefed on the lessons learned from the control rod uncoupling event. The feedback will be provided in writing and reviewed with supervisory personnel during shift turnover meetings during the week of June 21. The feedback will

emphasize appropriate pre-job briefings, procedural usage, and supervisory involvement in monitoring activities.

5. The Upper Guide Structure Lift Procedure has been reviewed and confirmed to contain adequate instructions for documentation and verification of critical activities.

6. The two refueling procedures used by the Operations Department have been reviewed and confirmed to contain adequate verification instructions.

7. The Control Rod Coupling Procedure will be reviewed and revised prior to its use in the 1993 Refueling Outage. Particular attention will be given to the documentation requirements and the verification of proper control rod coupling.

8. The Control Rod Uncoupling Procedure will be revised prior to its next use in the 1994 Refueling Outage to ensure it contains adequate instructions for verification and documentation of proper control rod uncoupling.

9. The Reactor Head Lift Procedure will be reviewed prior to use in the 1994 Refueling Outage to determine the adequacy of inspection for coupled control rods.

The above actions are intended to ensure that the lessons learned from the control rod uncoupling event are incorporated into our outage activities prior to core alteration activities. These actions are also intended to provide feedback to personnel involved in other outage activities to help prevent similar problems.

As you are aware, in the last several years the nuclear industry has recognized a growing trend that indicates that hardware problems were being resolved and human performance issues had become the major contributors to plant performance problems. In 1991, I reorganized the Nuclear Operations Department and established a new business plan that emphasized the importance of the personnel resource and its responsibilities for further improving overall plant performance. I (and the rest of the Nuclear Operations management team) sought more individual involvement and self-assessment in highlighting problems and implementing effective corrective actions. Numerous specific actions have been completed or are ongoing to improve employee participation in problem identification/resolution and process improvement. I continue to actively pursue continuous improvement and take other steps to proactively influence human performance.

I have seen a good deal of progress to date, but I am not satisfied with the inconsistent performance of the organization. The recent failure to uncouple a control rod is an example of the type of event we are striving to avoid. We will continue to examine such events for insights that will help us operate more reliably.

Apart from learning from such events, I am actively pursuing improvements in our ability to understand and apply practical methods of increasing the reliability of our human performance. One such example is our self assessment that utilizes INPO SOER 92-01, "Reducing the Occurrence of Plant Events Through Improved Human Performance." An interim progress report to assess outage preparedness was completed, and the results were shared with Palisades personnel to remind our staff of improvement opportunities. This self-assessment will continue into the third quarter of 1993.

I recognize such events cannot be tolerated. Reducing the frequency of these events will be required for us to achieve the level of safe and efficient plant operation we both desire. Finally, I believe we will succeed only through consistent, thorough efforts such as those we are now pursuing.

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