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# AUDIT REPORT

Audit of NRC's License Renewal Program

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## **I. EXECUTIVE SUMMARY**

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### **BACKGROUND**

U.S. Nuclear Regulatory Commission (NRC) regulations limit the term of an initial nuclear reactor operating license to 40 years. However, the regulations also allow a license to be renewed for an additional 20 years given that the initial term was based on economic and anti-trust considerations, not technical limitations. Through technical research, NRC concluded that many aging phenomena are readily managed and therefore should not preclude renewal of a reactor license.

NRC published requirements for license renewal in the *Code of Federal Regulations* (CFR). 10 CFR Part 54<sup>1</sup> addresses operating safety issues — the main focus of this Office of the Inspector General (OIG) report. Part 54 was amended in 1995 to concentrate NRC's reviews on how licensees manage adverse effects of aging to provide reasonable assurance that plants will continue to operate in accordance with their current licensing basis for the period of extended operations.

### **PURPOSE**

The purpose of OIG's audit was to determine the effectiveness of NRC's license renewal safety reviews.

### **RESULTS IN BRIEF**

Overall, NRC has developed a comprehensive license renewal process to evaluate applications for extended periods of operation. However, OIG identified areas where improvements would enhance program operations. Specifically,

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<sup>1</sup>10 CFR Part 54, *Requirements for Renewal of Operating Licenses for Nuclear Power Plants.*

- License renewal reporting efforts need improvements
  - Reporting issues exist because the agency has not fully established report-writing standards or a report quality assurance process. As a result, those who read the reports could conclude that regulatory decisions are not adequately reviewed and documented.
- Guidance for removing licensee documents from audit sites could be clarified
  - Inconsistencies regarding removal of documents result from audit teams being prohibited by their management from removing licensee-supplied documents from audit sites, whereas the inspectors do keep such documents to assist in report writing. As a result, it is more difficult for audit team members to write their reports without using workaround tools.
- Consistent evaluation of operating experience would improve NRC reviews
  - Although expected to, audit team members do not consistently review or independently verify licensee-supplied operating experience information because program managers have not established requirements and controls to standardize the conduct and depth of such reviews. Consequently, license renewal auditors may not have adequate assurances that relevant operating experience was captured in the licensee's renewal application for NRC's consideration.
- More attention is needed to planning for post-renewal inspections
  - Post-renewal inspections are considered vital to ensure that licensees adhered to commitments made for license renewal. However, the agency has only recently focused its attention on developing and overseeing details associated with these inspections. Inadequate planning increases the risk that licensees could enter into the extended period of operation without being in full compliance with license renewal terms; inspections will

be inconsistently implemented; and inspection and technical support resources will be unavailable when needed.

- License renewal issues need evaluation for backfit application
  - When NRC imposes new staff positions resulting in new review standards, a documented justification is required pursuant to the backfit rule. However, new license renewal review standards have not followed NRC's backfit policy because NRC does not have a mechanism or methodology to trigger such a backfit review. Consequently, the use of different review standards without a backfit justification may result in several management challenges.

#### **RECOMMENDATIONS**

This report makes eight recommendations to help NRC improve the effectiveness of its License Renewal Program. Seven of the recommendations are addressed to the Executive Director for Operations. In consideration of the agency's formal comments concerning the applicability of the backfit rule to license renewal applicants, the last recommendation is directed to the Commission. A Consolidated List of Recommendations appears in Section IV.

#### **OIG ANALYSIS OF AGENCY COMMENTS**

On May 8, 2007, OIG issued its draft report to the Executive Director for Operations. On July 6, 2007, the Deputy Executive Director for Reactor Programs provided a formal response to this report in which the agency disagreed with OIG's finding regarding applicability of the backfit rule to license renewal applicants. The agency's transmittal letter and specific comments on this report are included in their entirety as Appendix E.

This final report incorporates revisions made, where appropriate, as a result of the subsequent meetings with staff and the agency's written comments. Appendix F contains OIG's analysis of the agency's formal response.

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## I. BACKGROUND

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The Atomic Energy Act of 1954, as amended, and U.S. Nuclear Regulatory Commission (NRC) regulations limit the term of an initial nuclear reactor operating license to 40 years. The regulations also allow a license to be renewed for an additional 20 years given that the initial term was based on economic and anti-trust considerations, not technical limitations. Nonetheless, NRC recognizes that some plant systems, structures, and components (SSC) may have been engineered with the expectation of a limited 40-year service life. Through technical research, NRC concluded that many aging phenomena are readily managed and therefore should not preclude renewal of a reactor license.

In the early 1990s, NRC published requirements for license renewal in the *Code of Federal Regulations* (CFR). 10 CFR Part 51 addresses environmental issues.<sup>2</sup> 10 CFR Part 54<sup>3</sup> addresses operating safety issues — the main focus of this Office of the Inspector General (OIG) report. Part 54 was amended in 1995 to concentrate NRC's reviews on how licensees manage adverse effects of aging to provide reasonable assurance that plants will continue to operate in accordance with their current licensing basis for the period of extended operations.

In July 2001, NRC issued NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, as the agency's primary technical basis document for NRC-approved programs for managing the aging of a large number of structures and components that are subject to aging management reviews.

### **Agency Assumptions**

The two key principles of license renewal are: 1) NRC's existing regulatory process adequately ensures that currently operating plants will continue to maintain adequate levels of safety during extended operation, with the possible exception of detrimental

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<sup>2</sup> In response to the National Environmental Policy Act, NRC also pursued an environmental rule, 10 CFR Part 51, *Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions*, revised 1996.

<sup>3</sup> 10 CFR Part 54, *Requirements for Renewal of Operating Licenses for Nuclear Power Plants*.

effects of aging on certain SSCs, and a few other issues that may arise during the period of extended operation; and 2) each plant's licensing basis is required to be maintained during the renewal term in the same manner and extent as during the original licensing term. NRC incorporates the following assumptions into its reviews of license renewal applications:

- an applicant should rely on the plant's current licensing basis,<sup>4</sup> actual plant-specific experience, applicable industry-wide operating experience, and existing engineering evaluations to determine which plant SSCs are the initial focus of a license renewal review; and
- a plant's "active" components<sup>5</sup> do not require additional review during license renewal because aging effects of active components are more readily detected and corrected through routine surveillance and maintenance. Therefore, the license renewal process limits its reviews to "passive and long-lived" plant structures and components,<sup>6</sup> time-limited aging analyses,<sup>7</sup> and aging management programs for renewal-related components.

### ***Review Process and Program Responsibilities***

In order to assess the reliability of its assumptions about aging, NRC uses a review process that proceeds along two parallel tracks:

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<sup>4</sup> "Current licensing basis" is the set of NRC requirements applicable to a specific plant and a licensee's written regulatory commitments for ensuring compliance and operation within applicable NRC requirements and the plant-specific design basis that are docketed and in effect.

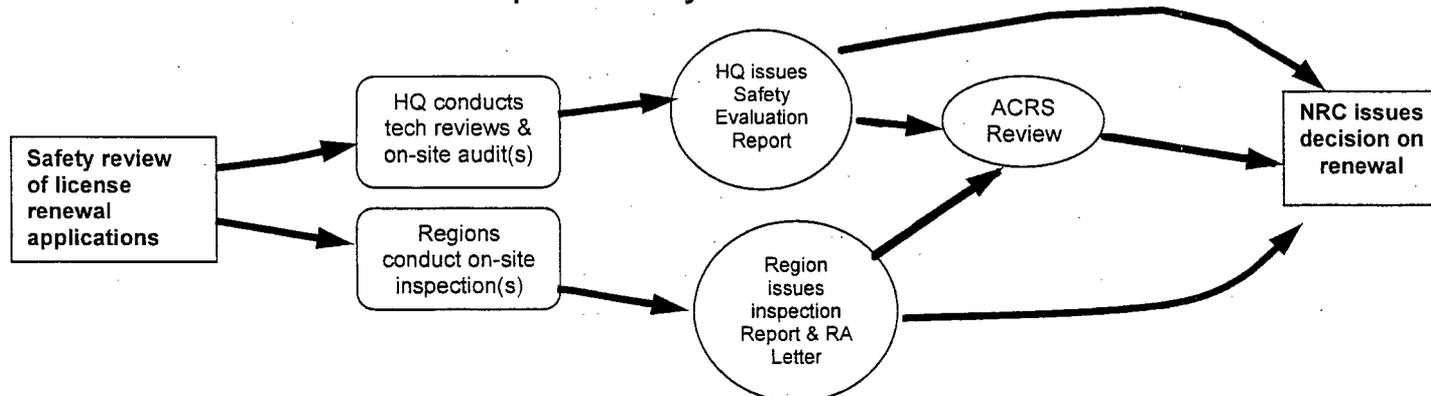
<sup>5</sup> "Active" components include motors, diesel generators, cooling fans, batteries, relays, and switches.

<sup>6</sup> "Passive" and "long-lived" structures and components are those that perform an intended function without moving parts or a change in properties, and those not subject to replacement based on qualified life or specified time period, respectively. Passive and long-lived SSCs include reactor vessels, reactor coolant system piping, steam generators, pressurizers, pump casings, and valve bodies.

<sup>7</sup> "Time-limited aging analyses" are licensee calculations and analyses that: involve SSCs within the scope of license renewal; consider aging effects; involve assumptions defined by the current 40-year operating term; are relevant for making a safety decision; involve basis for decision that SSCs are capable of performing their intended functions; and are contained in or referenced in the current license basis.

a safety review (Part 54) and an environmental review (Part 51). Figure 1 reflects a simplified license renewal safety review process. (See Appendix B for the NRC's dual-track license renewal review process.)

**Figure 1**  
**Simplified Safety Review Process**



Source: OIG-creation based on NRC information

As reflected in Figure 1, the safety review process consists of headquarters-based technical reviews, on-site audits, and region-based inspections. Primary responsibility for the license renewal program lies within NRC's Office of Nuclear Reactor Regulation (NRR), Division of License Renewal (DLR). DLR project teams, consisting of technical auditors and engineer consultants, perform on-site audits to review the supporting documentation for those aging management programs and aging management reviews cited in the licensee's application as consistent with the *GALL Report* or based on NRC-accepted past precedence. Concurrently, NRR's headquarters-based engineering divisions review scoping and screening of SSCs, plant-specific aging management programs and aging management reviews, and other items not addressed in the *GALL Report* (e.g., unresolved or emergent issues). The results of the NRC staff's review are documented in a safety evaluation report.

Additionally, teams of specialized inspectors from NRC's four region offices travel to the reactor sites to verify the licensees' claims that current or proposed aging management programs will be effective.

The Advisory Committee on Reactor Safeguards (ACRS) acts as an independent third-party oversight group who reviews safety evaluation report findings as well as inspection report findings and makes recommendations on the renewal application to the Commission. Throughout the process, NRC's Office of the General Counsel (OGC) provides legal and regulatory interpretations as needed and formally reviews and concurs on the safety evaluation reports. When applicable, the Atomic Safety and Licensing Board rules on stakeholders' requests for license renewal hearings.

**Application Review Timelines and Costs<sup>8</sup>**

As shown in Figure 2, renewal application processing can take more than 4 years — approximately 2 years and \$20 million is spent by licensees to research, document, and prepare a license renewal application for submission. For NRC's review and decision on an application, it typically takes 22 months and \$4 million without a hearing, and a projected 30 months<sup>9</sup> with a hearing.

**Figure 2  
Application Preparation and Review Process**

Licensee Applicant Activities		NRC Review Activities
Engineering & Environmental Work	LRA prep	<ul style="list-style-type: none"> <li>• Audit, environmental &amp; technical reviews</li> <li>• Regional Inspections</li> <li>• OGC &amp; ACRS reviews</li> <li>• ASLBP reviews, if applicable</li> </ul>
18 – 24 months		22 – 30 months

<sup>8</sup> Regulations allow for renewal applications to be submitted as early as 20 years before expiration of a current license, but licensees technically have until the end of their 40-year license to apply for an extension. However, NRC notes that if a "sufficient" application is not submitted at least 5 years prior to license expiration, a plant may have to cease operations until the renewal decision is made.

<sup>9</sup> OIG notes that NRC's projected 30-month schedule, including a hearing, has not yet been tested because none of the license renewals granted to date went through a hearing process.

### ***Status of License Renewals***

The agency's extensive experience with license renewal issues began in 1982. As of April 2007, approximately one-half of the Nation's licensed reactors have either received renewed licenses or are currently under review. Specifically, license extension requests for 48 of the 104 licensed power reactor units in the U.S. have been reviewed and approved. Additionally, eight renewal applications are currently under review while licensees representing an additional 23 plants have announced intentions to submit renewal applications through 2013.

### ***Proactive License Renewal Program Features***

NRC incorporated several features into the license renewal program that correspond to the agency's Principles of Good Regulation. For example,

- Several facets of openness are built into the process for public involvement, including open meetings and opportunities to request an adjudicatory hearing.
- For a more efficient license renewal review process:
  - the *GALL Report* was developed to document the basis for determining whether existing programs are adequate and for identifying those programs that warrant particular attention during NRC's review of a license renewal application,
  - NRC Regulatory Guide 1.188<sup>10</sup> helps standardize the format and content of license renewal applications, and
  - the audit function enables NRC staff to review more applications simultaneously by reducing the need for requests for additional information.

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<sup>10</sup> Regulatory Guide 1.188, *Standard Format and Content For Applications to Renew Nuclear Power Plant Operating Licenses*.

- Some NRC staff and industry representatives made favorable comments to OIG about the clarity of NRC's guidance regarding the expected content for a renewal application and NRC's adherence to its established review schedule, which provides reliable planning assistance to NRC technical engineering divisions and future license renewal applicants.

## **II. PURPOSE**

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The purpose of OIG's audit was to determine the effectiveness of NRC's license renewal safety reviews. Appendix A provides a detailed description of the audit's scope and methodology.

### **III. FINDINGS**

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Overall, NRC has developed a comprehensive license renewal process to evaluate applications for extended periods of operation. However, OIG identified areas where improvements would enhance program operations. Specifically,

- A. license renewal reporting efforts need improvements,
- B. guidance for removing licensee documents from audit sites could be clarified,
- C. consistent evaluation of operating experience would improve NRC reviews,
- D. more attention is needed to planning for post-renewal inspections, and
- E. license renewal issues need evaluation for backfit application.

#### **A. NRC's License Renewal Reporting Efforts Need Improvements**

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Improvements to the staff's reporting efforts could provide necessary support for NRC's license renewal decisions. Adequate documentation of review methodologies and support for staff conclusions in license renewal reports is important for supporting the sufficiency and rigor of NRC's review process. However, the NRC staff does not consistently provide adequate descriptions of audit methodology or support for conclusions in license renewal reports. This is because DLR has not fully established report-writing standards and does not have a report quality assurance process to ensure adequate documentation. As a result, stakeholders and others who read the reports could conclude that regulatory decisions are not adequately reviewed and documented.

##### **Review Documentation Standards and Current Guidance**

NRC's license renewal reviews must be supported to demonstrate the adequacy and rigor of NRC's review process. One way to accomplish this is to have documentation to support conclusions in NRC's license renewal reports, which include the license renewal

audit, inspection, and safety evaluation reports. DLR's audit guidance also acknowledges the importance of documentation for reaching conclusions in the audit reports.

DLR is responsible for conducting on-site audits of the license renewal applications. The license renewal auditors, referred to internally as the project team, use a handbook titled, *Project Team Guidance for License Renewal Application Safety Reviews*, to guide the conduct of the audit. A peer review checklist in the *Project Team Guidance* reminds the reviewer to make sure the conclusions in the audit report are supported by adequate technical bases.

### **Review Methodology and Conclusions are Not Fully Described in Reports**

License renewal audit, inspection, and safety evaluation reports do not provide full descriptions of the methodology the staff used to review an aging management program or provide full support for the staff's conclusions. In some cases, the language presented in the audit and safety evaluation reports mirrors the language provided by the licensee in its license renewal application, which, according to NRC, may have been taken by the licensee out of the *GALL Report* and placed in the application.

OIG performed a content analysis of audit, inspection, and safety evaluation reports for a judgmental sample<sup>11</sup> of license renewal applications submitted between September 2000 and January 2006.<sup>12</sup> For its analysis, OIG focused on narrative passages in the applications and reports that addressed the operating experience program element for a selection of aging management programs.<sup>13</sup> OIG's analysis resulted in 458 report narrative samples.

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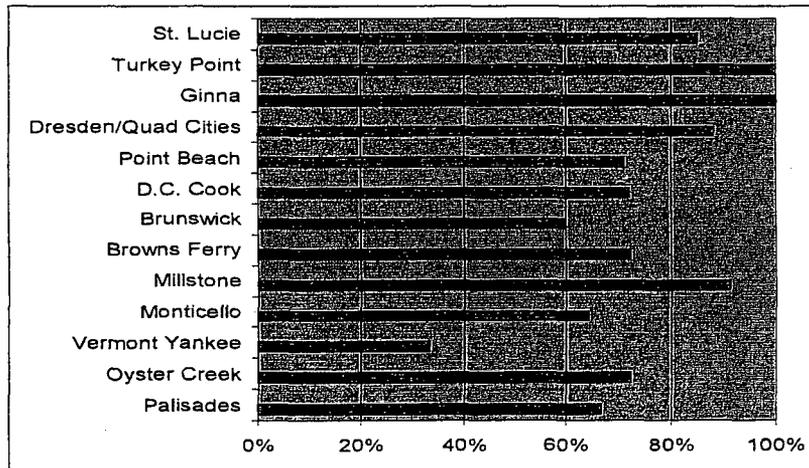
<sup>11</sup> Results of this judgmental sample are limited to the population of license renewal applications sampled.

<sup>12</sup> The judgmental sample of applications represents a cross-section of plant ages, technologies, year of renewal, NRC application review process used, and NRC region. A detailed description of OIG's content analysis methodology is presented in Appendix C.

<sup>13</sup> Operating experience is one of ten GALL program elements that a licensee's aging management program must satisfy in order to secure approval from NRC.

OIG found that approximately 76 percent of the audit, inspection, and safety evaluation report samples did not provide substantive NRC comments about operating experience. Operating experience is a critical facet of the review process. For its analysis, OIG defined non-substantive samples as those that 1) did not describe *any* review methodology for operating experience or provide *any* specific support for the staff's conclusions; or 2) provided information that was identical or nearly identical to the information provided in the licensee's renewal application. Figure 3 depicts, by plant license renewal application, the percent of report samples that did not provide substantive NRC comments about operating experience.

**Figure 3**  
**Percent of Report Samples Lacking Substantive Operating Experience**  
**Comments, by Plant**



Source: OIG analysis of NRC license renewal audit, inspection, and safety evaluation reports; and of license renewal applications.

In some cases, the identical or nearly identical word-for-word repetition of renewal application text found in the audit, inspection, or safety evaluation reports are not offset or otherwise marked to indicate the text is identical to that found in the license renewal application. The lack of precision in differentiating quoted and unquoted text makes it difficult for the reader to distinguish between the licensee-provided data and NRC staff's independent assessment methodology and conclusion. A reader could conclude that they were reading NRC's independent analysis and conclusions when, in fact, it was the licensee's conclusions. While

NRC reviewers may have actually performed such an independent review, a comparison between the license renewal application and the audit report may cast doubt as to what, exactly, NRC did to independently review the licensee's program other than restate what was provided in the renewal application.

For example, NRC's narrative description of operating experience for Millstone's flow-accelerated corrosion program is nearly identical to the description provided in the licensee's renewal application. NRC's Millstone audit report, shown on the right side of Table 1 below, presents information about the trending successes in the Millstone flow-accelerated corrosion program and gives the appearance of the audit team's independent review and analysis. In fact, this passage is nearly identical to that presented in the license renewal application, shown in the left column of the table. Moreover, while NRC states that the project team reviewed operating experience, there is no discussion of what precisely was reviewed.

**Table 1**  
**Sample Comparison of Licensee and NRC Report Narrative<sup>14</sup>**

<b>Millstone Unit 2 renewal application</b>	<b>NRC's Millstone renewal audit report</b>
<p><i>The number of planned and unplanned replacements has generally trended downward over the past several years due to the establishment of the Flow-Accelerated Corrosion program and following the recommendations identified in NSAC-202L. (p. B-42)</i></p>	<p><i>The project team reviewed operating experience for the applicant's Flow-Accelerated Corrosion program. The number of planned and unplanned replacements has generally trended downward over the past several years due to the establishment of the Flow-Accelerated Corrosion program and following the recommendations identified in NSAC-202L. (p. 67-8)</i></p>

Source: OIG analysis

<sup>14</sup> Additional examples are provided in Appendix D.

NRC staff stated that when the licensee claims an aging management program is consistent with the *GALL Report*, the licensee may copy the operating experience from the *GALL Report*, and the safety evaluation report may copy the application. However, OIG's analysis shows that—for the audit, inspection, and safety evaluation reports sampled—the staff's description of the methods used and the support they provided for their conclusions often lack substance.

### **Staff Report-Writing Standards Are Not Fully Established**

DLR management has not fully established report-writing standards for describing the license renewal review methodology and providing support for conclusions in NRC license renewal audit, inspection, and safety evaluation reports. DLR managers said that they expected license renewal staff to use their own language and avoid copying directly from the license renewal application when writing renewal reports. The managers said they are aware of the importance of demonstrating NRC's independence in the license renewal reviews. DLR managers also said that they have verbally communicated and stressed their expectations to the staff. Yet, the *Project Team Guidance* does not reiterate these expectations or provide any report-writing standards that would support management's expectations. The *Project Team Guidance* instead focuses on the process of compiling the audit and safety evaluation reports and not on the quality of information presented in these reports.

DLR management pointed to some report quality assurance tools that involved audit team leader, peer group, and branch chief reviews of the audit and safety evaluation reports. DLR places the greatest emphasis on the audit team leader review to control report quality. DLR management and staff said that the peer review, conducted near the end of the report-writing process, is not a page-by-page review of the audit and safety evaluation reports but is primarily a spot review seeking to correct major mistakes in the reports. However, these tools have not ensured that the reports contain substantive documentation of NRC's application review methodology and independent support for staff conclusions.

Essentially, DLR lacks a complete report quality assurance process to ensure documentation of the staff's aging management program review methodology and substantive support for staff conclusions.

While the team leader and peer review tools currently in place could form the basis of a report quality assurance process, DLR does not currently have any way to measure or determine the effectiveness of these team leader and peer reviews. Nor does the Division have procedures that would specify additional report quality assurance steps to take, given a pattern or trend in discovered problems. Such procedures would help DLR management refine the report quality assurance process to meet the quality assurance needs of the audit teams and division directors, as well as those—like ACRS members—who depend on the audit and safety evaluation reports for their review responsibilities.

### **NRC Basis for Conclusions Important to Stakeholders**

The basis for conclusions reached by NRC license renewal review staff is important to stakeholders and others who read NRC's reports. The lack of an effective report quality assurance process to ensure that review methodology and support for conclusions are provided in the license renewal reports could lead readers to conclude that regulatory decisions are not adequately reviewed and documented. Furthermore, providing more substantive analysis and conclusions would help NRC better meet its strategic goal of transparency.

NRC internal users—such as members of the ACRS—benefit from more substantive discussions of license renewal review methodologies and support for conclusions. ACRS members said that they rely on information in all of the license renewal reports, and pointed specifically to the value of the level of detail in the audit reports.

### **RECOMMENDATIONS:**

OIG recommends that the Executive Director for Operations:

1. Establish report-writing standards in the *Project Team Guidance* for describing the license renewal review methodology and providing support for conclusions in the license renewal reports.

2. Revise the report quality assurance process for license renewal report review to include:
  - establishing management controls for NRR and DLR management to gauge the effectiveness of team leader and peer group report reviews, and
  - implementing procedures that would specify additional report quality assurance steps to be taken in the event that the team leader and peer group report reviews fail to ensure report quality to management's expectations.

## **B. Guidance for Removing Licensee Documents from Audit Sites Could Be Clarified**

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OIG found inconsistencies in the guidance provided to license renewal auditors with regard to removing licensee documents obtained at audit sites. License renewal audit teams should collect and document the information they review during site visits. However, audit teams are prohibited by DLR from removing licensee documents from the audit site, which makes it more difficult for audit team members to write their reports without using workaround tools. DLR's policy also creates document handling inconsistencies with inspectors, who do keep documents obtained from the licensee's site.

### **Information Collection Guidance**

As noted earlier, the license renewal audit team uses the *Project Team Guidance*, to guide the conduct of the audit. With regard to documentation, the *Project Team Guidance* exhorts auditors to "properly collect and document the information they review during site visits," especially for information used as a basis for reaching a conclusion regarding the audit and safety evaluation reports.

### **Audit Teams Prohibited from Removing Licensee Documents from Audit Site**

License renewal audit teams, as a matter of DLR policy, are prohibited by their management from removing copies of licensee-provided documents from the audit site. The licensee provides an extensive amount of bases and technical documents for DLR auditors. DLR auditors review these documents for information that may answer their questions about the license renewal application. Licensee staff may exert great effort to make multiple copies of documents available, both in hard copy and on compact disc. Because DLR management prohibits auditors from removing licensee-provided documents, auditors use the time available on-site to peruse the documents and interview licensee staff.

License renewal auditors said that being allowed to take documents offsite would aid them in writing and supporting their audit and safety evaluation report inputs. They thus resorted to removing documents provided by the licensee in violation of the Division's policy.

DLR management's policy to prohibit license renewal auditors from removing licensee-provided documents from the audit site is also contrary to the policy and practice for license renewal inspectors. For example, NRC region-based license renewal inspectors said that the renewal inspection teams can and do take documents from the site. The inspectors said it is standard procedure to dispose of licensee documents once their report is written.

### **Guidance for Removing Licensee Documents from Audit Sites is Inconsistent**

OIG found inconsistencies in the guidance provided to license renewal auditors with regard to removing copies of licensee-provided documents from audit sites. DLR management provides the audit teams with verbal guidance to never remove licensee documents obtained from the audit site. However, DLR's *Project Team Guidance* appears to permit some removal of licensee documents from an audit site, as indicated on page 26:

*"The project team shall not take documents from an applicant's site for in-office review, unless the documents are either already in ADAMS or the applicant agrees that the NRC can put the document in ADAMS."*<sup>15</sup>

Elsewhere, the *Project Team Guidance* states that "if the documentation cannot go on the docket or into ADAMS then it cannot be taken off site." A more permissive document removal policy is provided to inspectors through Inspection Manual Chapter 0620.<sup>16</sup> It provides a number of acceptable practices for obtaining licensee documents, including sending an inspector to the site or using the licensee's equipment to make copies of relevant materials. The guidance states that copies of licensee records and documents may be reviewed offsite with the licensee's permission.

When asked the reason for the more restrictive verbal removal policy, DLR managers echoed the rationale provided by the *Project Team Guidance*. They said that most documents provided by the

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<sup>15</sup> ADAMS is NRC's Agencywide Documents Access and Management System.

<sup>16</sup> Inspection Manual Chapter 0620, *Inspection Documents and Records*, dated January 27, 2006.

licensee at the audit site have not been docketed by NRC and, therefore, DLR does not want license renewal auditors to bring the undocketed items back to headquarters. According to DLR management, OGC told NRR staff that all documents that NRC auditors bring back "must be docketed."

A senior attorney involved with the License Renewal Program said that OGC warned NRR management not to take documents unless they are willing to "give them up" through a Freedom of Information Act request or via a mandatory disclosure requirement for a hearing. The OGC attorney could not identify any specific guidance that required NRC to put licensee documents on the docket, and admitted that NRC's criteria regarding what licensee documents must be docketed by the agency is unclear.

The OGC attorney also said that the practice among region-based inspectors to remove licensee-provided documents from a license renewal site is acceptable. However, the attorney expressed concern about the inconsistent practices of the license renewal audit and inspection staffs regarding the removal of documents from license renewal sites.

### **Consequences of DLR's Documentation Policies and Practices**

DLR's prohibition on its audit staff from removing documents provided by the licensee at license renewal sites makes it more difficult for the auditors to write their inputs to the audit and safety evaluation reports. Instead, the audit staff has to rely on notes and memory, and use other source document workarounds—such as worksheets and the licensee-managed database of questions and answers—to construct input for the audit and safety evaluation reports. Given the Division's greater reliance on the staff to perform audits with fewer contractors, any effort to provide auditors with source documents may contribute to review efficiencies.

Furthermore, NRR's policy also leads to document handling inconsistencies between the license renewal audit and inspection teams. The same blanket prohibition on removal of licensee documents from the licensee's site does not extend to license renewal inspectors.

**RECOMMENDATION:**

OIG recommends that the Executive Director for Operations:

3. Clarify guidance and adjust procedures for auditors' and inspectors' removal of licensee-provided documents from license renewal sites

### **C. Consistent Evaluation of Operating Experience Would Improve NRC Reviews**

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License renewal audit teams have a unique opportunity to improve the NRC license renewal review with a deeper and more consistent approach to reviewing operating experience. Operating experience plays an important role in license renewal, and the license renewal staff is expected to review plant-specific operating experience, including corrective actions. Yet, audit team members do not review operating experience consistently. Furthermore, most audit team members do not conduct independent verification of operating experience, instead relying on licensee-supplied information. This is because program managers have not established requirements and controls to standardize the conduct and depth of such reviews. In the absence of conducting independent verification of plant-specific operating experience, license renewal auditors may not have adequate assurances that relevant operating experience was captured in the licensee's renewal application for NRC's consideration.

#### **The Importance of Operating Experience to License Renewal**

Operating experience plays an important role in license renewal and figures prominently in a licensee's renewal application. NRC's *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants* (Standard Review Plan) instructs NRC staff to assess 10 program elements for each aging management program submitted in a licensee's renewal application. Operating experience is listed as one of these 10 elements, and defined in brief in the *Generic Aging Lessons Learned (GALL) Report* summary as follows:

*"Operating experience involving the aging management program, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation." (p. 2)*

Operating experience is also an important part of two other aging management program elements: specifically, detection of aging effects, and monitoring and trending. The Standard Review Plan

also calls attention to the importance of the licensee's plant-specific operating experience in relation to scoping and screening, aging management review, and time-limited aging analyses activities. DLR management also said that it expects its license renewal staff to review plant-specific operating experience, including corrective actions. Given the Standard Review Plan's emphasis on operating experience and on management's expectations, OIG concludes there is ample reason for the licensee to provide—and NRC to review—sufficient amounts of operating experience information and data.

### **Operating Experience Is Not Consistently Reviewed or Independently Verified**

When reviewing aging management programs, license renewal audit team members do not approach their reviews of operating experience consistently and, furthermore, most team members do not conduct independent verification of operating experience. Team members are assigned aging management programs to review based on their areas of expertise. A more experienced reviewer or auditor may look more in-depth at, or conduct independent spot checks of, licensee-submitted information provided in the license renewal application.

OIG asked license renewal auditors and management about the appropriateness of conducting independent searches of licensee operating experience. Such searches might examine the licensees' corrective actions, system health reports, and inspection results. NRR managers said that they expect the audit teams to review plant-specific operating experience. Some managers said they expected license renewal auditors to perform their own searches of corrective actions rather than rely solely on information provided by the licensee.

However, license renewal auditors said that they generally do not conduct independent searches of licensee corrective action databases and that auditors would not normally review a plant's corrective action program for each aging management program because the industry-wide experience is already known. One reviewer said that it is the licensee's responsibility to provide NRC with plant-specific operating experience that is different from industry-wide operating experience. The auditor reviews only what the licensee provided in its application. Another reviewer said

that capturing plant-specific operating experience is time-consuming or that it is too difficult to learn how to use the licensees' corrective action program databases.

With the assistance of an OIG technical advisor having a general engineering background, OIG sought to learn how difficult it would be to generate a useful database report of corrective actions. OIG staff visited two separate plants owned by large utility companies and, using computers attached to the respective owners' local area networks, performed keyword searches of the corrective action databases.<sup>17</sup> OIG's technical advisor searched the available network data for the host plant and for several other already renewed plants in their respective fleets.<sup>18</sup>

From these searches, OIG was able to identify a number of areas for each plant that would warrant follow-up questions for licensees regarding past performance of license renewal aging management programs. Given the time to conduct and analyze the database searches, OIG concluded that accessing the corrective action databases was relatively easy and provided access to a good deal of information of potential value to license renewal audit teams. OIG does not believe that the results of such a search would necessarily validate an entire aging management program, but the endeavor does identify a relatively easy way for license renewal auditors to conduct an independent check of the information provided by the licensee.

### **Requirements to Independently Verify Operating Experience Have Not Been Established**

License renewal program managers have not established requirements or controls to standardize the conduct of independent verifications and depth of probes of plant-specific operating experience during audit reviews of licensee applications. That is not to suggest that DLR management has failed to mention the importance of reviewing operating experience to audit teams. On

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<sup>17</sup> Keywords included "corrosion," "cracking," "fatigue," "leak," "pitting," "drywell," "HPCI," "primary containment," "secondary containment," and "Torus."

<sup>18</sup> It is important to note that OIG staff had no previous experience or familiarity using these databases. At both plant sites, OIG staff needed approximately 5 hours total to learn basic search mechanisms for the corrective action databases, and then perform the keyword search for three plants in each fleet.

the contrary, OIG observed DLR management discussing the importance of plant-specific operating experience with license renewal auditors at a team meeting.

DLR management has not set any formal requirements that license renewal audit teams independently verify plant-specific operating experience as a standard part of their reviews. The *Project Team Guidance* handbook instructs reviewers to compare program elements for the plant's aging management programs to the corresponding program elements for GALL-identified aging management programs. But the *Project Team Guidance* handbook does not include any specific direction about how this should be accomplished. Essentially, the guidance leaves a lot of leeway to individual auditors to review operating experience as they see fit.

DLR also has no controls to monitor and enforce operating experience verification, which incorporate independent searches of corrective action databases. One manager said that more management controls to bring consistency to the reviews would be welcomed. The manager pointed out that DLR management can require audit teams to perform deeper probes of operating experience, but has no way of determining whether the auditors follow through.

### **Auditors May Not Be Aware of All Relevant Operating Experience**

In the absence of conducting independent verification of plant-specific operating experience, license renewal auditors may not have adequate assurances that all relevant operating experience was captured in the licensee's renewal application. As reported above, OIG was able to identify a number of areas for each plant that would warrant follow-up questions for licensees regarding past performance of license renewal aging management programs.

OIG's work in this area was, in part, informed by a discrepancy noted while reviewing the Oconee license renewal application. NRC received the Oconee plant's license renewal application in July 1998, whereupon the application remained under review until renewal was granted in May 2000. The application stated that minor local containment coatings failures had been observed and

repaired. Yet, the Oconee corrective action program contained 20 entries for degraded coatings from 1995-2003.<sup>19</sup> OIG's analysis of this corrective action program indicates that the coatings aging management program had not been implemented consistent with the statements in the Oconee license renewal application. In fact, coatings degradation was a continuing problem at the Oconee Nuclear Station as of Spring 2004, the date of the photograph presented in Figure 4 below, casting doubt on the efficacy of Oconee's aging management program for coatings.

**Figure 4**  
**Example of Coatings Degradation at Oconee**



Source: NRC Inspector

NRC license renewal reports do not indicate that NRC reviewers independently verified Oconee's operating experience for coatings. The license renewal inspection report states that the inspection included a review of the program description documents and discussion of the program with a site engineer. The inspection report concluded, based on the program document review and the

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<sup>19</sup> Six of the entries were made prior to the submittal of the license renewal application in 1998. Two of the entries were made after the renewal application was submitted, but prior to the granting of the renewed license in May of 2000.

discussion, that the "team verified that this previously existing program was implemented as described in the [license renewal application]." The license renewal safety evaluation report for Oconee quotes or paraphrases passages from the Oconee renewal application, including the licensee's conclusion that the program is based on well-established industry standards and has been revised as necessary on the basis of plant experience. The staff acknowledged in the safety evaluation report that the licensee did not provide coatings program operating experience in its application, yet the staff did not offer any indication of having conducted an independent look at coatings operating experience.

OIG contends that a quickly-performed, independent search of the Oconee corrective action database would have revealed discrepancies with the information and assessment provided by the licensee in the renewal application. Such a search would have generated the corrective action reports that described continuing coatings problems and raised questions about the licensee's contention that minor local containment coatings failures have been observed and repaired. Moreover, performing and documenting this type of search helps NRC prevent the appearance that license renewal reviewers trust information provided by the licensee in the renewal application without verification.

**RECOMMENDATION:**

OIG recommends that the Executive Director for Operations:

4. Establish requirements and management controls to standardize the conduct and depth of license renewal operating experience reviews.