

**EFFECTIVENESS REVIEW OF
LESSONS LEARNED
TASK FORCE REPORTS**

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Executive Summary

Objective and Scope

The U.S. Nuclear Regulatory Commission (NRC) has conducted a number of lessons learned reviews to assess its regulatory processes as a result of significant plant events or plant safety issues. The Davis-Besse Lessons Learned Task Force (DBLLTF) identified issues in several of the previous lessons learned reports that were repetitive or similar to the issues identified in the DBLLTF report, although the DBLLTF review was not extensive in this area. As a result, a more comprehensive review to understand the reasons for the recurring or similar issues was recommended. In a memo dated January 3, 2003, the Executive Director for Operations (EDO) directed the Office of Nuclear Reactor Regulation (NRR) to implement this recommendation; specifically, to review the issues identified in Appendix F, Table F-1 of the DBLLTF report to determine whether the recommendations from previous lessons learned reviews have been adequately implemented.

The Effectiveness Review Lessons Learned Task Force (ERLLTF) was chartered to conduct a limited effectiveness review of corrective actions that were proposed to resolve issues identified by previous lessons learned task forces. This review was limited to those issues [identified in four lessons learned reports] that recurred during or leading up to, the Davis-Besse event on March 5, 2002. In addition, for those corrective actions that were not effectively implemented, the task force was tasked with identifying the root and contributing causes, and making recommendations to prevent recurrence.

Background

On March 5, 2002, the licensee for the Davis-Besse Nuclear Plant Station (DBNPS) discovered a cavity in the reactor pressure vessel (RPV) head while conducting inspections for reactor pressure vessel head penetration (VHP) nozzle cracking due to primary water stress corrosion cracking. The inspection was in response to an NRC bulletin. The licensee discovered cracks in several VHP nozzles and a cavity with a surface area of approximately 20-30 square inches. Upon further examination, the licensee identified that the cavity extended completely through the 6.63-inch-thick carbon steel RPV head down to a thin internal liner of stainless steel cladding. In this case, the cladding withstood the primary system pressure over the cavity region during operation. However, the cladding was not designed to perform this function. Boric acid corrosion of the carbon steel RPV head was the primary contributor to the RPV head degradation.

On September 30, 2002, the DBLLTF completed its evaluation of the NRC's regulatory processes related to the Davis-Besse event. Appendix F of the DBLLTF report listed the results of a review of the four Lessons Learned Reports that were used to determine whether there were recurring or similar problems at Davis-Besse. The DBLLTF identified the following issues as recurring performance or programmatic issues that had been previously identified and persisted through the review of the Davis-Besse event: (1) closeout of inspection findings before licensee implementation of corrective actions (F.2.1); (2) lack of program guidance for assessing long-standing hardware problems (F.2.2); (3) deficiency of NRC inspectors/reviewers skills, abilities, experience (F.2.3); (4) deficiency of a process to verify

information (F.2.4); (5) deficiency of NRC review of routine reports (F.2.5); (6) inadequate NRR/regional office interaction during safety evaluation development (F.2.6); (7) specific review guidance (F.2.7); (8) lack of integration of inspection findings (F.2.8); (9) inadequate performance review process (F.2.9); (10) inadequate industry guidance (F.2.10); (11) inadequate requirements in licensing basis (F.2.11).

The present report documents the ERLTTF efforts to trace recurring issues through the NRC processes and programs to closure and to identify the root and contributing causes of recurrence.

Methodology

The task force tracked the corrective actions proposed to resolve the recurring issues raised by each lessons learned task force report. This allowed a close examination of the processes, programs, databases, policies, procedures, and practices used to disposition and implement corrective actions to resolve issues. Root and contributing causes of the recurring issues were also identified through this examination. An effectiveness review of the corrective actions was conducted to ensure that the corrective actions were effectively implemented. Staff members and managers, both first-line and senior management, were interviewed to gain an understanding of policies and actions taken. Additionally, the recommendations from the Davis-Besse report, lessons learned reports, and the document which closed out the issue were compared and analyzed to ensure that the issue in question was properly characterized.

Observations and Conclusions

Overall, the task force concluded that the previous lessons learned task forces (1) conducted very thorough and exhaustive reviews, (2) identified areas for improvements, and (3) proposed recommendations that would have reasonably mitigated the impact or prevented recurrence of the event. The corrective actions resulting from these reviews, although initially effective, were not always found to remain effective. The predominate root cause for the ineffective corrective actions identified during this review is the lack of an agency corrective action program (CAP). An effective CAP ensures accountability and minimizes failure (recurrent issues). Establishing processes, effectiveness reviews, and a centralized tracking system will ensure consistency in the way tools are used to disposition, track, and closeout agency corrective actions.

The agency does not have a CAP, or a similar program that is specifically established to correct the agency's own problems. Instead, line organizations are generally assigned lead roles in evaluating and resolving problems, proposing and implementing corrective actions, and then tracking them to closure. This process, however, does not facilitate resolving problems to prevent recurrence, since there is less senior management oversight and no overall effectiveness review. The task force noted that when corrective actions are tracked at the Commission level, there is greater staff accountability, the tracking and status of items is much clearer, and all the documents are electronically available.

The four root causes identified were the lack of a corrective action process and program, the lack of effectiveness reviews, the lack of a centralized tracking system, and weaknesses in line organizations' closeout practices. The corresponding problems, which led to the recurrence, and can be found in Section 5.0, "Summary of Results," include: (1) reversal of corrective

actions, (2) corrective actions partially addressed/completed, (3) corrective actions failed to address issue, (4) recommendation did not result in measurable actions, (5) corrective actions closed out, work ongoing, but not complete, and (6) due dates changed frequently. Most of these problems could have been prevented if an effectiveness review had been conducted.

The task force identified and evaluated several databases which were used by the agency to track the action items from the four lessons learned task force reports. See Section 4.0 for additional details on the tracking systems. These tracking systems were used to manage the corrective actions that were proposed to resolve the issues raised by the lessons learned task forces. In the case of Millstone, the corrective actions were tracked using an informal database that was retired when the lead staff was promoted to a new position. Since there was no overall organization responsible for tracking follow up of the corrective actions or coordinating an effectiveness review, tracking of the corrective actions appeared to cease.

The DBLLTF identified 11 issues as recurring performance or programmatic issues that had been previously identified and persisted through the review of the Davis-Besse event. Two of those issues were identified in all four lessons learned reports: inspector knowledge, training, and skills, and the performance review process. Inspector knowledge, training, and skills, and the performance review process appeared to be addressed by the enhancements to the ROP training and assessment process areas. Two additional problem areas that the ERLTF identified were the failure of (1) the NRC to effectively use operating experience and (2) inspectors to have a questioning attitude. The task force believes these were contributing factors in all the lessons learned reports and still need to be monitored. The task force notes that these two areas are being addressed in the Davis-Besse Action Plan but the effectiveness of the corrective actions has not yet been assessed.

Recommendations

The recommendations of the ERLTF (Appendix A, Consolidated Table of Recommendations - Table 1) have the potential to establish a system to ensure that corrective actions properly address issues, policy issues are raised, cases of delinquent corrective actions are brought to senior management's attention, reversal of corrective actions implemented will be prevented, and high-priority action items are traceable to closure, thus, preventing recurrence of previously identified issues.

The ERLTF recommends that the NRC establish an agency-wide CAP that has the fundamentals and accountability of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and focuses on the corrective actions from major lessons learned reports and high-priority commitments. Corrective actions from lessons learned would be only one source of the commitments. Other corrective actions that could be tracked include items from the Office of Inspector General (OIG) and the Advisory Committee on Reactor Safeguards (ACRS). Corrective actions from external organizations such as the General Accounting Office should also be considered.

1.0 Introduction

Objective

The purpose of this review was to evaluate the effectiveness of NRC corrective actions implemented to resolve issues identified by previous lessons learned reports, identify the root cause of any recurrences, and recommend action(s) to prevent further recurrences. This review was limited to those issues identified in four lessons learned reports during the Davis-Besse event on March 5, 2002. This task force used the recommendations contained in Appendix F of the Davis-Besse Lessons Learned Task Force report to conduct its review. Also, issues that recurred during the Davis-Besse event, which were not cited by the DBLLTF, were identified from the four lessons learned reports by this task force.

Background

On March 5, 2002, the licensee discovered a cavity in the DBNPS reactor pressure vessel head while conducting inspections for reactor pressure VHP nozzle cracking due to primary water stress corrosion cracking. The inspection was in response to an NRC bulletin. The licensee discovered cracks in several VHP nozzles and a cavity with a surface area of approximately 20-30 square inches. Upon further examination, the licensee identified that the cavity extended completely through the 6.63 inch thick carbon steel RPV head down to a thin internal liner of stainless steel cladding. In this case, the cladding withstood the primary system pressure over the cavity region during operation. However, the cladding was not designed to perform this function. Boric acid corrosion of the carbon steel RPV head was the primary contributor to the RPV head degradation.

Following the discovery of degradation of the pressure boundary material of the DBNPS reactor pressure vessel head, the EDO directed the formation of an NRC task force to conduct an independent evaluation of the NRC staff's regulatory processes related to assuring reactor vessel head integrity. The DBLLTF report, issued on September 30, 2002, contained a recommendation to assess the effectiveness of the NRC actions taken from previous lessons learned efforts.

Appendix F of the DBLLTF report is a review, by the DBLLTF, of four previous lessons learned reports to determine whether they identified similar problems. The reports are as follows:

- "Indian Point 2 Steam Generator Tube Failure Lessons-Learned Report," October 23, 2000
- "Report of the Millstone Lessons-Learned Task Group, Part 1: Review and Findings," September 23, 1996
- SECY-97-036, "Millstone Lessons-Learned Task Group, Part 2: Policy Issues," February 12, 1997 (Part 2 of this report included the recommendations from Part 1. The two reports are treated as one report for this review).

- “Task Force Report Concerning the Effectiveness of Implementation of the NRC’s Inspection Program and Adequacy of the Licensee’s Employee Concerns Program at the South Texas Project,” March 31, 1995

Lessons Learned Reports Under Review

The following is a brief description of the background of each lessons learned report that was reviewed by the DBLLTF.

South Texas

The objectives of the South Texas Project Lessons Learned Task Force (STPLLTF) was to (1) review the effectiveness of the NRC Inspection Program, (2) review the effectiveness of the implementation of the Inspection Program at South Texas Project (STP), (3) review the adequacy of Houston Lighting and Power Company (HL&P) safety performance, and (4) review and assess HL&P’s employee concerns program activities and NRC’s oversight of those activities.

The construction of STP began in 1975, following the issuance of a limited work authorization by the NRC. The NRC subsequently issued construction permits in December 1975. Significant construction problems occurred during the late 1970s, largely as a result of deficiencies in the quality assurance and quality control programs. In 1985, the NRC performed a construction appraisal team inspection at STP. In 1988, the NRC formed a safety significance assessment team to follow up on approximately 700 allegations of construction irregularities at STP identified by the Government Accountability Project.

During the first year of Unit 1 operation, some challenging events occurred including a main generator hydrogen fire, steam generator feed pump damage, and an auxiliary feedwater line rupture. Once Unit 2 entered commercial operation, it also experienced equipment problems, such as the failure of the main transformer, failure of a connecting rod in one of the standby diesel generators (SDGs), and steam generator feed pump problems.

Systematic Assessment of Licensee Performance (SALP) reports for the first 2 years of operation indicated generally good performance. However, the 1991 and 1992 SALP reports pointed out declines in performance. The STP was again discussed at the January 1993 senior management meeting (SMM), where it was decided that a diagnostic evaluation team would be sent to STP to enable the NRC to better understand the performance at STP.

Shortly before the January 1993 SMM, HL&P experienced a significant operability issue with the STP SDGs and another safety-significant operability issue with the turbine-driven auxiliary feedwater (TDAFW) pump turbines and associated control equipment. These two events heightened NRC management’s awareness of concerns regarding STP’s safety performance. After the TDAFW pump event, STP entered what ultimately became a lengthy shutdown and received its first confirmatory action letter.

Millstone

A task group was formed to identify problems or deficiencies in NRR's programs as they related to issues raised at Millstone. In October 1993, Northeast Utilities (NU) submitted a licensee event report (LER 93-11) for Millstone, Unit 1, indicating that the unit had operated outside of the plant's design bases during refueling outages. Issues of concern in the LER included (1) how much of the reactor core the licensee moved from the reactor vessel to the spent fuel pool during refueling operations and (2) assumptions used in its (a) updated final safety analysis report (FSAR) and (b) analyses that supported a previous license amendment.

The licensee's refueling practices were inconsistent with information provided to and reviewed by the NRC through the licensing and license amendment processes. The utility's root cause analysis to resolve the situation showed that (1) the plant FSAR contained errors and omissions; (2) the plant's administrative process, if followed precisely, would not have maintained the FSAR accurately; and (3) the utility staff did not fully understand the interrelationship of licensing and design documents. Concerns were raised regarding the NRC's process for reviewing and approving licensing actions and NRC's reliance on information submitted by the licensee.

Indian Point 2

A task force was formed to conduct an evaluation of the technical and regulatory processes related to assuring steam generator tube integrity in order to identify lessons learned and recommend any areas for improvements, based on the February 15, 2000, steam generator tube failure.

On February 15, 2000, with the unit at 99% power, the operators of the Indian Point 2 (IP2) nuclear power plant received indication of a steam generator tube failure. The tube failure consisted of a through-wall crack in one of the 3,260 tubes in one of the SGs that allowed reactor coolant water to flow through the crack into the steam generating side of the SG at the rate of about 150 gallons per minute. The licensee, Consolidated Edison (Con Ed), declared an alert in accordance with the site emergency plan. An alert is the second lowest of the four NRC event classifications. The operators manually tripped the reactor, isolated the steam generator (SG) with the tube failure, and proceeded to use the three other SGs to cool the reactor. The licensee terminated the "alert" after the reactor coolant system temperature was reduced to below 200 degrees F, and the reactor was placed in the cold shutdown condition.

After placing the unit in the cold shutdown condition, Con Ed inspected SG 24 and found that the row 2, column 5 (R2C5) tube had failed. This small-radius, low-row tube, had cracked at the apex of the tube U-bend due to primary water stress corrosion cracking (PWSCC).

2.0 Scope and Methodology

The objectives of this review were to evaluate the effectiveness of corrective actions implemented to resolve issues identified by previous lessons learned reports, identify the root cause of any recurrence, and recommend actions to prevent recurrence. This task force used the recommendations in Appendix F of the Davis-Besse Lessons Learned Task Force report

for this review. This task force also used the four lessons learned reports to identify issues that recurred during the Davis-Besse event and that were not cited by the DBLLTF report.

In assessing the effectiveness of the corrective actions from the STP, IP2, and Millstone reviews, the ERLTF first traced all actions to completion, regardless of whether the issues were thought to be recurring or not by this task force. The task force used this approach to closely examine the processes, databases, policies, procedures, and practices used to disposition and implement corrective actions proposed to resolve issues. When actions were not traceable, the task force reviewed the current policy or practice in use, in an effort to measure the effectiveness of those actions. The task force primarily interviewed senior staff members and senior and first-line management when conducting effectiveness reviews to gain an understanding of how policies, practices, and follow up of issues were implemented.

The proposed corrective action was then analyzed for its effectiveness. When evaluating the corrective actions, even after tracking them to completion, the task force asked three questions:

- Would the corrective action reasonably prevent recurrence?
- Does the manner of disposition reveal a lack of a process or problems in the existing processes?
- Are the issues taken out of context or characterized properly?

3.0 Traceability

The DBLLTF reviewed several previous NRC lessons-learned activities to determine whether they suggested any recurring or similar problems. Appendix F of the DBLLTF report documented the results of that review. The ERLTF tracked to closure all corrective actions associated with the recurring issues identified by the DBLLTF. This approach was taken in order to examine processes, policies, and procedures that were in place to track and resolve high-priority actions that resulted from a lessons learned task force.

Where appropriate, the ERLTF also examined other reasons, such as misinterpretation or rephrasing of the recommendation, to help explain why the intent of the original task force's recommendation was lost. Additionally, the recommendation was examined to verify if it could have prohibited resolution.

This section of the report focuses on identifying root and contributing causes that resulted in recurring issues; therefore, this section of the report discusses only those corrective actions that were not fully successful in resolving the associated issue. Corrective actions that were successfully tracked to closure are not discussed. In the paragraphs below, references to recommendations, such as F.2.2, F.2.3, etc., are from Appendix F of the DBLLTF report.

3.1 South Texas

There were four recommendations (F.2.2, F.2.3, F.2.8, F.2.9) found to be recurring issues by the DBLLTF. The ERLTF found two recommendations (F.2.2, F.2.9) to be completed and effective, but then later reversed by subsequent program changes. Two recommendations

(F.2.3, F.2.8) were found to be partially completed and addressed (failed to address the issue). One recommendation (F.2.8) was closed out based on ongoing activities.

3.1.1 Program Guidance for Assessing Long-Standing Hardware Problems, F.2.2

Recommendations from Previous Lessons Learned

This recommendation proposed that the NRC consider improving program guidance on assessing effectiveness of long-term corrective action programs to assure that broader problems were recognized.

Actions Taken in Response to Previous Recommendations

The Division of Inspection Program Management (DIPM), Inspection Program Branch (now IIPB, then PIPB), was the organization responsible for the resolution of this recommendation. PIPB believed that the 1994 revision to Inspection Procedure (IP) 40500, "Effectiveness of Licensee Process To Identify, Resolve, and Prevent Problems," resolved the problem and subsequently, included a paragraph in the newly generated inspector newsletter to caution inspectors against licensees taking credit for short-term improvement efforts and programs without timely or effective progress toward long-term results. Inspection Procedure 40500 was a procedure used under the old "core" Inspection Program.

With the implementation of the revised Reactor Oversight Process (ROP) in April 2000, the recommendation to improve guidance on addressing licensee's long-term corrective actions was not incorporated into the revised Inspection Program. The Davis-Besse event brought attention to this area, resulting in actions to address trending. IIPB revised (9/8/03) IP 71152, "Identification and Resolution of Problems," which requires inspectors to look at trending of hardware problems for equipment failures.

Conclusions Regarding Effectiveness of Corrective Actions Taken

The ERLTTF agreed that the changes to IP 40500 contained guidance for assessing long standing hardware problems. However, when the Inspection Program was revised to form the ROP, this change was "undone." This was possible since there was no basis document that ensures that the reasons and origins of high-priority recommendations from previous lessons learned are understood and retained by staff making changes. Further, the agency does not have a process for systematically tracking and retaining lessons learned.

The ERLTTF noted that the trending of hardware problems had been subsequently incorporated into the ROP Inspection Program as a result of the March 5, 2002, Davis-Besse event. The effectiveness of this corrective action could not be assessed by the ERLTTF. Trending results will not be available until approximately August 2004.

Recommendations to Prevent Further Recurrences

Establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to explain the reasons for changes and to ensure that

future changes to documents or processes will not unknowingly remove these changes. An effectiveness review of the change to IP 71152 (addressing longstanding hardware issues) should also be conducted.

3.1.2 NRC Inspector/Reviewer Skills, Abilities, Experience, F.2.3

Recommendations from Previous Lessons Learned

This recommendation proposed that the agency continue ongoing efforts in inspector development programs and solicit feedback from inspectors and regional managers on those inspector skills and abilities that may require additional enhancement. Also, it was suggested that inspector training courses could be expanded to focus more on interpretive areas of system operability and judgmental technical issues like surveillance testing.

Actions Taken in Response to Previous Recommendations

The responsible organization, PIPB, responded to this recommendation by taking credit for an ongoing activity when posting vacancy announcements for the senior resident inspector/resident inspector (SRI/RI) development programs. Additionally, in 1995, there were plans to implement an Inspection Program newsletter to improve organizational communication and participation in program direction. Efforts continued on the management of the SRI/RI development programs. PIPB initiated the Inspection Program newsletter. A SRI/RI counterpart meeting was also held in September 1995, which provided inspector feedback on various Inspection Program issues.

The recommendation to continue developmental programs for the SRI and RI were good initiatives by PIPB. However, in this case, the primary deficiency was not totally addressed by ongoing activities implemented by PIPB since the STPLTTF appeared to be concerned with the numerous missed opportunities to elicit more timely corrective actions from the licensee. Therefore, how did the Inspection Program prepare inspectors to integrate very large amounts of information in an effort to prevent missed opportunities to identify safety concerns?

In tracking the documentation to verify PIPB's resolutions, this task force could not find a hard copy or the electronic version of the 1995 newsletter. All other issues to date were available electronically. The SRI/RI development programs were geared towards career advancement. Knowledge and skill development in technical areas were not evident in a programmatic or training application. The SRI/RI counterpart meeting provided an opportunity to tell inspectors about "hot topics," technical areas of interest, and any information that regional management believed important to its inspection staff. This was a good initiative and is viewed as a support function. PIPB committed to assess program implementation and solicit feedback for improvement, modification, or termination. The Inspection Program newsletter was credited for solicitation of inspector and manager feedback for additional enhancements and continuous improvement. Formal updates to address the resolution of recommendations ended with the June 11, 1996, status update memorandum.

Conclusion Regarding Effectiveness of Corrective Actions Taken

The planned corrective actions failed to address the total issue. The STPLLTF recommended changes to training courses to address (and identify) the interpretive areas of system operability and technical areas such as surveillance testing that require engineering judgment. This recommendation was not addressed at all. There was no evidence of feedback solicitation. The resolution was to apparently fill positions for the SRI/RI developmental programs and put an article in the newsletter. The task force could not locate this newsletter.

Recommendations to Prevent Further Recurrences

Develop and implement a process check within the CAP recommended in Section 3.1.1 to ensure recommendations from lessons learned activities are fully addressed. Revisit training provided to inspectors to ensure current training covers the recommendations from the STPLLTF.

3.1.3 Integration of Inspection Findings, F.2.8

Recommendations from Previous Lessons Learned

This recommendation proposed that the NRC consider actions that should be taken to ensure effective integration of inspection findings will continue in light of NRC's organizational flattening and downsizing activities underway at the time. The integration of inspection findings by the NRC was considered weak when regional management was in flux and distracted by competing needs for limited resources. The integration process improved as management stabilized and the workload decreased.

Actions Taken in Response to Previous Recommendations

The responsible line organization, PIPB, took credit for a number of ongoing activities established to improve NRC integration of inspection findings and assessments: improvement to the quality of periodic plant performance reviews (PPRs), the implementation of the integrated performance assessment process (IPAPs), and the addition of regional and headquarter positions for senior reactor analysts (SRAs).

PIPB's response to the recommendation was to improve the PPR process by adopting the most effective features from each regional office's practices and issuing draft standardized guidance. Subsequent to the standardized guidance, PIPB incorporated lessons learned for use of this draft guidance in the PPRs that preceded the June 1996 SMM and issued a finalized PPR Inspection Manual Chapter (IMC) in mid-1996. Formal updates to address the resolution of the recommendations ended with the June 11, 1996, status update memorandum, although PIPB committed to provide continued updates on the actions taken to provide enhanced guidance for the PPR process. The ERLTF could not locate further closeout documents to verify the enhancement.

The challenging area for regional management while in flux and distracted by competing needs for limited resources was not considered in the evaluation of this action. It is stated in the STPLLTF report and it is the opinion of the ERLTF that the distraction of regional

management by competing needs for limited resources had an impact on the ability to integrate findings.

The ERLTTF reviewed the current ROP to verify that the Inspection Program allows for resources when a region is challenged with competing needs and priorities, limited resources and staff, and fixed budgeted inspection activities. As a result of the March 5, 2002, Davis-Besse event, additional enhancements have been made to the ROP to provide regions with resources when events occur that are beyond the budget for that fiscal year. The staff now budgets for one plant in an IMC 0350 status. If more than one plant is subjected to IMC 0350, the regions and headquarters share resources to supplement the additional unbudgeted inspection demands. More resources have been added, per region, for supplemental inspections (IP 95003) and reactor head inspections (IMC 2515, Appendix C).

Conclusion Regarding Effectiveness of Corrective Actions Taken

The corrective actions taken to address the STPLTTF recommendation only addressed the integration process. The issue involved integrating findings when resources were challenged or scarce. The current Inspection Program is structured to allow resources to be shared when a region is challenged with competing priorities (problem plants) and strained resources.

Recommendations to Prevent Further Recurrences

Since the budget process is predictive in nature, an effectiveness review should be conducted each year to verify that the inspection resources are adequate to implement the ROP.

3.1.4 Performance Review Process, F.2.9

This recommendation proposed that the NRC should better integrate and analyze available data such that it would lead NRC to earlier recognition of performance problems. The resolution focused on improvements to inspection guidance and oversight.

3.1.4.a Inspector Guidance

Recommendations from Previous Lessons Learned

This recommendation proposed that the NRC consider developing guidance for inspectors, sensitizing them to the importance of questioning (1) the adequacy of surveillance tests which do not, to the extent practicable, demonstrate that the components will function under their design basis conditions, (2) the operability of equipment that does not perform properly on the initial attempt of a surveillance test, and (3) the acceptability of preconditioning equipment in preparation for the performance of surveillance tests. Such questioning would help identify equipment performance problems similar to those experienced by STP TDAFW pumps, which would trip on initial start attempts unless the steam lines were first pre-warmed and drained of condensate.

Actions Taken in Response to Previous Recommendations

The responsible line organization, PIPB, conducted a thorough review of this area by reviewing all inspection guidance related to surveillance testing. IP 61726, "Surveillance Observations," was changed to provide general guidance for inspecting licensee surveillance activities. IP 93801, "Safety System Functional Inspection," was revised to provide inspection requirements and associated guidance for verifying that surveillance testing demonstrates system function under design basis conditions. A review of generic communications and the Inspection Manual was performed to identify existing guidance to address the STPLLTF recommendation. Inspection Manual Part 9900: Technical Guidance, "Maintenance - Preconditioning of Structures, Systems, and Components Before Determining Operability" (previous title in 1994 "Operable/Operability: Ensuring the Functional Capability of a System or Component"), was revised to provide guidance for the review of licensee operability determinations, including the need to determine the root cause of test failures and to correct the problem before resumption of testing.

IP 61726 has been replaced in the current Inspection Program by IP 71111.22. The task force obtained a copy of the old procedure, IP 61726, and compared it to the corresponding procedure, IP 71111.22, in the current program (ROP). IP 61726 does an outstanding job of including those attributes outlined in the STPLLTF report. IP 71111.22 merely lists "preconditioning" as a significant surveillance test attribute for consideration. The examples or the bases for preconditioning (which satisfied the STPLLTF recommendation) and guidance for surveillance testing, operability, and design bases were excluded. It does, however, list Inspection Manual Part 9900 as a reference.

Inspection Manual Part 9900 contains the guidance and is referenced in the procedure although it is no longer a part of the Inspection Program. The ERLTTF interviewed the responsible staff for this Inspection Manual Part to determine the usage and status of updates. The Part 9900 guidance was noted to be reference material for inspectors use and inspectors are not required to learn that specific part of the manual. At this point, newer inspectors are told about its existence, usage, and content by more tenured inspectors. The manual has not been updated since September 1998, prior to the implementation of the ROP in April 2000. Since it is not required reading self study material, or included in the ROP, no process captures the periodic review and update of the Inspection Manual Part 9900 guidance.

Conclusion Regarding Effectiveness of Corrective Actions Taken

The recommendation proposed by the STPLLTF was initially effectively implemented. The revision to the Inspection Program when the ROP was established reversed the effective corrective actions. The review of Inspection Manual Part 9900, and thus, the review of the STPLLTF recommendations related to surveillance testing is not a requirement of the present inspection procedure.

Recommendations to Prevent Further Recurrences

As discussed in the recommendations in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to

explain the reasons for changes and to ensure that future changes to documents or processes will not unknowingly remove these changes. IIPB should ensure that the STPLLTF recommendations regarding surveillance testing are incorporated into the ROP Inspection Program. Inspection Manual Part 9900 should be assessed as to whether it should be revised.

3.1.4.b Inspector Oversight

Recommendations from Previous Lessons Learned

This recommendation proposed that regional management be encouraged to evaluate any significant increase in the amount of reactive inspection its inspectors are performing at a site, and determine the cause for the change, such as insufficient NRC resources or declining performance by the licensee.

Actions Taken in Response to Previous Recommendations

PIPB completed a study to investigate the feasibility of using significant changes in reactive inspection hours to identify declining trends in licensee performance and challenges to routine inspection. PIPB determined that it was unfeasible to use reactive inspection hours as an indicator of declining licensee performance and closed out the corrective action based on this assessment. The ERLTTF concluded that other venues should have been pursued. The real issue of detecting declining licensee performance was not addressed in response to the STPLLTF recommendation.

As part of its review, the ERLTTF conducted an effectiveness review to ensure that there are measures in the ROP to detect declining performance. The task force concluded that the ROP action matrix objectively identifies declining licensee performance.

Conclusion Regarding Effectiveness of Corrective Actions Taken

The actions proposed did not fully address the issue. Those actions that partially addressed the issue failed to satisfy the intent of the STPLLTF recommendation. Other actions should have been explored when this occurred. The current Inspection Program provides measures to objectively detect declining licensee performance.

Recommendations to Prevent Further Recurrences

Develop and implement a process check within the CAP recommended in Section 3.1.1 to ensure recommendations from lessons learned activities are fully addressed. (This is identical to the recommendation in Section 3.1.2).

3.2 Millstone

There were four recommendations (F.2.1, F.2.3, F.2.4, F.2.9) found to be recurring issues by the DBLLTF. This task force found that one recommendation was completed (F.2.4), two recommendations had corrective actions that were not complete (F.2.1, F.2.3), and one recommendation that did not result in measurable actions that could be used to verify effectiveness of corrective actions (F.2.1). Further examination of closeout documents and

the recommendation listed in both the Davis-Besse and Millstone reports revealed the following problems, which eventually led to recurrence: corrective actions done, then reversed (F.2.3), corrective actions closed out to other activities (F.2.1, F.2.3, F.2.9), and corrective actions did not fully address the issue (F.2.1, F.2.3).

3.2.1 Closeout of Inspection Findings Before Licensee Implementation of Corrective Actions, F.2.1

Recommendations from Previous Lessons Learned

This recommendation proposed that the Inspection Program clearly state management's expectation for identifying, following up, and closing open items. The Inspection Program Branch should assess the regions' use of the open items tracking system and the effectiveness of quality assurance-related inspections in identifying serious problems in licensees' quality assurance programs.

Actions Taken in Response to Previous Recommendations

There were two corrective actions proposed by PIPB to resolve this recommendation: conduct an audit of IP 40500, the governing procedure for corrective action program inspections, and implement the associated STPLLTF recommendations.

This task force interviewed senior management from PIPB to verify the implementation of these corrective actions, since closeout documents from the resolving organization could not be located. The corrective actions to resolve this recommendation were not a part of the tracking system (performance improvement plan) used to keep the status of recommendations. The corrective actions were not captured in any of the status documents, other than the Millstone, Part 2 report, which contained an update to the original recommendations made by the Millstone Lessons Learned Task Force (MLLTF).

An audit of IP 40500 was conducted by PIPB to address the STPLLTF recommendation. Although, from the description of this item in Part 2 of the Millstone report, the scope and purpose of this audit was not identified. It was the opinion of the ERLTTF that conducting this audit would not result in stating management's expectations for identifying, following up, and closing open items. The results of the audit could possibly indicate to management the severity of the problem.

Additionally, a portion of this recommendation did not appear to have been addressed. The Inspection Program Branch did not assess the regions' use of their open items tracking system, as recommended by the MLLTF. This is a significant area since the inventory of open items can be an early indication of precursors to repetitive failures. Concerns that exist today with the open items involve non-cited violations (NCVs). If the finding is greater than green, then it will be followed up with a review and verification of corrective action implementation and plans. If the finding is green, it is selected on a sampling bases so therefore may never be reviewed. The Problem Identification and Resolution (PI&R) team (under guidance of IP 71152) verifies corrective action timeliness and looks for additional examples of problems that got the licensee the NCV. This sampling approach stems from the risk-based philosophy that

findings that are green are seen to pose less risk significance than those greater than those green.

Conclusion Regarding Effectiveness of Corrective Actions Taken

The corrective action did not adequately address the issue raised by the MLLTF. It was clearly stated in the MLLTF report that the Inspection Program should review the policy of conducting verifications on a sampling basis. This aspect of the Inspection Program was recommended for review. An audit of the procedure that gives the guidance to identify, follow up, and close open items could possibly indicate to management the severity of the problem, but could not resolve the problem. There were no actions proposed to engage the regions in an assessment in their use of open item tracking systems. The audit of IP 40500, nevertheless, could have assessed the effectiveness of quality assurance-related inspections in identifying serious problems in licensees' quality assurance programs.

Recommendations to Prevent Further Recurrences

Similar to the recommendation in Section 3.1.2, develop and implement a process check within the CAP recommended in Section 3.1.1 to ensure recommendations from lessons learned activities are fully addressed. Ensure the ROP clearly state management's expectation for identifying, following up, and closing open items.

3.2.2 NRC Inspector/Reviewer Skills, Abilities, Experience, F.2.3

Recommendations from Previous Lessons Learned

This recommendation proposed that NRC determine if inspectors have sufficient knowledge and skills needed to independently verify the acceptability of design-related actions. Also, it was recommended that (1) employees with inspection and review responsibilities have all the necessary knowledge and skills to independently verify the acceptability of design-related actions and (2) the knowledge and skills base for these employees be reviewed and a determination made as to whether it needs further development.

Actions Taken in Response to Previous Recommendations

In the case of this recommendation, the ERLTF found that the documentation to closure was weak and at times non-existent. Thus, this task force interviewed senior staff and lead reviewers that were knowledgeable about the history of the associated corrective actions. Since there were several corrective actions to address this one recommendation, the task force conducted an effectiveness review for all of the corrective actions and qualified each corrective action below, but discusses only corrective actions that were ineffective.

There were seven corrective actions assigned to address this recommendation. Two were not tracked by the formal tracking system used to capture the MLLTF action items. The other five corrective actions were captured in the Performance Improvement Plan (PIP) tracking system (#47, #31b, #12, #32b, and #34) used to give an update, status, and completions of MLLTF action items.

The ERLTTF conducted an effectiveness review of all corrective actions associated with this recommendation and concluded that five of the seven corrective actions (PIP #47, #31b, and #12 and two not tracked in formal system) were completed. However, the corrective actions, with the exception of one of the items not tracked formally, did not measure or require change or implementation of new practices, processes, or policies. Thus, the specific weakness identified by the MLLTF has the potential to recur.

Additionally, implementation of two of the corrective actions (#32b and #34) could not be verified to completion. The task force was unable to locate official agency records to confirm that the corrective actions had been implemented. In contrast, the two corrective actions discussed above that were not captured in the formal tracking system had been completed, although the task force was unable to assess the effectiveness of the actions.

The task force also found that even though PIP #12 (determine the status of training for Project Managers (PM), examine PM functions (job task analysis), determine training requirements, and establish appraisal criteria and a performance plan) was complete, the corrective actions did not remain effective. This action had been performed as described; however, through interviews with senior staff members, it was the opinion of the senior staff that PM knowledge had not improved. A great deal of effort and resources were expended on the job task analysis to identify training needs. However, based on the interviews, PM training practices are the same today as they were when the Millstone recommendations were proposed, although, there was a formal PM training program for approximately one year.

An OIG audit (OIG-97A-21, "Review of the Project Manager Position in the Office of Nuclear Reactor Regulation," dated, July 13, 1998), also addressed this issue and stressed that management needed to provide the time and staff support necessary to ensure PMs were adequately trained in areas identified as critical to the PM job function. During the audit, a May 1989 memorandum was reviewed, which committed the supervisor to identify courses each PM should take to meet the job requirements and those courses would become the formal training plan. The PMs interviewed by OIG had not received training plans as required. Semiannual meetings conducted by Project Directorates to discuss training needs for the PMs were not being conducted as proposed by the Associate Director for Reactor Projects (ADRP).

The EDO responded back to OIG in a June 1, 1998, memorandum ("Review of Draft Audit Report - Review of the Project Manager Position in NRR"). Therein, the development of an improved training program for NRR PMs was to be pursued following the completion of the job task analysis, and on-the-job training was to be an integral part of the training program.

Since the ERLTTF could not obtain documents that verified completion of the PM training program discussed above, senior staff members were interviewed. Based on those interviews, it was determined that a PM training program was established for approximately one year, however, there is currently no PM training program that satisfies this corrective action.

Conclusions Regarding Effectiveness of Corrective Actions Taken

The MLLTF focused attention on the need for personnel with inspection and review responsibilities to have all the necessary knowledge and skills to independently verify the acceptability of design-related actions and the need to determine whether the knowledge and

skills base needed further development. The Millstone closeout document that outlined the corrective actions for the recommendation accurately captured the intent of the recommendation; however, the associated corrective actions proposed to address the issue were primarily geared towards project managers. Technical reviewers were not included. Revisions were made to inspector training requirements in IMC 1245, but the ERLTTF could not determine whether the training was effective since an evaluation was not conducted.

The line organization ADRP that had ownership of this issue primarily focused on the resolution for PMs. Also, the corrective actions proposed by ADRP did not indicate that the necessary knowledge and skills base [to independently verify the acceptability of design-related actions] was assessed or explored for the need for further development, as recommended by the MLLTF.

Project Manager training was established as a formal program and a year later it was dissolved. From interviews with senior staff members the reason for such actions were unknown. In tracking this issue, it was discovered that the corrective action was closed based on an ongoing activity to satisfy a similar recommendation made by the OIG.

The knowledge and skills base for inspectors was addressed when PIPB incorporated on-the-job training related to design basis knowledge in the engineering portion of the inspector qualification journal. The closeout actions for inspector training was silent on initiatives or measures to rectify deficiencies in design basis knowledge other than an additional on-the-job training requirement in the inspector qualification journal.

Recommendations to Prevent Further Recurrences

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to explain the reasons for changes and to ensure that future changes to documents or processes will not unknowingly remove these changes. PM training should be revisited to ensure the recommendations from the MLLTF are addressed.

3.2.3 Performance Review Process, F.2.9

Recommendations from Previous Lessons Learned

This recommendation proposed adding structure and more objective criteria to the SMM and performance review processes and was found to have been closed out due to an ongoing activity to implement the revised SMM process in place at the time.

Actions Taken in Response to Previous Recommendations

Historical documents (the SECY Web page only goes back to 1996) show that the SMM process had been continuously critiqued for improvement and revised from 1996 through 1999, followed by the suspension of SALP (SECY-99-086) and inception of the ROP (see SECY-99-007, which describes the integrated performance assessment process that has replaced the SMM process).

In September 1996, the MLLTF Report, Part 1, was issued with recommendations. On February 12, 1997, the MLLTF Report, Part 2: Policy Issues was issued, which contained the subject recommendation with status (SECY-97-036). SECY-97-072, "Staff Action Plan To Improve The Senior Management Meeting Process," issued April 2, 1997, informed the Commission of the staff's plans to address the recommendations made by the Arthur Andersen Company to improve the SMM process. One recommendation of this SECY paper was to revise screening meetings to be as objective as possible and provide a visible connection between facility performance and the ensuing decisions. Other recommendations included the development of an improved trend plot algorithm, management and operational performance effectiveness measures, and a plant performance template to improve the rigor and structure of the SMM information presentation.

Under the current Inspection Program, the ROP has an assessment program that replaced the former SMM process. The assessment program (IMC 0305, "Operating Reactor Assessment Program") collects and analyzes information from inspections and performance indicators (PIs). The results assist senior managers in arriving at objective conclusions about the licensee's safety performance. Based on this assessment information, the NRC determines the appropriate level of agency response, including supplemental inspection and pertinent regulatory actions ranging from management meetings up to and including orders for plant shutdown.

Conclusions Regarding Effectiveness of Corrective Actions Taken

Although this recommendation was closed out to ongoing activities in IIPB, the issues were adequately addressed. Structure and objective criteria for decision making during the SMM were the main concerns for the MLLTF.

Recommendations to Prevent Further Recurrences

An assessment should be conducted by IIPB to verify that the current process addresses all of the MLLTF concerns regarding SMMs. As recommended in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to explain the reasons for changes and to ensure that future changes to documents or processes will not unknowingly remove these changes.

3.3 Indian Point 2

Most of the recommendations made by the Indian Point 2 Lessons Learned Task Force (IP2LLTF) report were grouped together and treated as one milestone in the Steam Generator Action Plan. There were nine issues identified by the DBLLTF report as recurring. Of those nine recommendations, four were completed (F.2.2, F.2.4, F.2.5, F.2.6,) and five were partially completed (F.2.3, F.2.7, F.2.9, F.2.10, F.2.11). Further examination of closeout documents and the recommendations listed in both the Davis-Besse and IP2 reports revealed the following problems, which eventually led to recurrence: recommendations did not result in measurable actions (F.2.10, F.2.11), corrective actions closed, but work not completed (F.2.9, F.2.10, F.2.11), due dates changed frequently (F.2.9), and corrective action closed out to ongoing activities (F.2.10).

3.3.1 NRC Inspector/Reviewer Skills, Abilities, Experience, F.2.3

Recommendations from Previous Lessons Learned

This recommendation involved revising training guidelines for both experienced and new NRC inspectors performing the SG inspection activities. The revision would mirror the new inspection guidance and activities required by the recent revision of the baseline IP 71111.08. This procedure was revised to provide additional guidance specific to SG inspections.

Actions Taken in Response to Previous Recommendations

Two corrective actions were to review and revise the IMC 1245 training program for inspectors related to SG inspections and provide training materials to the regions. The materials consisted of industry standards pertinent to the SG inspections and were provided to the Regions in October 2001. Also, a 3-day training course was given to inspectors by the Materials and Chemical Engineering Branch of the Division of Engineering (DE). The training was successfully completed during January 22-24, 2002, and videotaped for future use to train new inspectors in this specialized area.

The completion of these corrective actions was documented with a memorandum from the responsible Division Director to the Associate Directors in NRR. The sub-milestones were completed in February of 2001.

A revision to IMC 1245 training was documented as complete, however the ERLTTF found that this revision was not completed or planned by the lead organization (IIPB). In a separate, routine effort to improve inspector training, feedback from the regions identified this area as a weakness; IIPB was unaware that there was an outstanding commitment to complete this revision associated with IP2. Since the IIPB staff was unaware of this commitment, there was no urgency, plan, or milestone for completion. As a result of the ERLTTF review, IIPB has taken action to complete this revision.

Conclusions Regarding Effectiveness of Corrective Actions Taken

The ERLTTF found that most of these milestones have been completed as stated, with the exception of one. IMC 1245 has not been revised and updated to reflect the new information related to SG inspections. Furthermore, until the task force asked about the revision, there were no plans to implement this revision in the near future. As a result of this task force, there are now plans to complete this revision.

Recommendations to Prevent Further Recurrences

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to explain the reasons for changes and to ensure that future changes to documents or processes will not unknowingly remove these changes.

3.3.2 Specific Review Guidance, F.2.7

Recommendations from Previous Lessons Learned

This recommendation suggested that formal guidance be provided to staff reviewers of SG related submittals.

Actions Taken in Response to Previous Recommendations

The corrective action was documented as complete and closed out by a memorandum from the responsible Division Director to the Associate Directors in NRR. The memorandum contained the commitment that incorporated the new guidance into the Standard Review Plan (SRP) or a similar vehicle. The SRP commitment was not included in the planning for the current fiscal year (FY2004) due to budget and prioritization reasons, but is planned for the next fiscal year (FY) when selected sections of the SRP is scheduled to be updated.

Conclusions Regarding Effectiveness of Corrective Actions Taken

The corrective actions were documented as completed based on a commitment to update the SRP; however, the actual SRP changes have not been completed. Since there is no centralized tracking system and the corrective action is closed, the remaining action has the potential to remain incomplete; especially if budgeting and other projects become a higher priority.

Recommendations to Prevent Further Recurrences

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Additionally, there needs to be a basis document or some other means to explain the reasons for changes and to ensure that future changes to documents or processes will not unknowingly remove these changes.

3.3.3 Performance Review Process, F.2.9

Recommendations from Previous Lessons Learned

There were two recommendations for this issue from the IP2LLTF report. First, that additional guidance should be developed on when and how much of its inspection of licensee's SG tube examination should be completed in the NRC baseline inspection program. Second, that the staff should establish risk informed thresholds, either through the performance indicators or the significance determination process (SDP), that can be applied to the results of the periodic SG inspections to identify SG tube degradation that warrants increased NRC attention.

Actions Taken in Response to Previous Recommendations

The completion of the first corrective action was documented with a memorandum from the responsible Division Director to the Associate Directors in NRR. The memorandum stated that the NRC in-service inspection (ISI) baseline inspection procedure, IP 71111.08, which includes

the oversight of SG inspection activities, had been revised and was provided as an attachment to the closeout memorandum. The ERLTTF retrieved this document and confirmed that the revisions were performed and concluded that the changes were in accordance with the recommendations proposed and will effectively satisfy the required purpose.

The completion of the second recommendation was divided into two minor tasks. The first task was to develop modifications to the SDP process to address inspection findings that could warrant increased NRC attention. The second task was to incorporate these changes into the ISI baseline inspection procedure and issue the new official document. The modifications were made and incorporated into the ISI procedure, but the revised procedure had not been officially issued at the beginning of the ERLTTF review.

Based on interviews with the staff, it was determined that the completion date for the SG tube integrity SDP was continually pushed back for two years due to industry comments, which delayed progress made by the staff. However, there was no indication that the corrective action was overdue, since it had already been closed out in the SG Action Plan. The ERLTTF notes that the SDP was issued on April 30, 2004, over two years after the item was closed out.

Conclusions Regarding Effectiveness of Corrective Actions Taken

Most of the corrective actions were found to be complete; however, the timeliness issue needs to be explored. Documenting a corrective action as completed, when actually it was not, results in corrective actions remaining open for lengthy periods of time or not being completed at all.

Recommendations to Prevent Recurrence

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. In addition, more formality and accountability should be required to change and extend dates for completion of corrective actions.

3.3.4 Inadequate Industry Guidance, F.2.10

Recommendations from Previous Lessons Learned

This recommendation required that improvements be made to the Electric Power Research Institute (EPRI) SG guidelines. Additionally, the IP2LLTF recommended that a generic communication be issued to clarify the current NRC position on industry guidance and to highlight SG tube integrity program weaknesses.

Actions Taken in Response to Previous Recommendations

To facilitate the corrective actions, there was a public meeting between the Nuclear Energy Institute (NEI), industry, and NRC, whereby a list of recommendations from the IP2 lessons learned report as well as issues discussed in Regulatory Issue Summary (RIS) 2000-22," Issues Stemming from NRC Staff Review of Recent Difficulties Experienced in Maintaining Steam Generator Tube Integrity," were presented.

Industry presented a database that contained industry issues and committed to coordinate the resolution of these issues with the NRC via Working Groups. Since the final resolutions were dependent on actions by the industry, the industry provided the NRC with a summary of actions taken.

3.3.4a EPRI SG Guidelines

The corrective actions that resolved the first recommendation were documented complete based on the meeting with NRC, industry, and NEI, and the fact that IP2LLTF SG tube integrity issues were captured in a table for continued discussion with NRC, the industry, and NEI.

During the approximately four years since the meeting, the staff and industry have met periodically to discuss the issues. A number of the issues have been incorporated into industry guidelines, however, some remain in the table. There are no apparent due dates established for the resolution of the remaining issues and it is not clear which have the highest priority.

This task force reviewed the EPRI guidance on eddy current examination, and based on that review, it appears a number of recommendations have been incorporated into the guidance, but as discussed above, not all the recommendations from the IP2LLTF report have been incorporated.

3.3.4b NRC Position on Industry Guidance

The IP2LLTF recommended that, "...the NRC should issue a generic communication to clarify the current NRC position on industry guidance and to highlight SG tube integrity program weaknesses manifested by the IP2 experience that could exist at other plants."

RIS 2000-22, "Issues Stemming from NRC Staff Review of Recent Difficulties Experienced in Maintaining Steam Generator Tube Integrity," was issued November 3, 2000, one week after the issuance of the IP2 Lessons Learned Task Force Report. The ERLLTF reviewed the RIS and determined that the recommendation, "... to issue generic communication to clarify the current NRC position on industry guidance and to highlight SG tube integrity program weaknesses manifested by the IP2 experience that could exist at other plants..." was not entirely addressed. The current NRC position on industry guidance was not apparent.

Conclusions Regarding Effectiveness of Corrective Actions Taken

Since the IP2LLTF recommendation was closed out based on discussing all the issues with the industry and NEI, and documenting them in a table, the ERLLTF believes the specific actions discussed in the IP2LLTF report are not all currently being addressed and tracked within the SG Action Plan or some other agency tracking system. Therefore, the recommendations to further improve EPRI guidelines could be further delayed or may not be implemented at all. In addition, based on interviews conducted, it does not appear that NRC staff are currently working with industry to address the recommendations in the table and potentially enhance EPRI guidelines. The ERLLTF notes that the EPRI guidelines are written and maintained by industry and contain SG guidance, which licensees can deviate from. The guidelines are not NRC requirements.

Regarding the NRC's issuance of a generic communication to clarify the current NRC position on industry guidance and to highlight SG tube integrity program weaknesses, the ERLTTF believes that the program weaknesses were discussed appropriately in the RIS. Through interviews with senior staff and management, it was evident that great efforts have been expended by NRC to improve industry SG guidance. However, the RIS did not clarify the NRC position on industry guidance, although in subsequent years, the NRC's position has been clarified.

Recommendations to Prevent Further Recurrence

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Corrective actions should not be closed out until the final actions are completed or addressed. An effectiveness review of the actions taken should also be conducted.

3.3.5 Inadequate Requirements in Licensing Basis, F.2.11

Recommendations from Previous Lessons Learned

This recommendation suggested improvements to technical specifications (TS) related to PWR SG requirements: industry should (1) assess the adequacy of the TSs regarding operational leakage limits and (2) ensure that the technical requirements are strengthened to reflect current knowledge of the SG degradation mechanisms, examination techniques and methodology.

Actions Taken in Response to Previous Recommendations

Corrective actions were documented as completed and formally closed out with a memorandum from the responsible Division Director to the Associate Directors in NRR. This recommendation was grouped together with 3.3.4 as one action item in the SG action plan (item 1.2). The resolving actions for both recommendations were those involving the table created by NRC.

This corrective action is similar to 3.3.4 (F.2.10) since it was included in the table developed by NRC, EPRI, and NEI to resolve SG integrity issues. An effectiveness review was conducted by this task force to verify the completion of the corrective actions. The TS in question was still under review by the TS branch at the time of the effectiveness review.

Conclusions Regarding the Effectiveness of Previous Corrective Actions

Since there is no centralized tracking system and the corrective action is closed, the remaining actions had the potential to remain incomplete especially if budgeting and other projects become a higher priority. In the case of closure for this corrective action, the branch assigned to resolve the issue is dependent upon pending actions from another branch. These pending actions further contribute to the potential for delays and incomplete actions.

Recommendation to Prevent Further Recurrence

Similar to the recommendation in Section 3.1.1, establish a CAP that has a centralized tracking system (with archive) for lessons learned recommendations and corresponding corrective actions. Corrective actions should not be closed out until the final actions are completed.

4.0 Tracking

The ERLTTF examined the tracking systems used for the corrective actions associated with issues from the South Texas, Millstone, and Indian Point 2 lessons learned reports. Tracking systems were the traditional databases that collected information organized by fields, records, and files in such a way that a computer program quickly selected the requested data. The Agency Wide Document Access and Management System (ADAMS), the EDO and the NRR Office Director tracking systems, the Safety Issue Management System (SIMS), the SECY Web page, and Action Plans were the databases used for tracking action items. Thus, this section is primarily focused on the adequacy of tracking systems and database usage in the agency.

4.1 South Texas Tracking

A closeout memorandum from the Division Director of the Division of Inspection and Support Programs to the Office Director, dated June 6, 1995, and updated on June 11, 1996, was obtained by contacting the PM assigned to the South Texas plant during this time frame. This memorandum gave a status and evaluation of the corrective actions that satisfied the South Texas lessons learned recommendations.

Prior to contacting the PM, the Inspection Program Branch was contacted for its records. There was no system by which corrective actions were tracked. The ERLTTF relied on the PM's institutional knowledge to obtain the approximate time that the memos were issued, as well as the author and recipient of the document in order to retrieve the closeout documents from ADAMS.

4.2 Millstone Tracking

The Millstone recommendations proposed in the Millstone, Part 1 report were in SECY 97-036, "Millstone Lessons Learned Report, Part 2: Policy Issues," dated February 11, 1997. The recovery of the closeout and relevant documents were a challenge. The ERLTTF was able to trace the corrective actions proposed to resolve the recommendations back to an unofficial agency Word Perfect document called the PIP. This document was a database maintained by the Associate Director for Project Licensing and Technical Analysis.

The ERLTTF noted that some of the corrective actions, which addressed issues such as changes to the SMM process and the licensee's commitment tracking program, which required additional follow up in SECY papers, were easily traceable. Corrective actions contained in the PIP were difficult to trace. When the responsible staff changed positions or retired, no one

maintained the database. There was no one staff member knowledgeable about the database, however, the task force was able to recover the remnants of the PIP.

The last update to the PIP was June 19, 1998. There were at least four printouts of the database, but none represented a comprehensive list of all the corrective actions. It appeared that some of the lists captured incomplete corrective actions and that other lists showed completed corrective actions. However, the numbering system indicated that the corrective actions did not comprise all of the actions. Additionally, a task group was formed in 1998 to conduct what appeared to be a verification of closeout, however, this did not provide any additional information.

ADAMS proved to be the most reliable and valuable source to obtain history and closeout documents for the Millstone recommendations. This was possible since the updates were provided to the Commission and were hence, very traceable.

The ERLTTF also obtained records from the EDO's commitment tracking system database which tracks commitments to the Commission. These records were not useful since the system does not track the completed corrective actions associated with the recommendations. A Work Item Tracking System (WITS) item number was assigned and represented the closeout document assigned to the recommendation in the staff requirements memorandum. It is important to note that although the ability to retrieve documents was exceptional, the EDO's commitment tracking system is in the process of an overhaul and all of the past documents will be incompatible with the new software and thus, unretrievable.

4.3 Indian Point 2 Tracking

The SG Action Plan is a database that was developed to capture the issues related to SG tube integrity, primarily arising from the IP2LLTF recommendations and the steam generator differing professional opinion. The overall management of this plan is the responsibility of NRR's Division of Licensing Project Management (DLPM).

The SG action plan is one plan in the overall action plan that is governed by Office Instruction No. LIC-502, "Procedure for Development, Implementation, and Management of Actions Plans," which provides the staff with guidelines to establish and implement action plans. The action plans are consolidated in a WordPerfect document and distributed to Division Directors in the Director Quarterly Status Report (DQSR). The DQSR contains the status and updates of recommendations and ensures it is appropriately tracked and dispositioned.

Corrective actions for the IP2 lessons learned report were easily assessable and trackable through the DQSR. Further, the systematic use of ADAMS to make closeout documents a part of the agency records ensured traceability. The staff that maintains the action plans were interviewed, along with various staff members that had the responsibility of dispositioning and closing Davis-Besse action items, to verify the consistency of usage and ability to serve as a reliable tracking system.

4.4 Discussion

The task force found that placing dispositioned and closed corrective actions into ADAMS is not a requirement. Further, action plans are not an official agency tracking system established by the Office of the Chief Information Officer (OCIO). The idea of action plans for generic activities originated in the 1994-5 time frame and was prompted by an OIG issue concerning Rosemount transmitters and resource expenditures. This led to concerns as to whether NRR was managing its resources directed at generic activities. Through interviews it was found that the DQSR is under review for continued usage and that the SG action plan is under review for deletion from the consolidated action plan database.

The ERLTTF concluded that this perpetual cycle of establishing and retiring NRR tracking systems ultimately leads to ineffective corrective actions (i.e., sustaining). It appears that databases or tracking systems are established to satisfy an immediate concern and other line organizations within NRR use that system to also track high priority and significant corrective actions. When the immediate need is satisfied, the staff member who originally managed and created the database may be assigned to other duties, which can result in a loss of ownership for the database. In some cases like that of the Millstone database, it did not become an agency record. A new staff member assumes responsibility for the database without understanding its intent, and it is retired when it is believed to have served the intended purposed.

4.5 Data Management

The OCIO plans, directs, and oversees the NRC's centralized information technology (IT) infrastructure, applications, and information management (IM) services. The development and implementation of IT and IM is done with the purpose of supporting the agency's mission, goals, and priorities. If a tracking system or database is not established and sanctioned by OCIO as official, it has the potential to go undetected, unbudgeted, and therefore unsupported.

As of January 2004, the NRC had over 300 official tracking systems agency wide. Of the 300 systems identified by OCIO, NRR had ownership of 62 systems. Twenty of the 62 systems were identified by the staff as no longer in use, and the other 42 systems were identified as active and in use by the staff today. These numbers, however, only represent known systems. There are numerous other tracking systems in use today on individual desktops both within NRR and throughout the agency. This was the case with the tracking systems used to track high priority corrective actions from the Millstone and IP2 lessons learned reports.

This becomes a further issue as the NRC upgrades its software applications to Windows XP as its standard desktop operating system. Those unidentified tracking systems that are incompatible with Windows XP will simply disappear along with the data. The migration from Windows NT to Windows XP is scheduled to begin October 2004 and continue through December 2004.

4.6 Conclusion

The ERLTTF found that high priority corrective actions were frequently tracked in the staff member's personal tracking system or database. There was also a direct correlation between the formality with which corrective actions were tracked and the intended audience. When the Commission had to be briefed, there were routine status documents such as SECY papers that gave accurate and complete accounts of the corrective actions, with a corresponding Word Perfect database. When the Office Director had to be briefed, the line organization gave status updates via office memorandum from the Division Director, without a tracking system.

Many databases were used to manage the resolution or corrective actions for proposed recommendations by the lessons learned task forces. The corrective actions were tracked using informal databases that were retired when the lead staff member was promoted to a new position or retired from the agency. The tracking systems tended to be the mechanisms "in place" at that time in the agency. Thus, initially, the corrective actions were dispositioned by the line organization responsible for implementation and tracked for status. Since there was no organization responsible for overall tracking, coordinating the effort, and conducting an effectiveness review, the updates ceased, as in the case of Millstone.

ADAMS is the official agency database used to store agency records. This is a logical and positive method to store agency records. However, the ability to retrieve documents related to these lessons learned reports was hindered by inconsistencies in how the data was profiled when put into the ADAMS database. In most cases, the staff involved at the time of the issuance of the document had to retrieve the document because these staff members knew pertinent information that could be searched in multiple ways. These staff members were the key to locating documents.

The ERLTTF concluded that the agency's accessibility to lessons learned task force records should not rely on staff memory, but rather those records should be consistently profiled in a common way to enhance retrievability.

4.7 Recommendation

There needs to be a centralized, official agency tracking system and archive for corrective actions and the corresponding recommendations from lessons learned reports. Also, an effectiveness review and lessons learned process that focuses solely on verifying corrective actions' effectiveness and proper closeout should be established as a permanent entity within the agency. Those corrective actions that tend to linger or require a policy decision should be brought to senior management's attention in a timely manner. This process should also have (1) a separate database for the corrective actions and (2) periodic reports issued to the Office Director and all Division Directors. Additionally, line organizations should also conduct an effectiveness review of their own corrective actions.

ADAMS has the potential to be an excellent database for storing status and closeout documents that contain dispositioned corrective actions associated with lessons learned reports. This database needs to be improved to better access information; specifically, profiling records need to be improved. Also, guidance should be established to require that all status and closeout documents be input into ADAMS as agency records.

5.0 Summary of Results

5.1 Problems and Recurring Issues

Appendix D contains Appendix F of the DBLLTF report. There were 11 different issues identified as recurring. The recurring issues are as follows:

- F.2.1 Closeout of Inspection Findings before licensee implementation of corrective actions
- F.2.2 Program Guidance for Assessing Longstanding Hardware Problems
- F.2.3 NRC Inspectors/Reviewer Skills, Abilities, and Experience
- F.2.4 Process to Verify Information
- F.2.5 NRC Review of Routine Reports
- F.2.6 NRR/Regional Office Interaction During Safety Evaluation Development
- F.2.7 Specific Review Guidance
- F.2.8 Integration of Inspection Findings
- F.2.9 Performance Review Process
- F.2.10 Inadequate Industry Guidance
- F.2.11 Inadequate Requirements in Licensing Basis

The problems that led to these recurring issues, along with examples, are listed in Table 2 below. As illustrated, the recurring issues identified by the DBLLTF are represented by alphabetic and numeric nomenclature as seen in the right-hand column of the table. The lefthand side of the table represent the original lessons learned report [under review] that cited the issue.

These problems were identified by tracking the corrective actions (CAs) to closure and conducting an effectiveness review in the absence of tangible closeout documents.

Problems That Led to Recurrence - Table 2

CA Done, Then Undone (Reversed)	
Lessons Learned Report	Appendix F, DBLLTF
-South Texas Project	F.2.2, F.2.9
-Millstone	F.2.3, F.2.4
CA Partially Addressed/Completed	
Lessons Learned Report	Appendix F, DBLLTF
South Texas Project	F.2.3, F.2.8, F.2.9

Indian Point 2	F.2.3, F.2.7, F.2.9, F.2.10, F.2.11
Millstone	F.2.3
CA Failed to Address Issue	
Lessons Learned Report	Appendix F, DBLLTF
South Texas Project	F.2.3, F.2.8, F.2.9
Millstone	F.2.1, F.2.3, F.2.9
Recommendations Did Not Result in a Measurable Action	
Lessons Learned Report	Appendix F, DBLLTF
Indian Point 2	F.2.10, F.2.11
Millstone	F.2.1
CA Closed; Work Not Complete	
Lessons Learned Report	Appendix F, DBLLTF
Indian Point 2	F.2.9, F.2.10, F.2.11
Due Dates Changed Frequently	
Lessons Learned Report	Appendix F, DBLLTF
Indian Point 2	F.2.9
CA Closed Out to Ongoing Activities	
Lessons Learned Report	Appendix F, DBLLTF
South Texas Project	F.2.3, F.2.8
Millstone	F.2.1, F.2.3, F.2.9
Indian Point 2	F.2.10

The corrective actions proposed to resolve the issues identified by the lessons learned task force were initially effective in many cases. However, the problems listed in this table contributed to the many instances of ineffective corrective actions identified by this task force.

There were a few cases in which corrective actions were effective. This task force chose not to discuss those corrective actions since there was no contribution to understanding the

processes, policies, practices, or programs that could render corrective actions ineffective. Thus, it is not covered in Section 3 of this report. Those corrective actions found to be effective are as follows:

Effective Corrective Actions - Table 2a

Lessons Learned Report	Appendix F, DBLLTF
Millstone	F.2.4
Indian Point 2	F.2.2, F.2.4, F.2.5, F.2.6

The right-side of the table represents the effective corrective actions for those recurring issues identified by the DBLLTF. The lefthand side of the table represents the lesson learned reports that identified recurring issues that had effective corrective actions.

5.2 Issues Common to All Lessons Learned Reports

Of the 11 recurring issues identified with DBLLTF, there were two recurring issues that were common to all of the lessons learned reports under review in this report: (1) insufficient inspector knowledge, training, and skills, and (2) the lack of standardization to assess licensee performance (performance review process).

5.2.1 Inspectors Knowledge, Training and Skills

The ERLTTF concluded from the review of the lessons learned report that there were problems in the knowledge, training and skills of the inspectors. From the examples cited in some of the reports, it was difficult to identify if the inspector simply lacked knowledge that should have been known or if the appropriate training and skills had not been provided to the inspector.

In the case of Millstone, several instances of previously inspected issues, whereby the inspector arrived at the incorrect or incomplete technical conclusions or failed to fully develop the scope of relevant issues were cited. The South Texas Project report provided many examples of problems, in nine different areas, that were missed, but the connection to inadequate inspector training, skills, and experience were not explicit nor apparent enough to conclude that the inspector skills, training, and experience caused the failure. Follow up activities to investigate all the problems were not conducted via the routine inspection program. As a result, the NRC missed several opportunities to elicit more timely corrective actions from the licensee. In the case of IP2, the regional inspectors lacked technical expertise in ISI. There was no requirement in Manual Chapter 1245, "Inspector Qualification Program for the Office of Nuclear Reactor Regulation Inspection Program," that required regional inspectors to have specialized training or be an expert in ISI.

A strategy to address deficient inspector knowledge, training, and skills is through the Inspection Qualification Program: 1) define the selection criteria for inspectors; 2) develop

tools to promote consistency in deciphering, linking and integrating information; and 3) train the inspectors. In order to determine the training needs, there must be an assessment process to identify the competency level of each inspector. Once the skill levels are determined, employees with inspection and review responsibilities must be trained to ensure that all skill gaps are filled.

The ERLTTF conducted an effectiveness review to verify that the core competencies for each inspector had been addressed and training provided to instill skill base performance. IIPB has taken excellent measures to address inspector knowledge, skill, and training. Prior to the March 5, 2002, Davis-Besse event, in mid-2000, IIPB established a IMC 1245 Working Group to update the inspector training and qualification program to reflect the needs of inspector qualification requirements on a competency-based model. A competency model maintains a focus on the underlying knowledge, skills and attitudes needed to perform a task rather than on the task itself.

In June 2002, IIPB issued, "Revising Inspection Manual Chapter 1245, Inspector Training and Qualification: Rational and Methodology for Changes." Therein, the inspector competency model, with details on the knowledge, skills and attitudes were contained. A link was also established between the competency areas and the tasks.

From interviews with the responsible staff for inspector training, the results thus far have indicated favorable feedback with respect to inspector knowledge. Regional management has indicated that the inspectors are more knowledgeable, than in the past, when taking oral boards for inspector qualification. Since inspector qualification is a 2-year process, FY 2004 is the first year to measure the effectiveness of the changes made in 2002. The inspectors that previously qualified through the inspector qualification program will not receive the benefit of the competency model, but IIPB has addressed this through training initiatives: Columbia Shuttle and Boric Acid self study training and simulator refresher training. Inspector refresher and continuing training is now geared towards preparing inspectors to inspect under the principles of the ROP.

The ERLTTF recommends that IIPB should continue to monitor the performance of inspectors who complete the revised qualification process and those that receive training through the refresher and self study courses designed to instill the fundamentals of the inspector competency model.

5.2.2 Performance Review Process

Some of the lessons learned task force reports viewed the performance review process as the region's ability to assess licensee performance (using inspection guidance) and another report viewed it as senior management's ability to provide oversight in light of declining performance. Both the region and senior management have a role in providing oversight in the performance review process. Inspectors identify and document deficiencies according to the NRC regulations. Senior management makes decisions on how the agency will respond to declining and unacceptable performance.

The South Texas Project task force was concerned with the region's ability to know when to increase the amount of reactive inspection its inspectors performed at a site, and determine

the causes for the change, such as insufficient NRC resources or declining performance by the licensee. In the case of Millstone, the recommendation was directed towards senior management's actions in response to information available and failure to act aggressively [NRC processes used to assess plant performance]. The Indian Point 2 task force was concerned with the lack of performance measures in the ROP to assess licensee performance regarding SG tube examination. Performance indicators and the significance determination process give indications of acceptable and unacceptable performance by using risk-informed thresholds. Results from both performance indicators and the significance determination process are used by senior management to make decisions in response to declining performance.

The examples cited by the lessons learned task force warranted merit during the time frame in which the respective policies were in effect. Since the South Texas Project and Millstone task force made recommendations, approximately a decade ago, the performance review process has evolved and enhancements have been made to the Inspection Program. Therefore, considering the progress made, this task force does not view this as a problem area.

In the case of South Texas Project, reactive inspections are no longer used and the ROP now has a predefined baseline inspection that all plants receive. When performance "falls below" preestablished thresholds, supplemental inspections are automatically scheduled. The Millstone task force proposed adding structure and more objective criteria to SMM. Today, there is an assessment program that is a part of the ROP (see Section 3, Millstone, F.2.9, "Performance Review Process"). As a result of the IP2 event, the SDP will have a risk-informed threshold for steam generator tube degradation. The SG risk-informed thresholds for performance indicators have been considered and determined unwarranted.

5.3 Additional Recurring Issues

The ERLTTF, in its review to determine why issues recur, identified recurring issues in other areas which were not cited as recurring by the DBLLTTF. Examples of recurring issues were obtained from closeout documents and interviews. The problem areas that the ERLTTF identified as significant, common recurring issues to all lessons learned reports were the failure of (1) the NRC to use operating experience and (2) inspectors to maintain a questioning attitude. All of the reports contained examples to support these findings. One example concerns STP:

Apparently, the NRC either overlooked the IN [information notice] or did not consider the circumstances at STP similar to those at Calvert Cliffs. IR [inspection report] 88-10 was issued without taking issue with the change to the STP surveillance procedure to blow down the steam supply line.

The STPLTTF believes these problems should have raised questions concerning the operability of the TDAFW pumps and should have been pursued by the inspectors.

5.3.1 Operating Experience

Applying operating experience (OE) can prevent recurrent issues like those identified by the DBLLTF. The ERLTTF searched NRC procedures for the requirements to apply OE. First-line supervision was interviewed to verify the tools to provide inspectors with timely OE. The Reactor Operating Experience Task Force (OE Task Force) Report, issued on November 26, 2003, was reviewed for discussions on this issue.

As a result of the DBLLTF report recommendations, improvements have been made to the Inspection Program and retrieval of OE information. IP 71152 was revised (9/08/03) to include the requirement for a PI&R team to select OE as a sample during an inspection. Improvements were suggested by the OE Task Force to retrieve OE information.

The OE Task Force interviewed resident and regional inspectors and regional management. Through these interviews, it was noted that the inspectors had limited time to research the background of an inspection area, and a user-friendly means to access OE information (e.g., generic communications, INPO SEE-IN documents) would be valuable. The OE Task Force recommended that, "... NRC create and maintain OE data and information Web sites and develop processes to catalog and make available current databases...." At the time of this report, those suggestions had not been fully implemented.

The ERLTTF interviewed resident inspectors to verify the use and accessibility of OE information. It was found that OE information was not word searchable according to systems, components, equipment failures, plant type, etc. The Reactor Operating Experience Web page provided operating experience through links from other offices in the agency. The shortcomings of this method are that (1) inspectors have to know the approximate year of the generic communication or take several hours to search each year for the information and (2) databases and Web pages cannot provide the inspector with a comprehensive, cumulative history of OE to prepare for an inspection or resolve a potential safety concern in a timely manner. Thus, germane OE information available that could be applied to potentially address the recurrence of problems that happened elsewhere in the country, as was the case with South Texas Project, is not being routinely factored into inspection activities. If this OE retrieval capability was a part of the Inspection Program [databases and Web pages] and a requirement in the inspection preparation phase, many recurring issues could possibly have been identified through inspections. An inspector should be able to search a database for a particular plant type and corresponding system unique to the plant type, to find inspection reports, generic communications, and inspection findings for this system of this plant type.

The OE manager interviewed verified that OE information was not available in such a way that it could be available to inspectors to search for information according to systems, components, equipment failures, plant types, etc. The OE Task Report recognized OE retrieval as an issue, and credited the Inspector Electronic Support System Web page and Reactor Operating Experience Information System as a database and information system that will improve the accessibility to OE information. The ERLTTF reviewed the status of the development of this database and information system. At the time of this report, detailed plans had not been made to include this search feature as part of the new information systems under development.

The ERLTTF recommends that OES should continue its efforts in making OE information more assessable to inspectors. Databases that are managed by OES should be kept current and more comprehensive to give a complete history on the subject matter.

IIPB should continue its efforts with the electronic Web page geared towards making information (such as results of inspection reports and operating experience) more assessable to inspectors. The search capability from the inspection report and operating experience database should include the ability to perform searches on equipment failures, effected plants, system types, components, words, complete history, etc. Currently, the developmental plans for the electronic Web page do not include a search capability on inspection reports. (The STPLTTF report had an almost identical recommendation).

5.3.2 Questioning Attitude

A lack of a questioning attitude by inspectors was pointed out by all the lessons learned reports reviewed, and viewed by this task force as a deficiency that causes recurrence of previously identified issues.

This issue of a questioning attitude was thought to be by many interviewed, as a trait of any good inspector and something that is not learned. The ERLTTF contacted each region and the Technical Training Center to determine if the Inspection Program provides training to its inspectors to develop a questioning attitude. This area was covered in training course G-303, "Inspecting for Performance." However, this task force was unable to assess the adequacy of this training since there was no course material to review. The training is given by the regions in a seminar setting.

Questioning attitude was recognized as an issue in the DBLLTTF report. IIPB provided training at each of the 2004 Regional Spring Inspector Counterpart Meetings. The topic of the training was on the individual's role in developing and maintaining a questioning attitude. In addition, IIPB also provided web-based training on the Columbia Shuttle accident and followed up with a workshop in each Region to discuss inspector's questioning attitude. The web-based training has also been captured as part of the requirements for new agency inspectors.

The ERLTTF recommends that IIPB continue to take measures to codify a questioning attitude and to conduct an effectiveness review on the measures taken thus far.

6.0 Root & Contributing Causes & Recommendations

6.1 Root Causes

The lack of a corrective action process, effectiveness reviews, and a centralized tracking system, and weaknesses in line organization closeout practices were the four basic root causes for the recurrent corrective actions identified by the lessons learned task forces.

The ERLTTF analyzed the closeout documents that dispositioned the corrective actions, and the recommendation from the respective lessons learned task force and the line organization

that resolved the issue. This task force was able to identify the root and contributing causes from the results of this analyzes. The tracking section (3.0) of this report gives additional details.

6.2 Contributing Causes

There were several contributing causes that underscored these root causes, some of which are: 1) the absence of a bases document, which would explain the reasons for change and to ensure future changes will not unknowingly remove the changes, and 2) the lack of mechanisms for line organizations to self audit the effectiveness of corrective actions proposed to address the recommendations of a lessons learned task force. Appendix B is a complete list of contributing causes. When taken in isolation, the contributing causes do not appear to have caused failure. However, collectively they compromised the integrity of the process, giving rise to other causes, which are referred to in this document as root causes.