

Inspection Program Evaluation

Scope and Objectives—The staff of the U.S. Nuclear Regulatory Commission (NRC) evaluated the inspection program in accordance with Inspection Manual Chapter (IMC) 0307, “Reactor Oversight Process Self-Assessment Program.” The staff used self-assessment metrics and other pertinent information to provide insights regarding the effectiveness of the Reactor Oversight Process (ROP) in fulfilling the regulatory principles of being objective, risk-informed, understandable, and predictable, as well as ensuring safety, openness, and effectiveness. The staff also obtained input from internal stakeholders through onsite visits by the inspection program staff, counterpart meetings, focus groups, and the internal feedback process. In addition, the staff obtained external feedback through a *Federal Register* solicitation for comments and through periodic meetings with the industry and other stakeholders.

Based on the metric results, stakeholder feedback, and other lessons learned through ongoing program monitoring, the staff identified certain issues and actions to further improve the inspection program. This enclosure discusses these issues in further detail, and Enclosure 5 summarizes the status of implementation issues. In addition, the annual ROP performance metric report, available through the Agencywide Documents Access and Management System (ADAMS), provides the data and staff analysis for each of the program area metrics (reference ADAMS Accession No. ML060590135).

Summary of Previous Self-Assessment—In SECY-05-0070, “Reactor Oversight Process Self-Assessment for Calendar Year 2004,” issued April 25, 2005, the staff noted that the inspection program met its established goals during calendar year (CY) 2004. The staff made several improvements to the program to address Davis-Besse Lessons Learned Task Force (DBLLTF) recommendations. The regions completed the required baseline inspection program for CY 2004, and the increases in the regional inspection budget in 2004 and action by regional offices in filling open inspector positions prevented the staffing shortages experienced in 2002 and 2003 from extending into the 2004 inspection cycle. The annual inspection program evaluation did not result in any significant changes to the inspection procedures (IPs), but as a result of the CY 2004 self-assessment, the staff committed to perform a more detailed analysis of the scope and level of effort of the IPs in CY 2005 and to adjust existing resources within the baseline inspection program for CY 2006. The staff further committed to assess the results of the pilot engineering design inspections and develop recommendations for Commission consideration.

Completion of the Baseline Inspection Program—All four regions completed their baseline inspections in CY 2005 in accordance with IMC 2515, “Light-Water Reactor Inspection Program—Operations Phase.” As in the 2004 inspection cycle, all regions completed their baseline inspections in 2005 with the allocated regional resources, without the need for the coping measures experienced in CY 2002 and 2003. Each region documented its completion of the baseline inspection program in CY 2005 in a memorandum to the Division of Inspection and Regional Support in the Office of Nuclear Reactor Regulation (NRR). The NRC approved a delay in the completion of inspection activities associated with the biennial emergency preparedness exercise at Waterford 3, and the inspection is scheduled for completion during

CY 2006. The biennial emergency preparedness exercise and the inspection activities associated with the exercise were initially planned for December 7, 2005. However, because of the impact from Hurricane Katrina, the licensee requested that the exercise be rescheduled to June 2006.

Changes to Inspection Guidance—The staff revised several inspection program guidance documents in CY 2005 to improve their focus and address certain concerns. The staff revised IMC 2515 to address recommendations from the audit by the Office of the Inspector General (OIG) of the NRC’s baseline inspection program (OIG-05-A-06, issued December 22, 2004). Some of the changes included providing the basis and rationale for the baseline IP sample size, including a discussion of when, or why, to use more than the minimum samples; additional management guidance for assigning inspectors to perform certain IPs to ensure that inspectors are adequately qualified for their assignments; and clarification on IP deferral.

In addition, the staff revised Appendix D, “Plant Status,” to IMC 2515 to require inspectors to monitor and trend reactor coolant system (RCS) leakage indications. The change requires inspectors to review licensee procedures and action plans to identify sources of RCS unidentified leakage. In addition, the staff provided guidance and techniques necessary to assess a potential adverse trend or a change in action levels in response to increasing RCS unidentified leakage.

The staff revised IMC 0612, “Power Reactor Inspection Reports,” to clarify definitions for the terms “NRC-identified,” “self-revealing,” and “licensee-identified” findings; provide additional guidance on documenting cross-cutting issues; improve guidance on closure of licensee event reports; clarify the definition of a performance deficiency; and provide additional examples of cross-cutting aspects of a finding.

The staff performed its annual review of each baseline IP during CY 2005. The period assessed spanned from October 2004 through September 2005. The staff evaluated each IP against the requirements in IMC 0307 and performed additional analyses of inspection findings. Based on this review, the staff did not identify any significant issues that warranted changes to the inspection program; however, the ROP baseline inspection realignment effort discussed below did result in revisions to several inspection procedures.

Additionally, the staff evaluated the number of findings associated with each IP. The variables that influence inspection findings made it difficult to assess the effectiveness of IPs. However, recognizing these uncertainties, the staff’s self-assessment of the inspection findings, internal and external feedback forms, and other independent reviews of the ROP indicated the general success of the inspection program in identifying performance deficiencies in many of the areas inspected. The median number of findings per 1000 hours of inspection (4.7) for CY 2005 remained about the same as compared to the results from CY 2004. As in CY 2004, the success of the inspection program in identifying performance deficiencies varied with each IP.

As committed to in the NRR Management Control Plan, the staff evaluated the effectiveness of the revisions to the problem identification and resolution and fire protection IPs and adjustments to several other IPs regarding procedure scope, frequency, and level of effort. The staff also continued to improve major program guidance as a result of stakeholder feedback and lessons learned. The problem identification and resolution focus group reviewed the effectiveness of the changes made in response to the DBLLTF recommendations to IP 71152, “Identification

and Resolution of Problems.” The focus group agreed that the changes to IP 71152 have resulted in no unintended consequences, reinforce NRC expectations that inspectors have a questioning attitude, and provide a method for highlighting issues that might indicate a more significant problem. The staff believes that the changes to IP 71152 were effectively implemented and addressed the DBLLTF recommendations. The staff also reviewed and increased the scope of IP 71111.05, “Fire Protection,” in two areas during CY 2005.

ROP Baseline Inspection Realignment Effort—In accordance with its commitment in the CY 2004 self-assessment, the staff performed a more detailed analysis of the scope and level of effort of the IPs. The review consisted of an examination of inspection results data from October 2001 through September 2004 to evaluate the effectiveness of each IP to identify inspection findings. Through this review, the staff sought to improve the alignment of inspection resources to inspected areas that had indication of risk-significant performance deficiencies in the past. The working group to support this realignment effort consisted of representatives from the NRR Division of Inspection and Regional Support and the regions. The working group met and reviewed data on each of the IPs in the baseline inspection program. The group reviewed several measures of inspection procedure effectiveness and examined the inspection resources (both estimated hours to perform as well as range of inspection samples) used for each procedure. Based on the working group’s efforts, seven IPs were revised, however the net resource impact was zero. The NRC issued the revisions in Change Notice 01-006 for implementation by the inspection staff in CY 2006 (reference ADAMS Accession No. ML060060380).

Review of Inspection Findings—The staff noted an increase in the total number of findings identified during fiscal year (FY) 2005 across all cornerstones. Inspections resulted in 933 green findings and 17 greater-than-green findings, including 16 white and 1 yellow finding. An additional yellow finding was identified a few days after the close of FY 2005. Table 1 compares these results with those of previous years.

**TABLE 1
INSPECTION FINDINGS BY COLOR AND PERIOD**

	10/01/2001– 09/30/2002	10/01/2002– 09/30/2003	10/01/2003– 09/30/2004	10/01/2004– 09/30/2005
Green	696	716	881	933
White	26	14	12	16
Yellow	2	2	0	1
Red	3	1	0	0
Total	727	733	893	950

Engineering Design Inspections—In response to Commission direction to improve the effectiveness of engineering design inspections, the staff committed in the CY 2004 ROP self-assessment to assess the results of the pilot engineering design inspections and develop recommendations for Commission consideration in FY 2005. The staff developed Temporary Instruction (TI) 2515/158, “Functional Review of Low Margin/Risk Significant Components and

Human Actions,” and implemented it at one pilot site in each region. SECY-05-0118, "Results of the Pilot Program to Improve the Effectiveness of NRC Inspections of Engineering and Design Issues," issued July 1, 2005, assessed the results of the pilot inspections. As a result of the assessment, the staff changed the title of IP 71111.21 from “Safety System Design and Performance Capability Inspection” to “Component Design Bases Inspection.” The staff also revised the inspection details to be consistent with the TI and focus on components rather than systems. The revised IP will be conducted at all plant sites over the CY 2006 and CY 2007 biennial period. The staff plans to develop additional guidance for engineering design inspections after CY 2007 based on lessons learned during initial implementation of IP 71111.21.

Licensee Self-Assessments—As part of its ongoing efforts to improve the effectiveness of the ROP, the staff intends to evaluate whether licensees should receive credit for certain self-assessments. However, the staff has deferred this work until completion of the revised engineering design inspections. After completing the revised design/engineering inspections and assessing the results, the staff will evaluate the proposed policy of granting licensee credit for self-assessment activities.

Safety Culture Inspection—In response to Commission direction and a DBLLTF recommendation to provide more structured and focused inspections to assess a licensee’s safety-conscious work environment (SCWE), the staff developed the safety culture working group and has begun revising IPs that will reflect the working group’s recommendations and input from external stakeholders. The revised IPs are planned for implementation starting in July 2006. The assessment program evaluation in Enclosure 4 includes additional discussion of the efforts and status of the safety culture working group.

Status of DBLLTF Items for the Inspection Program—Although the staff has addressed and closed all DBLLTF items for the inspection program, the following three items still require effectiveness reviews in CY 2006 once the changes have been implemented for a sufficient amount of time to evaluate their effectiveness:

- (1) The staff revised Appendix D to IMC 2515 in January 2005 to provide guidance and techniques necessary for assessing potential adverse trends and action levels in response to increasing levels of RCS unidentified leakage (reference DBLLTF item 3.2.1(2)).
- (2) The staff issued TI 2515/150, “Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles,” in October 2002 to provide guidance for examining licensees’ reactor pressure vessel head inspections pursuant to Order EA-03-009. The TI includes guidance for reviewing findings of boric acid accumulation (reference DBLLTF item 3.2.2(1)). The staff revised IP 71111.08, “Inservice Inspection Activities,” in May 2004 to add periodic inspection requirements and guidance for boric acid corrosion control programs. Staff review of inspection results from TI 2515/150 and IP 71111.08 and feedback from inspectors indicate that current licensee programs are generally adequate for locating and evaluating and/or correcting boric acid leaks, and the NRC inspection guidance is adequate and effective for oversight of boric acid corrosion control programs. In CY 2006, the staff will conduct its effectiveness review by evaluating the inspection results from two years of the revised IP 71111.08 implementation.

- (3) The staff revised IMC 0305, "Operating Reactor Assessment Program," to require it to consider the conclusions of independent assessments during midcycle and end-of-cycle reviews in order to self-assess the NRC's inspection and assessment processes (reference DBLLTF item 3.3.3(1)).

OIG Audit of the Baseline Inspection Program—The staff successfully resolved all 10 recommendations that resulted from the OIG audit of the baseline inspection program in December 2004 (OIG-05-A-06). The staff made changes to the inspection program to close all but three of the recommendations during CY 2005. The staff will address recommendation 2, which involves the development of guidance on identifying human performance trends and integrating that information into the ROP, following the implementation of the safety culture initiative. The staff changed inspection program documents to address OIG recommendations 3 (develop and implement guidance for documenting, tracking, and trending informal inspection issues) and 4 (define "effectiveness" as it pertains to the ROP and establish performance measures and targets to demonstrate that the baseline inspection program meets that definition). Currently, OIG is evaluating these changes for closure.

Feedback from Site Visits—In accordance with inspection manual guidance, the ROP inspectable area lead staff performed or observed several inspections to (1) assess the adequacy of the IP for possible improvements to its scope, focus, and guidance, (2) assess the adequacy of the ROP program guidance, and (3) collect comments on the ROP from inspectors and licensees. Most resident inspectors (RIs) indicated that the baseline inspection program appropriately looks for and identifies risk-significant issues and provides appropriate coverage of plant activities and operations important to safety. Most RIs agreed that most IPs can be accomplished within the estimated hours for the IP. The only outlier was the plant status IP (Appendix D to IMC 2515), which required more time than estimated. Additionally, the RIs observed that other unanticipated activities (such as completion of TIs and participation in special and team inspections) placed additional challenges on the RIs' ability to complete the baseline inspection program. These comments were consistent with the FY 2005 ROP resource data, and the staff's plans to address these increased resource needs are discussed in Enclosure 8.

The staff also received other comments on the inspection program, suggesting review and adjustment, as appropriate, of the scope and level of effort for some IPs, describing difficulty in determining whether a specific finding is minor, and requesting more time for reviewing plant status. The staff plans to address the issues raised during the site visits through its feedback process and will consider providing additional training, as appropriate.

Inspection Program Performance Metrics—All but one inspection program metric met their established criteria in CY 2005. The successful metrics were (1) percentage of inspection findings documented in accordance with requirements, (2) number of baseline IPs significantly changed, (3) number of feedback forms per document, (4) completion of the baseline inspection program, (5) timeliness of inspection reports, (6) timeliness of public communication, (7) accuracy of public communication, and (8) analysis of inspection hours. The metric regarding the timely completion of TIs was not met. The staff will review the reasons for untimely completion of TIs and recommend possible solutions in CY 2006.

The staff reviewed an integrated inspection report from each regional branch and other selected inspection reports from each region. About 94 percent of the findings were

documented in accordance with program requirements. The staff received 102 feedback forms during CY 2005, comparable to previous years, and has improved responsiveness in answering the forms.

Stakeholder Survey Results—The staff did not conduct an internal survey in CY 2005; therefore, the input to this discussion came solely from the external survey conducted in October 2005. Participants in the external ROP survey included nine industry representatives, four State or local government agencies, seven private citizens or public interest groups, and one anonymous response. The majority of those who provided feedback to the question on the utility of the information in the inspection reports responded that the inspection reports were clearly written and provided a better understanding of plant operations. Comments regarding revisions to IMC 0612 noted that the definition changes to allow more credit for licensee-identified findings and the clarification to Appendix E (adding examples of cross-cutting aspects) are improvements, but licensees are concerned about the expansion of the definition of a performance deficiency. Overall, stakeholder satisfaction was generally favorable and consistent. Enclosure 6 provides more detail on the results of the external survey.

Self-Assessment Conclusions—The inspection program met the goals and intended outcomes of the ROP based on the metric results, stakeholder feedback, and other lessons learned through ongoing program monitoring. The inspection program was objective, risk-informed, understandable, and predictable, and has ensured safety, openness, and effectiveness. The staff made several improvements to the program to address DBLLTF and OIG recommendations. The regions completed the required baseline inspection program for CY 2005. The staff completed its first ROP realignment review and revised seven IPs. The staff plans to evaluate other ways to measure the effectiveness of inspection program and to refine and formalize the process to ensure alignment of inspection resources to include consideration of industry performance.