

3.4.2 The NRC Failed to Provide Adequate Reactor Oversight Process Guidance
3.4.2.1 Detailed Discussion

The LLTF concluded that the NRC failed to provide adequate reactor oversight guidance following the evaluation of numerous light-water reactor inspection program documents, and the performance of interviews with NRC personnel directly involved in the inspection and oversight of Davis-Besse.

NRC inspection procedures were not consistently maintained and implemented at each operating facility. Inspection procedure 62001, Boric Acid Corrosion Prevention Program, was issued August 1, 1991, and subsequently canceled on January 17, 2001. This inspection procedure ensured that the licensee had a program in place to assess leakage from systems containing boric acid. The inspection resources section of procedure 62001 stated that implementation would require 8 hours of direct inspection effort; however, the LLTF did not identify any inspection performed at Davis-Besse using inspection procedure 62001. In addition, some staff members indicated that they felt that there were not enough hours allocated to complete boric acid program inspections.

ROP Manual Chapter Attachment 71111.20, Refueling and Other Outage Activities, does not specifically require nor recommend a containment structure closeout inspection. This non-routine inspection would be performed as an added component of Manual Chapter 2515, Appendix D, Plant Status, under the Plant Tours section, increasing the number of hours expended for implementation of Plant Status, a non-direct inspection effort, while not reducing the burden of the additionally required 70-100 hours of 71111.20 outage inspection that impacts the resident staff during a scheduled refueling outage. The LLTF concluded that the implementation of the ROP hours and sample sizes, during high activity times, may be a challenge with limited resources.

Review of Manual Chapter 2515, Appendix D, Plant Status, evidenced a lack of specific guidance on the level of detailed review expected for the corrective action documents routinely initiated by the licensee. A senior resident inspector assigned to Davis-Besse indicated in an interview that he was not aware of reactor head boric acid issues; however, a specific Davis-Besse corrective action document (PCAQ 98-0767), which described several fist-sized clumps of boric acid on the head, was written during his tenure. The LLTF concluded that the daily senior resident inspector focus on the licensee's corrective action program was not adequate to ensure that this significant plant issue was identified for review by the inspection program.

Limited experience, coupled with the structured nature of the Reactor Oversight Program (ROP), and several Davis-Besse events during 1998, may have led the inspectors to focus on issues and inspection items that they determined to be of greater significance than the reactor coolant system leakage symptoms that Davis-Besse was experiencing. Interviews indicated that a significant focus was placed on managing the ROP effort at the site. The inspectors used self-developed programs to monitor both baseline hours and the number of activities sampled. During the 2000 outage, the resident inspector was not yet qualified to perform

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independent inspections; the senior resident inspector indicated that the training of his resident inspector suffered due to his focus on ROP implementation and the large number of activities that needed to be followed. One of the inspectors conveyed that many things could not be done because the ROP would not allow it. The LLTF concluded that more experience may have allowed the inspectors to recognize the significance of some items such that they could be folded into the ROP for inspection and keep implementation of the ROP during the outage from becoming a distraction.

One of the inspectors conveyed that the ROP limited his ability to spend much time in containment. For two of the interviewed resident inspectors, Davis-Besse was the only reactor containment structure that they had experience inspecting. The LLTF considered their lack of breadth of experience in this area to be a detriment to their ability to make an experience-based judgement, or comparison, of the equipment condition in the Davis-Besse reactor containment.

Risk information may be misapplied in various activities. Risk informed regulation of NRC licensed commercial nuclear facilities includes decisions on allocation of inspections, assessment of the risk significance of occurrences, and the assessment of the severity of regulatory violations. Based on interviews with the staff, the LLTF was concerned that risk models do not appropriately account for degradation of passive components. Some of the staff perceived that the NRC has become risk-based as opposed to risk-informed, that issues cannot be pursued without having a risk number attached to them, and that deterministic safety requirements have been discounted.

The LLTF found that the staff was having difficulty characterizing the significance of the Davis-Besse event. This difficulty appeared to stem from technical limitations of risk assessments and SDPs in that pressure boundary integrity does not appear to be treated explicitly in PRAs. As a result, the type and extent of wastage of the RCS pressure boundary encountered at Davis-Besse appeared to be more within the scope of traditional deterministic analyses than in a risk-informed framework. In fact, as of the time of the LLTF review, the SDP for this event had been in progress for 5 months, with no resolution. Members of the NRC staff expressed the opinion that, in the transition to the ROP, the agency has placed an over-reliance on risk information as opposed to deterministic methods.

The structure of the reactor oversight process (ROP) doesn't allow the implementation of non-baseline inspections unless a greater than green finding is identified. Prior to this event, all ROP Performance Indicators were green, indicating a lack of risk-significant issues at Davis-Besse. Following the event, the NRC staff has taken several months to characterize the significance determination process (SDP) risk significance of this Davis-Besse condition. Subsequent to the identification of the Davis-Besse head degradation, Region III invoked Manual Chapter 0350, Oversight of Operating Reactor Facilities in a Shutdown Condition with Performance Problems, without meeting the prerequisites of the procedure. Specifically, Davis-Besse performance was not degraded into the multiple/repetitive degraded cornerstone, or the

unacceptable performance columns of the action matrix. The LLTF concluded that timeliness of completion of risk assessments and the procedural inability to consider a significant issue independent of the recent plant risk history, provided an environment such that this issue could be viewed as significant from a deterministic perspective, yet staff would have limited procedural guidance for further NRC action.

NRC enforcement focus was shifted by the risk-impact of the issue and enforcement actions were not implemented consistently due to differing staff views. Enforcement (EA 97-414) was issued citing the Maintenance Rule (10 CFR 50.65) involving Inconel Alloy 600 RCS instrument nozzle cracking at SONGS 2 and 3 due to a lack of staff support for enforcement against the licensee's Technical Specification for reactor coolant pressure boundary leakage. In addition, the staff issued the citation as a Severity Level IV, versus a Severity Level III when the staff could not come to full agreement. The licensee presented an argument that was focused on nozzle ejection stemming from catastrophic failure rather than from boric acid wastage.

Lessons learned weren't learned from previous lessons learned reviews (Millstone, IP2, South Texas).

PI&R? No OBF...Bob?

Operating Experience guidance? Gcs?

Barrier Integrity?

3.4.2.2 Recommendations

3.4.2.2.1 Recommendations for NRC

Review the risk-informed regulatory framework, clearly define which activities should be addressed by risk-informed methods and which should be addressed by deterministic methods, and establish a means to evaluate the deterministic methods.

Re-evaluation of the implementation of the ROP hours, sample sizes, and resources during high activity times is necessary.

Consideration should be given to proceduralizing "good practices" such as containment building tours.

Improvements to the ROP are necessary to minimize the opportunity for recurrence of this type of issue. Some recommendations provided for consideration are as follows:

- Reactivation of procedures 90700 and 62001;
- Develop guidance for inspection of changing work scope;
- Evaluate ROP guidance to allow samples of lower risk systems/components;
- Inspection of containment components when accessible;
- Inspection guidance for head inspections (i.e. SG guidance)
- Revisit the policy of not aggregating risk issues/subparts;

Use of traditional enforcement for cross-cutting issues;
 Assess feasibility of predictive PIs and inspections;
 Consider risk of repetitive LCO entries and develop inspection guidance;
 Improve ROP guidance to encourage inspection of temporary mods, workarounds, etc. that may not appear on licensee lists;
 Develop inspection guidance for review of deferred mods, mode restraints during outages, and inspection of plant hardware for age-related degradation;
 Develop inspection guidance to focus on repetitive multiple tasks for significance (i.e. CAC cleaning/ALARA);
 Develop inspection guidance for resident inspector samples of licensing requests to understand the basis and provide necessary feedback to the project manager;
 All cited NOV's should be reviewed during the PI&R biennial inspection;
 Inspection guidance to sample all electronic media (videos, etc) ;
 Develop guidance for threshold of sensitivity to RCS leakage, absolute value and trend changes;
 Develop guidance to inspect commitments and closure actions;

#PI&R guidance should be strengthened: Handoff of issues to the PI&R team; Selection of issues; Review of lic binning

#With aging plants, do more inspection hours on passive components

#Develop NRC criteria for inspection of industry initiatives. Provide inspection guidance to address selected industry operational experience. Initiate GC-specific inspection procedures. Incorporate GC references in inspection procedures

#Discussion threshold for mid-cycle/end of cycle review assessment

#Evaluate barrier integrity cornerstone inspection to determine if improvements are needed. Develop usable barrier integrity performance indicators.

#Should have independent identification reviewed as part of problems as part of PI&R inspections

#Do more inside containment inspections as part of License Renewals

3.4.2.2.2 Recommendations for Industry
 None.

NOTE: # recommendations are not supported with facts in the documentation...