

September 29, 2005

MEMORANDUM TO: Luis A. Reyes
Executive Director for Operations

FROM: J. E. Dyer, Director */RA by R. W. Borchardt for/*
Office of Nuclear Reactor Regulation

Carl J. Paperiello, Director */RA/*
Office of Nuclear Regulatory Research

SUBJECT: SEMIANNUAL REPORT - STATUS OF IMPLEMENTATION OF
DAVIS-BESSE LESSONS LEARNED TASK FORCE REPORT
RECOMMENDATIONS

By memorandum dated March 7, 2003, the Office of Nuclear Reactor Regulation (NRR) and the Office of Nuclear Regulatory Research (RES) submitted an overall plan for implementation of the recommendations of the Davis-Besse Lessons Learned Task Force (LLTF) by the U.S. Nuclear Regulatory Commission (NRC). The plan requires semiannual reports on the status of implementation of all LLTF recommendations. This is the fifth status report, covering the period from March to August 2005.

During this period, we continued to make substantial progress and the initial actions to address 48 of the 49 LLTF recommendations are now complete. The one remaining recommendation is being addressed by industry initiatives to update the reactor pressure vessel (RPV) head inspection requirements in the American Society of Mechanical Engineers (ASME) Code. Appropriate inspection requirements will be incorporated into NRC regulations. The RPV inspection requirements, currently required by First Revised Order EA-03-009 (the order), are adequate until the completion of this remaining item.

The following discussion summarizes the significant activities in each of the four major categories during this report period. The attached table contains detailed information on the current status of implementation of all Davis-Besse LLTF recommendations.

1. Assessment of Stress Corrosion Cracking

Activities related to RPV head inspection included continued monitoring of licensee outage inspection results pursuant to the order, following up on plants that discovered defects, and evaluating requests for alternatives to the order. NRC inspectors reviewed licensee inservice inspection activities and boric acid corrosion control (BACC) programs using the revised inspection procedures developed in response to the LLTF recommendations.

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The interim requirements of the order continued to provide adequate protection of public health and safety while the staff monitored the efforts of the ASME to develop alternative requirements for inspection of RPV upper heads and upper head penetrations during refueling outages. The industry moved forward on several items during this period. In June 2005 the ASME Board on Nuclear Codes and Standards approved Code Case N-729, which provides additional inspection requirements for RPV upper heads. The ASME Board on Nuclear Codes and Standards also approved Code Case N-722, which recommends bare metal visual examination of all ASME Code Class 1 Alloy 600/82/182 components at frequencies that depend on the component location temperature. ASME fully accepted both code cases during the August 2005 ASME Code meetings. We expect the ASME to formally publish these code cases by December 2005. The staff is developing a basis for incorporating these code cases into Title 10 of the Code of Federal Regulations (10 CFR), Part 50.55a. The inclusion of Code Case N-729, with conditions, into the amended 10 CFR 50.55a will inform the decision to rescind the order. The final rule is expected to be published in FY07.

Separately, a meeting to discuss actions for lower RPV head and associated penetration inspections is scheduled for September 29, 2005. This discussion will assist staff in the regulatory assessment of ASME Code Case N-722's lower RPV head inspection recommendations. In addition to the ASME activities to develop Code Case N-729, the Electric Power Research Institute Materials Reliability Project is developing alternative visual inspection and evaluation guidelines. This initiative is expected to be completed by the end of 2006.

2. Assessment of Operating Experience

The revised operating experience program based on Management Directive 8.7, "Reactor Operating Experience Program," and the associated handbook have been implemented in draft form since January 2005. The program establishes a clearinghouse to systematically collect, communicate, and evaluate operating experience information. Also, a task group is performing a benchmarking review to identify best practices consistent with regional programs and to strengthen the interface between the clearinghouse and other technical organizations.

The new program has advanced the use of information technology in making operating experience information available to internal users and members of the public. There is a new database for managing all reported events, as well as a new operating experience information gateway that consolidates a large collection of individual databases and Web sources of information onto a single Web access page. It is also easier for the public to search operating experience in generic communications, event reports, morning reports, and preliminary notifications. A new communication tool to promptly notify NRC staff members of new operating experience in their areas of expertise or practice has been developed. Users may also use this tool to examine recent or emergent operating experience in their respective areas. The office is in the process of creating teams of technical staff by October 2005 to automatically receive and systematically assess the operational data in the team members' specialized areas to identify trends and recommend appropriate action.

3. Evaluation of Inspection, Assessment, and Project Management Guidance

The staff completed a review of 80 previously deleted inspection procedures to determine if any should be reactivated. This action was, essentially, an effectiveness review of the previous

decision, as recommended by the LLTF. Four inspection procedures were determined to have continuing applicability and were reactivated.

Inspection Manual Chapter (IMC) 0040, which governs changes to the Inspection Manual, was revised in February 2004 to ensure that inspection requirements developed in response to a generic issue are not inadvertently removed when making subsequent changes. A look-back period of 4 years was established by the February 2004 revision. An effectiveness review of the change in August 2005 determined that no requirements had been inadvertently deleted, and also identified a procedure improvement that will enable historical tracking of generic issues beyond 4 years. IMC 0040 will be updated by February 2006 to incorporate these improvements.

The team formed to develop an agency-wide corrective action program is creating a program that will institutionalize the agency's most important lessons learned by applying a rigorous and formal process to the development and closeout of the associated corrective actions. Program definition and draft documentation are scheduled to be developed by December 31, 2005. Following a pilot program and staff training, the base program is scheduled to be implemented by June 2006. A status report on the program development effort was provided to the Commission by memorandum on July 22, 2005. In addition, the team is creating a list of previous lessons learned reports containing significant recommendations for the agency. The program offices will be asked to perform effectiveness reviews on selected samples from this list to verify that the original corrective actions are still effective. Additional reviews may be assigned depending on the results obtained from this sample. This effort will also be used to organize information about these lessons learned reports so that it can be more easily accessed and used by the staff in the future.

On the office level, existing processes are being used to address corrective actions. For example, within NRR, the process improvement program was revised to serve as the office corrective action program. Office Instruction ADM-101, Revision 1, "Office of Nuclear Reactor Regulation Corrective Action Program," was issued in March 2005. The NRR corrective action program leverages existing programs to capture lessons learned in one place and establishes a requirement for effectiveness reviews of completed corrective actions. Specific items that were identified for additional followup in the effectiveness review of previous lessons learned reports have been entered into the NRR corrective action program and will be tracked to completion by that process.

4. Assessment of Barrier Integrity Requirements

A working group of NRR and RES staff completed an evaluation to examine whether the NRC should revise RCS leakage limits and require plants to install enhanced leakage detection equipment. The staff identified techniques that could improve localized leak detection and online monitoring. The staff also identified several possible improvements to leakage detection requirements that could provide increased confidence that plants are not operated at power with reactor coolant pressure boundary leakage. However, implementing these increased capabilities would likely result in only a very modest reduction in loss-of-coolant accident frequencies. As a result, the staff concluded that the risk reduction would not justify the costs of

installing and maintaining such equipment (i.e., the cost-benefit criteria for applying the backfit rule, 10 CFR 50.109, could not be satisfied) and recommended no further action.

Nevertheless, even small leaks that are below Technical Specifications limits could result in large boric acid deposits if left for long periods, such as a complete plant operating cycle between refueling outages. Currently, actions to address leakage vary among licensees. Therefore, the staff is monitoring a pressurized-water reactor Owners Group initiative to develop a uniform method for calculating RCS leakage and is working with other industry groups that are developing uniform responses to RCS leakage. In addition, the implementation of ASME Code Case N-722, which specifies bare metal visual inspection requirements for all dissimilar metal welds in the RCS, will limit the amount of boron in containment that might otherwise accumulate from one outage to the next. Finally, staff audits have verified that licensees are implementing BACC programs that look for evidence of RCS leakage, and have been sensitized to look for smaller amounts of boron as part of these programs. Despite these positive activities, there continue to be examples of boric acid accumulation inside containment. The staff is considering follow up activities, potentially through a generic communication, to address this issue.

A second working group of NRR and RES staff addressed the recommendation to evaluate the adequacy of analysis methods for assessing risk of passive component degradation and integrating the results of the analyses into the regulatory decisionmaking process. In general, the group found that the methods used to assess risk are adequate; however, in most cases there is insufficient data to use these methods alone to produce robust results. Also, an understanding of the limitations and uncertainties of any risk assessment method is crucial for responsible risk-informed regulatory decisionmaking. The available risk assessment models by themselves are usually inadequate to provide strong support for many types of decisions. The inability of the risk models to predict degradation rates and structural integrity effects and the limited information about plant-specific conditions often make it difficult to make reliable predictions very far beyond the latest available measurements. However, the group concluded that decisions made on the basis of a proper combination of inspection results and predictive modeling can be successfully used to adequately control the risk to the public and recommended training on incorporating risk assessment results in regulatory decisionmaking. The staff expects to complete training and an effectiveness review by September 2006.

The staff continued its participation with industry representatives in the working group that evaluates improvements to the Reactor Oversight Process (ROP) performance indicators (PIs). In particular, the staff participated in a subgroup formed to assess the feasibility of creating a PI to track the number, duration, and rate of primary system leaks that have been identified but not corrected. The group concluded that creation of a new PI is not feasible at present, partly because it is hard for licensees to determine small leak rates accurately and partly because the quarterly data reporting makes it hard for the staff to determine the number, rate, and duration of leaks. However, the staff will continue to follow progress in leak detection capability and industry efforts in this area. As part of the ongoing effort to improve the ROP and the PIs, the staff is working with external stakeholders, and an NRC staff/industry subgroup has been established to explore possible improvements in the RCS leakage PI.

Other Activities

As part of the original implementation plan, action plans were developed to track the high-priority LLTF recommendations in each of the four categories. All activities in the action plans for operating experience, inspection and project management, and barrier integrity have been completed and the final updates of these plans were included in the Director's Quarterly Status Reports (DQSR) in April and July 2005. The action plan to address stress corrosion cracking will remain open to track follow-up regulatory actions resulting from completion of the LLTF recommendations regarding the staff analysis of nozzle cracking and boric acid corrosion experience, and the changes to ASME Code inspection requirements.

As previously reported, the original plan was augmented to include effectiveness reviews subsequent to the completion of initial LLTF actions - typically, approximately 1 year after completion. The staff determined that effectiveness reviews are appropriate for 31 of the 49 LLTF recommendations. Eighteen effectiveness reviews have been completed. In general, the actions were found to be effective in responding to the LLTF recommendations. Revisions to inspection program guidance will continue to be evaluated in the annual ROP self-assessments. The staff also plans to enter the LLTF recommendations into the NRR corrective action program, which has a provision for annual effectiveness reviews of a sample of completed actions.

As directed in the staff requirements memorandum dated December 15, 2004, the staff developed a summary report on the significant improvements that resulted from the LLTF. The report was posted on the NRC public Web site in June 2005.

Summary

In summary, only one LLTF recommendation remains open. It will be closed when industry initiatives to improve RPV inspection requirements in the ASME code are completed. The current inspection requirements of the order are adequate to ensure public safety until the revised ASME guidelines are subsequently incorporated into NRC regulations.

Attachment: Status of LLTF Recommendations

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LESSONS LEARNED TASK FORCE REPORT RECOMMENDATIONS

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