AUDIT REPORT

Audit of NRC's Power Uprate Program

OIG-08-A-09 March 28, 2008

March 28, 2008

MEMORANDUM TO: Luis A. Reyes
Executive Director for Operations

FROM: Stephen D. Dingbaum **/RA/**
Assistant Inspector General for Audits

SUBJECT: AUDIT OF NRC'S POWER UPRATE PROGRAM (OIG-08-A-09)

Attached is the Office of the Inspector General's (OIG) audit report titled, *Audit of NRC's Power Uprate Program.*

The report presents the results of the subject audit. Agency comments provided at the exit conference on February 22, 2008, have been incorporated, as appropriate, into this report.

Please provide information on actions taken or planned on each of the recommendations within 30 days of the date of this memorandum. Actions taken or planned are subject to OIG follow up as stated in Management Directive 6.1.

We appreciate the cooperation extended to us by members of your staff during the audit. If you have any questions or comments about our report, please contact me at 415-5915 or Sherri Miotla, Team Leader, Nuclear Safety Team, at 415-5914.

Attachment: As stated

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EXECUTIVE SUMMARY

BACKGROUND

Power uprate is the process for increasing the maximum power level at which a commercial nuclear power plant may operate. Plant components must be able to accommodate any new conditions that would exist at increased power levels. In some instances, licensees will modify and/or replace components in order to accommodate a higher power level. Depending on the desired increase in power level and original equipment design, this can involve major and costly modifications to the plant. All of these factors must be analyzed by the licensee as part of an application request for a power uprate.

In order to make a change to the license of a currently licensed plant, a licensee must file with the Nuclear Regulatory Commission (NRC) an application for an amendment that fully describes the changes desired. NRC's technical staff, legal counsel, and management are involved with the review of the application. After NRC completes its review of the application and acts on any applicable public comments, hearing requests, or Advisory Committee on Reactor Safeguards (ACRS) recommendations, the agency may approve or deny the request on the basis of its findings. This process for requesting and approving such changes is specified in the Code of Federal Regulations, Title 10, Parts 50.90, 50.91 and 50.92.

PURPOSE

The overall objective of this audit was to examine the process for reviewing and approving power uprate amendment applications.

RESULTS IN BRIEF

The process for reviewing and approving power uprate amendment applications is generally the same as that for other types of license amendments. Given the agency's long-established practices for reviewing license amendments, NRC staff often expressed satisfaction with the overall process as it is applied to power uprate reviews. However, the Office of the Inspector General (OIG) identified power uprate program matters needing NRC management attention. Specifically,

- The power uprate inspection procedure has been implemented and documented inconsistently.

  - NRC staff have an inconsistent understanding of the power uprate inspection procedure's use, implementation, and documentation, and some staff are not aware of the procedure. This is because the inspection procedure lacks specification, implementation, and documentation guidance, which results in stakeholders being unable to adequately monitor power uprate inspections.

- The circulation and written quality of power uprate safety evaluations needs improvement.

  - OIG found that not all regions and resident inspectors are aware of the recommended areas for inspection or the regulatory commitments sections in the power uprate safety evaluations due to a lack of internal controls for distributing safety evaluations. Consequently, inspectors risk developing their inspection samples and plans without knowledge of recommended inspection areas and regulatory commitments in the safety evaluation. In addition, NRC staff noted shortcomings in the writing quality of uprate safety evaluations that could be improved by strengthening the training for writing inputs to the safety evaluations. Poorly written safety evaluation inputs hamper a stakeholder's ability to comprehend NRC's basis for approving an uprate application.

- The power uprate coordinating function could be strengthened to ensure program success.

  - The power uprate program does not have a formalized mission statement, defined roles and responsibilities, and adequate communication and knowledge management tools. A key reason for these shortcomings is that the agency lacks an authoritative coordinating entity to oversee the entire program. As a result, power uprate internal stakeholders are left without clear direction and oversight.

RECOMMENDATIONS

This report makes eight recommendations. A Consolidated List of Recommendations appears in Section IV of this report.

OIG Analysis of Agency Comments

The Executive Director for Operations submitted formal written comments to this report, which appear in Appendix D. In the written comments, the agency generally agrees with the report findings and with six of the eight recommendations. The agency indicated that the remaining two recommendations were not needed. However, OIG's recommendations were developed to address specific shortcomings discussed in the report, and continues to believe agency action is warranted. Appendix E contains OIG's analysis of the agency's formal response.

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ABBREVIATIONS AND ACRONYMS

ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
the Branch	Generic Communication and Power Uprate Branch
BWR	boiling-water reactor
CFR	*Code of Federal Regulations*
EPUs	extended power uprates
the *Guide*	*Document Distribution Guide*
IMC	Inspection Manual Chapter
IP	Inspection Procedure
MUR	measurement uncertainty recapture
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OGC	Office of the General Counsel
OIG	Office of the Inspector General
OMB	Office of Management and Budget
PWR	pressurized-water reactor
RS	Review Standard
SECY	Office of the Secretary of the Commission
SPUs	stretch power uprates
SRM	Staff Requirements Memorandum

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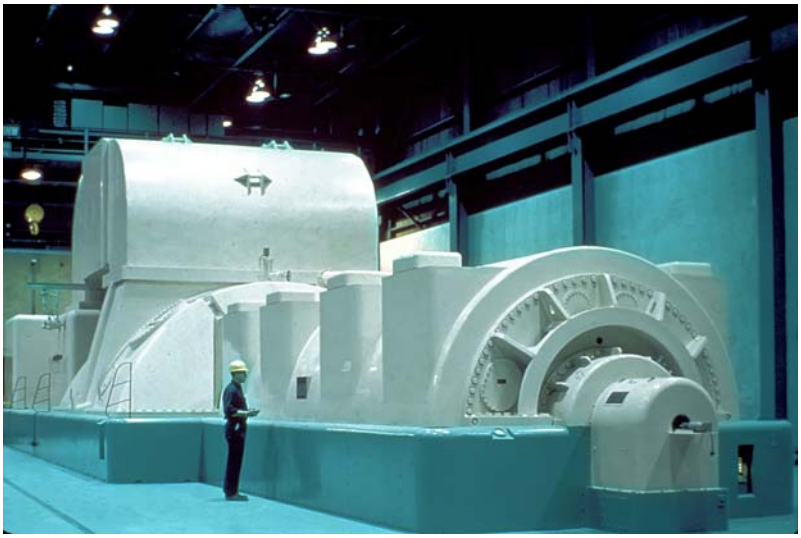
I. BACKGROUND

Power uprate is the process for increasing the maximum power level at which a commercial nuclear power plant may operate. A plant may increase its power level after the Nuclear Regulatory Commission (NRC) has reviewed and approved an application for a license amendment submitted by the licensee. NRC has approved 118 power uprate amendment applications since 1977, permitting licensees to generate an additional 5,263 megawatts electric, which is the equivalent of adding 3 to 4 additional power plants.[1]

A power uprate typically involves the use of more highly enriched uranium fuel and/or the installation of additional fresh fuel. This enables the reactor to produce more thermal energy and therefore more steam, driving a turbine generator to produce electricity. Plant components must be able to accommodate any new conditions that would exist at increased power levels. For example, a higher power level usually involves greater steam and water flow through the systems used in converting thermal power into electric power. These systems must be capable of accommodating the higher flows that result from the uprate.

Figure 1:
Power Plant Turbine



Source: NRC

In some instances, licensees will modify and/or replace components in order to accommodate a higher power level. Depending on the desired increase in power level and original equipment design, this can involve major and costly modifications to the plant, such as the replacement of main turbines. All of

[1] The average power rating for proposed new plants is 1,380 megawatts electric.

these factors must be analyzed by the licensee as part of an application request for a power uprate.

Types of Power Uprates

There are three categories of power uprates:

A. *Measurement uncertainty recapture* (MUR) are increases in power less than 2 percent from the previous power level and are achieved by implementing enhanced techniques for calculating reactor power. This involves the use of state-of-the-art flow measurement devices to more precisely measure feedwater flow, which is used to calculate reactor power. More precise measurements reduce the degree of uncertainty in the power level, which is used by analysts to predict the ability of the reactor to be safely shutdown under postulated accident conditions.

B. *Stretch power uprates* (SPUs) are increases in power typically up to 7 percent from the previous power level and are within the design capacity of the plant. The actual percentage increase value that a power plant can achieve in this category is plant-specific and depends on the operating margins included in the design of a particular plant. Stretch power uprates usually involve changes to instrumentation setpoints, but do not involve major plant modifications.

C. *Extended power uprates* (EPUs) are greater than stretch power uprates and have been approved for increases as high as 20 percent from the previous power level. These uprates require significant modifications to major balance-of-plant equipment, such as the high pressure turbines, condensate pumps and motors, main generators, and/or transformers.

The License Amendment Review Process

In order to make a change to the license of a currently licensed plant, a licensee must file with the NRC an application for an amendment that fully describes the changes desired. NRC's technical staff, legal counsel, and management are involved with the review of the application. In addition, for EPU applications, the Advisory Committee on Reactor Safeguards (ACRS) performs an independent technical review of the application. After NRC completes its review of the application and acts on any public comments, hearing requests, or ACRS recommendations, the agency may approve or deny the request on the basis of its findings. This process for requesting and approving such changes is specified in the Code of Federal Regulations

(CFR), Title 10, Parts 50.90, 50.91 and 50.92. The process for amending a commercial nuclear power plant license for a power uprate is governed by the same regulations.

NRC's Office of Nuclear Reactor Regulation (NRR) has the bulk of responsibility for reviewing the licensee's power uprate application. Technical staff review the licensee's analyses to determine if the application demonstrates that the plant will remain safe and that measures will continue to be in place to protect public health and safety when changes to accommodate an uprate are made. Project managers in NRR compile the technical analyses into a safety evaluation, which documents the agency's findings regarding site safety characteristics and emergency planning for the licensee's plant. Furthermore, staff at the NRC regions and in the plants are responsible for carrying out inspections related to power uprates.

The Inspection Process

One objective of the NRC's reactor inspection program is to obtain factual information providing objective evidence that power reactor facilities are operated safely and licensee activities do not pose an undue risk to public health and safety. NRC Inspection Manual Chapter (IMC)[2] 2515 establishes the agency's policy for the light-water operating reactor inspection program. However, IMC 2515 does not provide guidance for the conduct or timing of inspections related to the license amendment review process.

IMC 2515 describes the following three inspection programs for nuclear reactor inspection:

- the baseline inspection program, which provides examination of the plants and licensee activities to determine whether licensees are meeting safety objectives and to identify indications of performance problems;

- the supplemental inspection program, which describe inspections that are only performed as a result of performance issues that are identified by baseline inspections, event analysis, or other indicators of performance; and

[2] NRC Inspection Manual Chapters are documents containing written administrative or inspection program statements of policy. An IMC for an inspection program defines the program through a listing of inspection procedures, which is normally appended to the IMC.

- special and infrequently performed inspections, which may be performed in response to events, infrequent major activities at nuclear power plants, or to fulfill the NRC's obligations under interagency memoranda of understanding.

Power uprates are inspected through a combination of special and infrequently performed inspections, and baseline inspections. Inspection Procedure (IP) 71004, "Power Uprate," which is intended to be used to inspect extended power uprates and is considered a special and infrequently performed inspection, provides cross-references to other baseline inspection procedures.[3] According to IMC 2515, a special or infrequently performed inspection would be employed to address a major plant evolution.

History and Status of Power Uprate Applications

Of the 118 power uprates that NRC has approved since 1977, 38 have been measurement uncertainty recapture power uprates, 61 have been stretch power uprates, and 19 have been extended power uprates, as shown in Table 1 below.

[3] Inspection procedures—which are statements of objectives, requirements, and guidance—describe the activities to be performed by an inspector.

Table 1: Power Uprates Approved by NRC

Fiscal Year	MUR Power Uprate	Stretch Power Uprate	Extended Power Uprate	Totals
1977 -1998	0	42	1	**43**
1999	1	0	2	**3**
2000	0	3	0	**3**
2001	10	6	0	**16**
2002	7	1	9	**17**
2003	15	2	0	**17**
2004	1	1	0	**2**
2005	0	3	1	**4**
2006	1	2	4	**7**
2007	0	1	0	**1**
2008	3	0	2	**5**
Total	**38**	**61**	**19**	**118**

Source: NRC, as of February 27, 2008.

There are 9 power uprate applications currently being reviewed by NRC. Of these, 2 are measurement uncertainty recapture power uprates, 3 are stretch power uprates, and 4 are extended power uprates. The power that will be generated from the pending uprates will total 871 megawatts electric.

Furthermore, NRC expects to receive 24 power uprate applications for the time period between fiscal years 2008 and 2012. The agency expects that 7 of the uprate applications will be for measurement uncertainty recapture power uprates, and the remaining 17 applications to be for extended power uprates. The power that could be generated from the requested uprates could total approximately 1,751 megawatts electric, or the equivalent of over one new plant.

II. PURPOSE

The overall objective of this audit was to examine the process for reviewing and approving power uprate amendment applications. This audit did not examine the technical content of the staff's final safety evaluations for power uprates. Given that extended power uprates require significant plant modifications, the Office of the Inspector General (OIG) focused the bulk of its review on extended power uprates. Appendix A provides information on the audit scope and methodology.

III. FINDINGS

The process for reviewing and approving power uprate amendment applications is generally the same as that for other types of license amendments. Given the agency's long-established practices for reviewing license amendments, NRC staff often expressed satisfaction with the overall process as it is applied to power uprate reviews. However, OIG identified power uprate program[4] matters needing NRC management attention. Specifically:

A. the power uprate inspection procedure has been implemented and documented inconsistently;

B. the circulation and written quality of power uprate safety evaluations needs improvement; and

C. the power uprate coordinating function could be strengthened to ensure program success.

A. The Power Uprate Inspection Procedure Has Been Implemented and Documented Inconsistently

NRC staff have implemented and documented Inspection Procedure (IP) 71004 inconsistently. In the midst of external stakeholder interest on the status of nuclear power plants that had conducted a power uprate, NRC officials wrote letters to members of Congress and the public which emphasized the importance of power uprate inspections, including IP 71004. Nonetheless, NRC staff have an inconsistent understanding of IP 71004 use, implementation, and documentation, and some staff are not aware of the procedure. This is because IP 71004 lacks specification, implementation, and documentation guidance, which results in stakeholders being unable to adequately monitor power uprate inspections.

[4] During discussions with the agency, NRC management stated that the word "program" should not be used when talking about the power uprate license amendment process, because power uprates are considered part of the NRC overall license amendment program. However, NRC documents and staff have commonly used the word "program" to describe the entirety of power uprate activities, which includes the application review process as well as uprate-related inspections. For purposes of this audit, OIG will refer to it as a program.

NRC Emphasizes the Importance of Power Uprate Inspections

Since February 2004, NRC has written several letters to members of Congress and the public that have emphasized the importance of power uprate inspections, including IP 71004. These letters state that NRC will use IP 71004, "Power Uprates," as well as a number of baseline inspection procedures to inspect issues specifically related to power uprate. NRC senior officials, including two Chairmen, have signed letters stating that IP 71004 verifies that licensees have taken the required actions to alleviate or prevent the effects of new or likely initiating events that were caused by plant modifications related to a power uprate. A list of these letters is provided in Appendix B.

NRC Staff Implement and Document IP 71004 Inconsistently

Despite the agency's public emphasis on power uprate inspections, NRC staff have implemented and documented these inspections inconsistently. Specifically:

- NRC staff have an inconsistent understanding of IP 71004 implementation; and

- Internal and external stakeholders cannot easily find results of power uprate-related inspections.

Inconsistent Understanding of IP 71004 Implementation

NRC staff have an inconsistent understanding of IP 71004 implementation with regard to time, frequency, and permission to conduct the procedure. Staff are unsure when to start and stop the inspections called for in IP 71004. NRC regional staff and resident inspectors are also uncertain whether IP 71004 is a one-time or ongoing inspection. Furthermore, NRC staff are not sure if they need to request permission from regional administrators to conduct the procedure.

Most resident inspectors were aware that baseline inspection procedures address some of the plant modifications performed during a power uprate; however, they had an inconsistent understanding of IP 71004. During the audit, OIG interviewed resident inspectors for all of the nuclear power plant sites that had conducted an extended power uprate. Approximately one-third of these resident inspectors were not aware that IP 71004 existed. Several of them were not sure if power uprate-related inspections had been performed

at their assigned nuclear power plant or plants. Lastly, resident inspectors had inconsistent answers as to who is in charge of scheduling power uprate-related inspections.

NRC regional staff also had an inconsistent understanding of IP 71004. OIG interviewed the assigned points of contact for power uprates in each region. The regions are unclear as to when power uprate inspections should be conducted. Some points of contact said that it is a one-time inspection while others stated that it might be performed more than once. Regional points of contact were not sure if power uprate-related inspections were to be performed:

- before the receipt of a license amendment request for an extended power uprate,
- after the license amendment request is received,
- during NRC's review of the request,
- after NRC's review of the request is complete, or
- for any of these occasions.

Further, staff at one region stated that they were not sure if regional administrator permission to conduct IP 71004 inspections was needed, yet another region stated that regional administrator permission was not required.

Power Uprate-Related Inspection Results Are Not Easily Found

NRC internal and external stakeholders cannot easily find results of power uprate-related inspections. Inspection reports for nuclear power plants regulated by NRC are available on the agency's public website. However, any mention of IP 71004 and power uprate-related inspections having been conducted, or related uprate inspection results, are not easily found within these reports or cannot be found at all.

One way for the public and external stakeholders to find documents related to NRC's regulatory activities is through the Agencywide Documents Access and Management System (ADAMS). A search performed by OIG for inspection reports that address power uprates in ADAMS yielded hundreds of documents, which makes it hard for the public to find information about power uprate inspections that have been conducted. OIG searched on "uprate,"

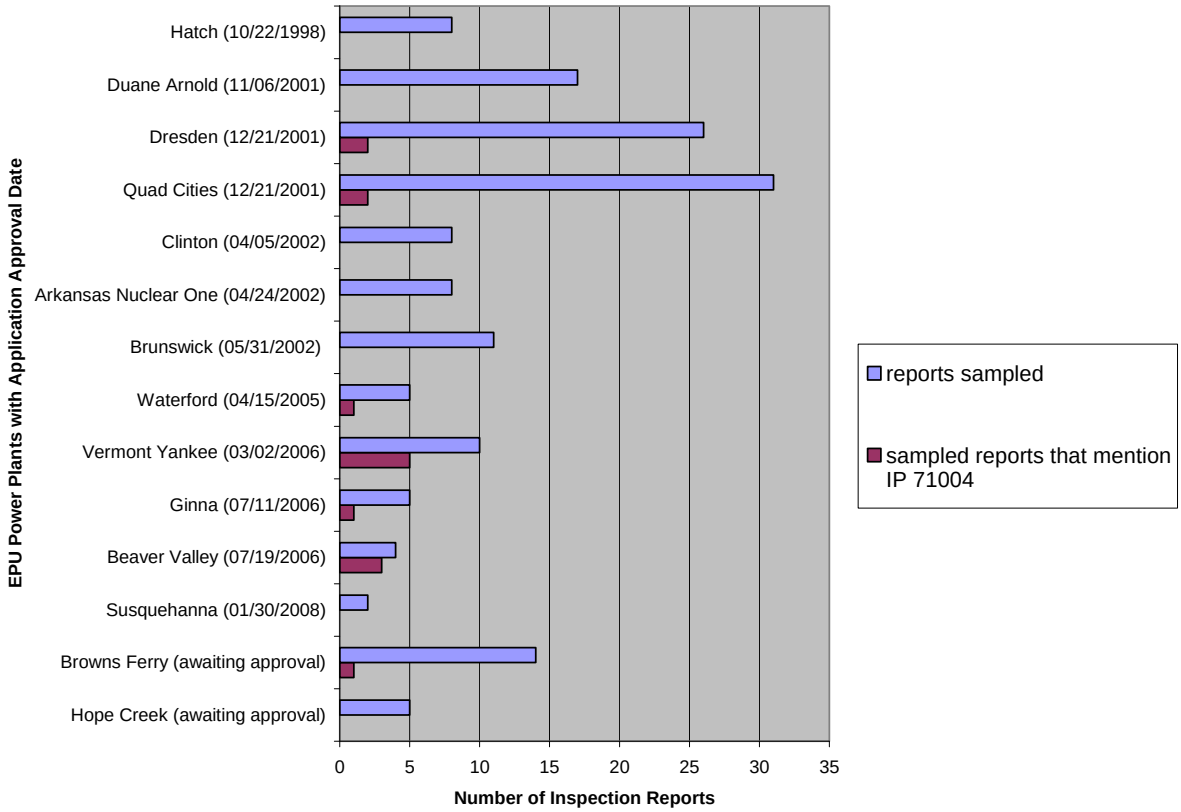
"EPU," and "71004" in public ADAMS. These searches produced a variety of documents, such as license amendment requests for power uprates, change notices for Inspection Manual Chapters (IMCs), and communication memos. The inspection reports were also produced from these searches, but were hard to find because they were interspersed with hundreds of other documents. This is inconsistent with the agency's public stance on the importance of these inspections.

OIG reviewed a sample of inspection reports for each nuclear power plant that had received or applied for an extended power uprate,[5] and only 15 out of 154 inspection reports sampled mention IP 71004 by name (see Figure 2). Most of the sampled inspection reports address findings related to power uprate modifications, but there is no consistency in the way that the information is presented within the reports. Power uprate findings are commingled with the results of other inspection procedures. Also, inspection reports found on the public website are sorted by nuclear power plant and report number only, making it extremely hard for the public to identify reports that address special inspection procedures, such as IP 71004.[6]

[5] The sample consisted of every inspection report published for each plant that had received or applied for an extended power uprate from 1 to 2 years before the plant submitted its power uprate application until mid-2007.

[6] The most common type of inspection report is an integrated inspection report. However, there are stand-alone inspection reports that address other baseline inspections. For example, there is a component design basis inspection report and fire protection triennial baseline inspection report.

Figure 2: Number of Inspection Reports that Mention IP 71004 for Plants Approved or Under Review for an Extended Power Uprate (EPU)[7]



Source: OIG analysis of NRC inspection reports.

[7] IP 71004 was first issued in July 2002. Even though some nuclear power plants had their power uprate applications approved before IP 71004 was issued, this does not preclude NRC inspectors from conducting IP 71004 inspections at these plants. For example, IP 71004 was used at Quad Cities and Dresden because the steam dryers were replaced due to EPU-related damage. Furthermore, plants do not always have all the modifications they need in place to achieve full uprated power upon approval from NRC. For example, the Duane Arnold extended power uprate was approved in 2001, but is currently operating below the approved power uprate level pending additional modifications and testing before full implementation.

IP 71004 Lacks Specification and Implementation Guidance

IP 71004 does not clearly specify inspection frequency and timing, and requirements for the regional administrator's permission to conduct the inspection procedure. Moreover, the procedure is not cross-referenced from other inspection procedures, and the results and records of IP 71004 being conducted are not documented or indexed in a centralized location or in an easily retrievable way so that staff and the public can easily find the results.

Appendix C of IMC 2515 states that IP 71004 is a "Special and Infrequently Performed Inspection;" however, neither IMC 2515 nor IP 71004 specify when to start and stop power uprate inspections or how frequent they should be conducted. NRC regions prepare quarterly inspection plans, and many of them have scheduled power uprate-related inspections. Still, there are inconsistencies between the regions as to how much staff time is needed to conduct these inspections and how many times they will perform it. For example, one region scheduled a power uprate inspection for 2 months with one full-time equivalent employee, while another region scheduled the same inspection for 9 months with two full-time equivalent employees.[8] Also, IMC 2515, Appendix C, specifies that special and infrequent inspections, such as IP 71004, require regional administrator permission.[9] Yet, one region is not asking its regional administrator for permission to conduct the inspection, and another region is not sure whether they are asking for regional administrator approval. However, IP 71004 does not address this requirement.

IP 71004 is also not cross-referenced from other inspection procedures. A unique aspect of IP 71004 is that it references baseline and other inspection procedures that could satisfy the requirements of IP 71004. However, those other inspection procedures do not cross-reference back to IP 71004. Thus, even if some of those other inspections procedures are performed, NRC inspectors would not be made aware of the applicability of the other procedures to satisfy portions of IP 71004. Including the cross-references in the baseline and other procedures would also help inform NRC's inspector community of the existence of IP 71004.

[8] The length of an inspection can be affected by the licensee's implementation schedule.

[9] According to Appendix C in *IMC 2515*, "These inspections are to be performed only when authorized by the Regional Administrator after a review and assessment of plant events or conditions, or to fulfill NRC's obligations under domestic interagency memoranda of understanding, or because of participation in international agencies."

Moreover, power uprate-related inspection results and records are not documented or indexed in a centralized location or in an easily retrievable way so that internal and external stakeholders can easily find the results. Instead, power uprate-related findings are inconsistently documented within NRC inspection reports. Since many of the baseline inspection procedures performed by NRC inspectors cover aspects of IP 71004, power uprate inspection results are found commingled with the results of other inspection procedures. In many instances, an inspection report had a section that specifically addressed power uprate inspections conducted. Yet, these reports also had other power uprate-related findings addressed in other sections that discussed baseline procedures performed. The ability to locate power uprate-related results is further complicated by the fact that inspection findings might be addressed in baseline inspection reports as well as other inspection reports that address annual, biannual, or triennial inspection procedures. NRC currently does not have an inspection report that aggregates power uprate-related findings.

Stakeholders Are Unable to Effectively Monitor Power Uprate Inspections

Inconsistencies in how IP 71004 is implemented and documented hamper internal and external stakeholders' ability to adequately monitor power uprate inspections. A better method for retrieving uprate inspection-related documents would help NRC staff keep track of power uprate implementation activities and related inspection findings. Agency employees that have not worked on power uprate inspections, such as resident inspectors newly assigned to a previously uprated plant, do not currently have access to a quick and simple process to track the power uprate inspections that were conducted and reported in previous years. Consequently, important follow-on inspection activities could be missed or inspectors could unknowingly duplicate previous inspection efforts.

OIG found a good practice for documenting uprate inspections among the NRC resident inspectors at the Beaver Valley Power Station. The resident inspectors have developed a document that tracks the power uprate-related inspection activities conducted under baseline inspection procedures. They also keep track of the plant management's implementation of the power uprate. These documents, which are held by Beaver Valley resident inspectors, provide current and future inspectors at Beaver Valley with quick access to the power uprate-related activities conducted at their site.

The performance and results of power uprate-related inspections are also important to external stakeholders who are interested in power uprate activities at plants, especially after NRC senior officials, including two Chairmen, have emphasized the importance of IP 71004. However, those who want to track the status of power uprate inspections may be left confused as to where to find documentation related to these inspections. Providing a centralized location or an easily retrievable way for internal and external stakeholders to retrieve power uprate-related inspection documents would help NRC continue to improve transparency of its regulatory activities.

RECOMMENDATIONS:

OIG recommends that the Executive Director for Operations:

1. Revise IP 71004 to provide more specificity with regard to the use of the inspection procedure.

2. Provide cross-references from baseline and other inspection procedures that are called for in IP 71004.

3. Document or index cumulative IP 71004 and other uprate-related inspection activities in a centralized location or in an easily retrievable way so that internal and external stakeholders can easily find the results.

B. Issues Related to NRC Staff Awareness and Development of the Safety Evaluation

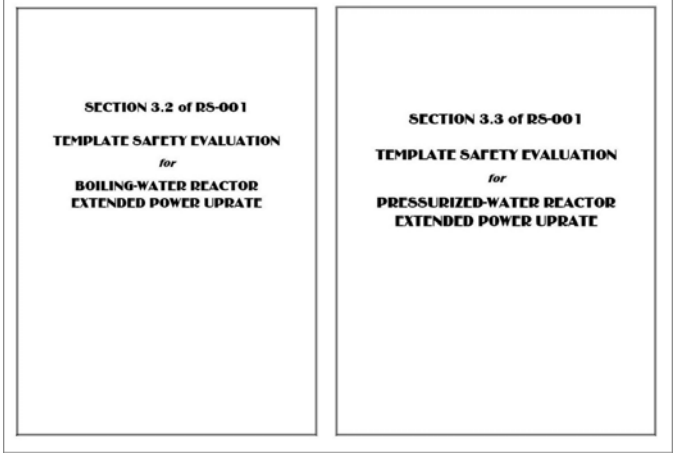
Notwithstanding the availability of agency guidance for circulating and developing safety evaluations,[10] OIG found that not all regions and resident inspectors are aware of the recommended areas for inspection or the regulatory commitments sections in the power uprate safety evaluations due to a lack of internal controls[11] for distributing safety evaluations. Consequently, inspectors risk developing their inspection samples and plans without knowledge of recommended inspection areas and regulatory commitments in the safety evaluation. In addition, NRC staff noted shortcomings in the writing quality of uprate safety evaluations that could be improved by strengthening the training for writing the safety evaluations. Poorly written safety evaluation inputs hamper a stakeholder's ability to comprehend NRC's basis for approving an uprate application.

Guidance for Developing and Circulating the Safety Evaluation

NRC's review of power uprate applications are documented in a safety evaluation, and the agency has provided guidance on the development and circulation of the safety evaluation from several sources, as follows:

- Review Standard (RS) for Extended Power Uprates, RS-001, issued in December 2003, identifies the project manager as responsible for preparing and finalizing the safety evaluation, including consolidating technical review inputs received from

Figure 3: RS-001 Safety Evaluation Templates



Source: NRC.

[10] The safety evaluation report documents the NRC's findings regarding site safety characteristics and emergency planning for plants applying to NRC for a license amendment.
[11] Internal controls are integral components of an organization's management that provides reasonable assurance that the effectiveness and efficiency of operations is being achieved.

other branches. Furthermore, the Review Standard supplies specific instructions for the format and content of the safety evaluations, including a recommended areas for inspection section and a regulatory commitments section. As an aid to NRC staff, RS-001 also provides two template safety evaluations for use in generating plant-specific safety evaluations—one for boiling-water reactor (BWR) plants and one for pressurized-water reactor (PWR) plants (see Figure 3).

- The *Division of Operating Reactor Licensing Handbook* is a Web-based resource that provides guidance on NRC processes and references, often in the form of NRC intranet hyperlinks to the source guidance for a particular topic. It includes reference sections for project managers and other staff on documenting staff decisions, preparing the safety evaluation, and issuing the license amendment package—including the safety evaluation—via e-mail distribution lists.

- NRR Office Instruction LIC-101, Revision 3, "License Amendment Review Procedures," provides guidance on the safety evaluation format, with some additional detail on the structure of the regulatory and technical evaluation sections. While guidance on the content of the safety evaluation is not detailed, LIC-101 does state that the evaluation should contain the staff's specific conclusion that the proposed change is acceptable in terms of public health and safety and provide sufficient justification for approving the licensing action.

NRC's Office of the General Counsel (OGC) also provides safety evaluation review guidance in the form of a review checklist. The checklist requires the OGC reviewer to decide whether the staff's conclusions in the safety evaluation are supported by a clearly articulated basis and that it is an independent review that does more than merely quote the licensee's power uprate application. The OGC reviewer is also required to judge whether the staff have properly reflected the licensee actions necessary for approval of the license amendment.

Some Staff Unaware of Safety Evaluation Content

Two sections—one titled recommended areas for inspection and another listing regulatory commitments—have regularly appeared in the extended power uprate safety evaluations since 2005. However, not all regions and resident inspectors are aware of these sections in the safety evaluations.

OIG contacted NRC resident inspectors at all of the plants that had undergone or had applied for an extended power uprate. Some resident inspectors were not aware of the recommended areas for inspection section or the section that lists the regulatory commitments in the safety evaluation. Additionally, some resident inspectors were unaware of any requirements to look at the safety evaluation or review the recommended inspection areas. One resident inspector stated that he relies on the project manager to alert him to this type of inspection guidance located in the back of a safety evaluation. The inspector had never heard of a list of recommended inspections being placed in a safety evaluation, and considered it highly unusual.

Similarly, several points of contact for power uprates in the NRC regions were unaware of the recommended areas for inspection in the safety evaluation. One of the regional points of contact stated that there should not be any recommended areas for inspection in the safety evaluation and that anything the regions need to inspect should be an action item. A point of contact at another region was also unaware of the recommended areas for inspection in the safety evaluation, because most safety evaluations do not have a list of recommended inspections.

Inconsistent Quality of Safety Evaluation Inputs

NRR project managers who have worked on a power uprate review have noted an inconsistent quality in the written inputs to the safety evaluation provided by NRR's technical branches. The project manager is charged with overall preparation of the safety evaluation, including writing specific sections of the evaluation and coordinating and reviewing the input of other staff for some of the technical sections of the safety evaluation.[12] Given their coordinating role in the safety evaluation, project managers are among the most qualified NRR staff members to comment on the overall quality of the inputs received from technical staff.

Project managers provided a variety of views with regard to the quality of the writing in the safety evaluation. These included the use of different writing styles and repetitive language, and the lack of consistency between technical

[12] NRR management, OGC, and the ACRS all have responsibilities to review the final draft safety evaluation, with the goal of providing consistency in the final report.

groups in what should be included in the evaluation. One project manager asserted that some of the technical groups do not know how to write a safety evaluation.

Moreover, the project managers were not necessarily in agreement with regard to the purpose of the safety evaluation. For example, one project manager said that the safety evaluation is a review of the licensee's proposal against the regulations and that the technical staff's input to the safety evaluation is too technically oriented. The project manager said he "doesn't want to know if something is technically adequate," and stated that the regulations are a technical justification that the plant is safe and therefore NRC's power uprate review is a compliance review with the regulations. Yet, another project manager indicated that the inputs received from technical reviewers were not technical enough. Specifically, the project manager stated that the technical reviewers tended to exclude the reasons for judging the application acceptable other than to designate it a "technically acceptable finding" in the safety evaluation.

NRC Lacks Internal Controls and Training for Safety Evaluations

OIG observed a lack of adequate internal controls to ensure that the unique recommended areas for inspection and regulatory commitments sections in the power uprate safety evaluation are communicated and highlighted to regional staff and resident inspectors. Furthermore, enhanced training for technical reviewers and project managers for writing the safety evaluation would be beneficial.

Internal Controls Over Safety Evaluation Circulation Needed

The agency does not have adequate internal controls to ensure that the recommended areas for inspection and regulatory commitments sections in the power uprate safety evaluations are communicated and highlighted to regional staff and resident inspectors. NRR's guidance for the distribution of the safety evaluation does not ensure that staff in the regions and at the plants receive, and are made aware of, important information in the safety evaluation.

The Division of Operating Reactor Licensing's *Document Distribution Guide* (the *Guide*) provides e-mail distribution lists for various types of documents, including the safety evaluation. According to the *Guide*, the safety evaluation

is to be circulated to generic region and plant e-mail lists. However, inspection points of contact in the regions and the resident inspectors are not specifically identified by the *Guide* for receipt of safety evaluations.

Project managers stated their belief that regional points of contact and resident inspectors receive the safety evaluation through the distribution list, even though they are not specifically identified as recipients on the distribution lists. Project managers are not required to confirm that the regional points of contact and resident inspectors have received the document, or are aware of the recommended areas for inspection and the list of licensee commitments. As one project manager acknowledged, there is no known mechanism that relays such information to these important internal stakeholders.

Training for Writing the Safety Evaluation Could Be Improved

Training for technical reviewers and project managers that is focused on writing the safety evaluation could be improved. Such training provided simultaneously to technical reviewers and project managers could help address writing issues observed by NRC staff. Specifically, it could help to:

- ensure that staff have a common understanding of the safety evaluation's purpose, including the degree to which it should include a specific amount of technical information and independent analysis to help the reader understand why NRC concluded that the licensee's application is acceptable; and

- bring consistency to the various writing styles developed by the separate engineering branches and individual project managers.

Concerns about safety evaluation quality is not a new issue to the agency and, to its credit, the agency has taken this issue seriously. According to project managers, the agency instituted a safety evaluation quality initiative in the past. However, one of the project managers commented that writing and formatting problems were not addressed.

In NRR, the technical branches and the Division of Operating Reactor Licensing have used mentoring partnerships between junior and senior staff to help address quality issues. For example, some engineering branches have an informal peer review process whereby the work of newer staff is

reviewed by more experienced staff. A similar arrangement appears to exist among project managers. Yet, there may be difficulty in making such arrangements given the turnover among staff in NRR.

In October 2006, NRR issued Office Instruction ADM-504, which outlined a qualification program for NRR staff. The office instruction presents position-specific requirements and tasks. For example, it provides a specific task for technical reviewers to write a safety evaluation according to the guidance in LIC-101. However, LIC-101 provides guidance primarily on the format and structure of the safety evaluation, but does not demonstrate how to write a quality safety evaluation. Furthermore, of the 12 study activities and 15 on-the-job training activities outlined for a project manager's qualification in ADM-504, none of them focus on the important activity of writing or compiling the safety evaluation.

The lack of training that is focused specifically on writing the safety evaluation prompted one project manager to assert that a course for writing safety evaluations would be very helpful. The project manager pointed out that this was particularly important because writing safety evaluations is one of the main things that NRR does.

Implications for Uprate Stakeholders and Inspections

If not corrected, shortcomings in inspector awareness of recommended areas for inspections and the writing quality in power uprate safety evaluations could have significant implications for internal and external uprate stakeholders.

First, inspectors risk developing their inspection samples and plans without knowledge of recommended inspection areas and regulatory commitments in the safety evaluation. Therefore, it remains possible that a suggested inspection will not be performed or may be overlooked. Several inspectors expressed the need for NRR to highlight important items in the safety evaluation or otherwise coordinate with regional and resident inspectors. Among other things, this would help inspectors understand what NRR is asking, whether it needs to be done, the impact on inspection resources, and whether any expert support would be needed to conduct the inspection.

Second, shortcomings in the writing quality of safety evaluation inputs may hamper a stakeholder's ability to comprehend NRC's basis for approving a power uprate application. Project managers were sometimes confused by the written evaluations received from technical reviewers. Furthermore, an

inconsistent approach among technical reviewers and project managers could lead to inconsistent review results. Without training for both reviewers and project managers that is specifically focused on writing or contributing to the safety evaluation, such inconsistencies are likely to continue and may be institutionalized through the mentoring of junior staff by their more experienced colleagues. Ultimately, confusing and inconsistent power uprate safety evaluations may hinder the inspectors' and public's comprehension of the NRC's review of power uprate applications.

RECOMMENDATIONS:

OIG recommends that the Executive Director for Operations:

4. Develop training for technical reviewers and project managers that is specifically focused on writing or contributing to a safety evaluation.

5. Implement internal controls to ensure communication of the safety evaluation, highlighting the recommended areas of inspection and regulatory commitments sections to the regions and resident inspectors.

C. Power Uprate Coordinating Function Could Be Strengthened

Effective programs should have certain elements to ensure program efficiencies, yet the power uprate coordinating function could be strengthened to ensure that the program includes these elements. For example, the power uprate program does not have a formalized mission statement, defined roles and responsibilities, and adequate communication and knowledge management tools. A key reason for these shortcomings is that the agency lacks an authoritative coordinating entity to oversee the entire program. As a result, power uprate internal stakeholders are left without clear direction and oversight.

Effective Programs Should Have Certain Elements

An effective program should embody certain elements to ensure program success and efficiencies. According to Federal guidelines[13] on approving accountability and effectiveness of Federal programs and operations, programs must have the following elements to ensure long-term success:

- Clearly defined policies and procedures in place to help ensure that program objectives are met;
- Defined roles, responsibilities, and appropriate delegations of authority throughout the program; and
- Well-defined documentation processes.

In 2002, NRC staff developed the *Effectiveness and Efficiency Plan for Power Uprates,*[14] which identified several areas where the power uprate application and review process can be improved. In the plan, the agency recognizes that strong management oversight is expected to result in early identification and resolution of problems, and lead to more efficient power uprate reviews and a reduction of unnecessary regulatory burden associated with delays.

[13] The Federal guideline discussed is OMB (Office of Management and Budget) Circular No. A-123, "Management's Responsibility for Internal Control," effective Fiscal Year 2006.
[14] By Staff Requirements Memorandum (SRM) dated February 8, 2002, the staff was directed to provide the Commission with a plan for improving the effectiveness and efficiency of power uprate reviews. The staff met the Commission's direction by developing the Effectiveness and Efficiency Plan for Power Uprates (SECY-02-0115) dated June 27, 2002.

Furthermore, NRR staff have developed a *Communication Plan for the Power Uprate Program* outlining the staff's communication strategies for power uprates, specifically:

- Key messages and other information related to power uprates are communicated to all stakeholders; and

- Information is communicated clearly, accurately, and in a timely manner.

Power Uprate Program is Missing Some Key Elements to Ensure Program Success

The power uprate program is missing some of the key elements that could help ensure program success. For example, the uprate program does not have a formalized mission statement, defined roles and responsibilities for headquarters and regional points of contact, and adequate communication and knowledge management tools.

Mission, Roles, and Responsibilities Not Defined

The power uprate program does not have a formalized mission statement. While the Generic Communication and Power Uprate Branch (the Branch) has a functional statement posted to its NRC intranet Web page, it is a generic statement of responsibilities for the entire Branch. It states that the Branch "provides project management for programs, projects, processes, and other tasks that are beyond the scope of plant-specific licensing issues." In addition to power uprates, the Branch coordinates the Generic Safety Issues Program; the 10 CFR 50.109 Backfit Process; the Operability Determination Process; and NRR coordination of the NRR Pandemic Response Plan. The statement does not offer much insight into the possible coordinating or oversight functions of the Branch with regard to power uprates.

Roles and responsibilities for the Branch have not been formally identified and communicated. Staff contends that the Branch is the programmatic lead for power uprates, providing oversight and guidance for anything having to do with power uprates, yet this has not been communicated to all stakeholders. For the public and licensees, the "Power Uprates" page on NRC's Web site[15] makes no mention of a programmatic lead for the power uprate program. Nor

[15] Web site last updated as of February 28, 2008.

has the Branch adequately communicated its roles and responsibilities to NRC staff. In fact, a number of NRC staff are unaware that the Branch exists. Those staff who are aware of the Branch have widely varying understandings of the Branch's roles and responsibilities. For example, some project managers believe the role of the Branch is to be the focal point for all power uprates while ensuring consistency between reviews, whereas others see the Branch as a scheduler with the role of tracking application review hours. Some of the roles for the Branch that internal stakeholders desired or already believed to exist, included:

- monitoring all power uprate activities,
- providing formal communication guidance on how to communicate with the power uprate branch,
- helping project managers communicate with other NRR branches during the application process,
- assisting staff with questions on completing the amendment process,
- communicating lessons learned on power uprate issues, and
- documenting and disseminating power uprate changes.

Of note, some of these functions are those that the Branch already performs or has stated an intention to perform, but has not clearly defined and communicated throughout the agency.

Prior to OIG's review, most of the regional offices had not identified power uprate program leads and formally defined and communicated their roles and responsibilities. NRR officials stated that each region has a designated power uprate lead identified on regional Web sites, yet a technical inspection contact was noted on only one regional Web site. Furthermore, three of the four regions acknowledged that, prior to OIG's review, they did not have a formal power uprate point of contact. OIG noted that a manager in one of the regions identified a contact for power uprates, yet the staff member appointed was unaware that they were the point of contact. The region with a technical point of contact stated that they provide coordination and oversight for power uprates, educate staff on power uprates, and provide counsel to resident inspectors. Other regions, however, consider their newly identified points of contact's roles and responsibilities as informal or non-structured.

Communication and Knowledge Management Tools Not Adequate

Project managers do not have adequate communication and knowledge management tools to support the variety of functions and breadth of knowledge for which they have responsibility. Currently, NRR project managers share information with each other largely on an *ad hoc* basis.

Managing information and knowledge among NRR's 48 different project managers is a critically important function. Many external and internal power uprate stakeholders are dependent on the project manager as a conduit of information. For example, the project manager is the licensee's primary point of contact with NRC headquarters. Technical reviewers in NRR funnel their questions and requests for additional information from the licensee through the project manager. Similarly, the project manager serves as headquarters' primary point of contact for region staff, who generally become aware of issues being reviewed by NRR's technical reviewers through the project manager. Furthermore, the perceived effectiveness of a project manager can be tied to his or her experience or knowledge. A resident inspector located at an uprated plant, for example, noted differences in the quality of the communications and coordination effort provided by different project managers.

Currently, project managers engage in information sharing and knowledge management by word of mouth. This practice is dependent on project managers turning to their peers to fill gaps in their own knowledge and experience. For less experienced project managers, or those who are assigned a plant for which they have little knowledge, these project managers have the challenge of mastering a wide variety of licensing and technical issues associated with a given plant. Some project managers acknowledged that the current information sharing and knowledge management process is not very structured, and that less experienced project managers are at a disadvantage in obtaining this information.

Power Uprate Program Lacks an Authoritative Coordinating Entity

The power uprate program is missing some key program elements, in part, because the agency does not have an authoritative coordinating entity to oversee all aspects of power uprate activities. In 2002, the Executive Director for Operations wrote to the Commission that NRR adopted enhanced management oversight by assigning a Senior Executive Service manager to be responsible for all aspects of the power uprate licensing process. Instead, the agency today has a lead project manager for power uprates located within

the Generic Communication and Power Uprate Branch in NRR. The Branch provides power uprate updates to NRC management, and claims to provide power uprate review guidance to project managers with plants that have applied for a power uprate, as well as direction and support to staff reviewing power uprate applications. However, the Branch does not direct program activities for all aspects of the power uprate licensing process. For example, the Branch does not operate in an authoritative capacity to proactively provide direction and support to staff contributing to power uprate reviews, which was corroborated by project managers and staff.

In providing a strengthened power uprate coordinating entity, the agency could better manage, oversee, and facilitate improvements in the entire power uprate program. This would help ensure that uprate policies and procedures are in place, roles and responsibilities are defined, and issues communicated, and help ensure that staff has access to adequate documentation and knowledge management tools.

Program Stakeholders Are Left Without Direction and Oversight

Without an authoritative coordinating entity, power uprate program internal stakeholders are left without clear direction and oversight. NRR branches are hierarchically organized into separate directorates and divisions, with no authoritative coordinating entity, other than the NRR Director, to attend to the details of the power uprate program. Appendix C illustrates the branches involved in a recent power uprate safety evaluation published by the agency in March 2007.

NRR's organizational arrangement requires clarification of the roles and responsibilities of the various program participants. It is quite possible that the Generic Communication and Power Uprate Branch is serving the purpose it was intended by agency managers. Yet, there are inconsistent understandings among the staff with regard to the purpose and role of the Branch. In any case, it does not appear that the Branch has a managerial or directional role for promulgating policies to coordinate efforts among different power uprate stakeholders.

Without an authoritative coordinating entity, NRR staff are left to troubleshoot power uprate-related organizational and managerial challenges that they encounter. This is evident in the way that project managers share information on an *ad hoc* basis, and has the effect of leaving knowledge management to

chance. An authoritative coordinating entity would improve the staff's efficiency and effectiveness in other areas as well. For example, it could have:

- ensured consistency in the staff's interpretation and use of IP 71004;
- ensured implementation of a tool or documenting procedure that could have helped NRC staff and the public find power uprate-related inspection results with ease;
- provided enhanced direction and training to staff to address the quality of written inputs to the safety evaluation; and
- provided management controls to ensure that key results of the safety evaluation were communicated to all power uprate stakeholders.

Management attention to the program weaknesses presented in this report could help minimize future challenges to agency managers and staff.

RECOMMENDATIONS:

OIG recommends that the Executive Director for Operations:

6. Strengthen and communicate the coordinating authority of the Power Uprate and Generic Communications Branch or assign a coordinating authority to be responsible for all aspects of power uprate activities.

7. Identify and communicate roles and responsibilities for headquarters and regional points of contact for power uprates.

8. Develop a tool for project managers to share and record information, monitor trends, and capture best practices and lessons learned.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

OIG recommends that the Executive Director for Operations:

1. Revise IP 71004 to provide more specificity with regard to the use of the inspection procedure.

2. Provide cross-references from baseline and other inspection procedures that are called for in IP 71004.

3. Document or index cumulative IP 71004 and other uprate-related inspection activities in a centralized location or in an easily retrievable way so that internal and external stakeholders can easily find the results.

4. Develop training for technical reviewers and project managers that is specifically focused on writing or contributing to a safety evaluation.

5. Implement internal controls to ensure communication of the safety evaluation, highlighting the recommended areas of inspection and regulatory commitments sections to the regions and resident inspectors.

6. Strengthen and communicate the coordinating authority of the Power Uprate and Generic Communications Branch or assign a coordinating authority to be responsible for all aspects of power uprate activities.

7. Identify and communicate roles and responsibilities for headquarters and regional points of contact for power uprates.

8. Develop a tool for project managers to share and record information, monitor trends, and capture best practices and lessons learned.

Appendix A

SCOPE AND METHODOLOGY

The overall objective of this audit was to examine the process for reviewing and approving power uprate amendment applications. However, this audit did not examine the technical content of the staff's final safety evaluations for power uprates. Given that extended power uprates require significant plant modifications, OIG focused the bulk of its audit on extended power uprates. To address the audit objective, OIG reviewed power uprate Inspection Procedure 71004, the development and distribution of the safety evaluation, and the extent to which the power uprate activities have been coordinated to ensure program efficiencies. Additionally, OIG analyzed program documents, and reviewed relevant management controls, related documentation from internal and external sources, and Federal guidance. Some of the key documents reviewed include:

- *Code of Federal Regulations*, Title 10, Part 50
- NRR *Communication Plan for the Power Uprate Program*
- NRR *Division of Operating Reactor Licensing Handbook*, *Review Standard for Extended Power Uprates* (RS-001), and other NRR guidance
- Inspection Manual Chapter 2515, Appendix C, *Special and Infrequently Performed Inspections*
- Inspection Procedure 71004, *Power Uprate*
- NUREG 0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants*
- Management Directive 6.8, *Lessons-Learned Program*
- Quarterly Inspection Plans for each plant that had received or applied for an extended power uprate from up to 6 quarters before a power uprate application was approved
- Inspection Reports for each plant that had received or applied for an extended power uprate from 1 to 2 years before the plant submitted its power uprate application until mid-2007

Auditors also conducted interviews with more than 75 agency and industry individuals including NRC senior managers and staff from headquarters, the regions, and the plants; OGC and Advisory Committee on Reactor Safeguards (ACRS); and industry representatives and plant personnel.

OIG conducted this audit between March 2007 and October 2007 in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient,

appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Major contributors to this report are Sherri Miotla, Team Leader; RK Wild, Audit Manager; Dan Livermore, Technical Advisor; Eric Rivera, Senior Auditor; and Andrea Ferkile, Management Analyst.

Appendix B

NRC LETTERS TO PUBLIC EMPHASIZING IMPORTANCE OF IP 71004

- Letter from the NRC Executive Director for Operations to the Honorable Patrick Leahy of the United States Senate, February 20, 2004

- Letters from the NRC Executive Director for Operations to the Honorable Patrick Leahy and the Honorable James Jeffords of the United States Senate, March 29, 2004

- Letter from the NRC Chairman to Michael Dworkin, Chairman of the Vermont Public Service Board, May 4, 2004

- Letter from the Director, Project Directorate I, Division of Licensing Project Management in NRR to Mr. Theodore Lewis, member of The Town of Wendell Selectboard, May 20, 2004

- Letter from the Director, Project Directorate I, Division of Licensing Project Management in NRR to Ms. Mariel Kinsey, May 27, 2004

- Letter from the Director of NRR to Mr. David Lochbaum, Nuclear Safety Engineer, Union of Concerned Scientists, July 12, 2004

- Letters from the NRC Executive Director for Operations to The Honorable Christopher Donelan, the Commonwealth of Massachusetts House of Representatives; The Honorable Stan Rosenberg, Commonwealth of Massachusetts Senate; The Honorable Andrea Nuciforo, Commonwealth of Massachusetts Senate; The Honorable Denis Guyer, Commonwealth of Massachusetts House of Representatives; The Honorable Stephen Kulik, Commonwealth of Massachusetts House of Representatives; and The Honorable Daniel Bosley, Commonwealth of Massachusetts House of Representatives,
  April 27, 2006

- Letter from the NRC Chairman to Congressman Maurice Hinchey, February 15, 2007

- Letter from the NRC Chairman to the Honorable Eliot Spitzer, Governor of New York, June 28, 2007

- Letter from the Director of NRR to Mr. Ned Sullivan, President of Scenic Hudson, Inc., July 2, 2007

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Appendix C

NRR ORGANIZATION CHART

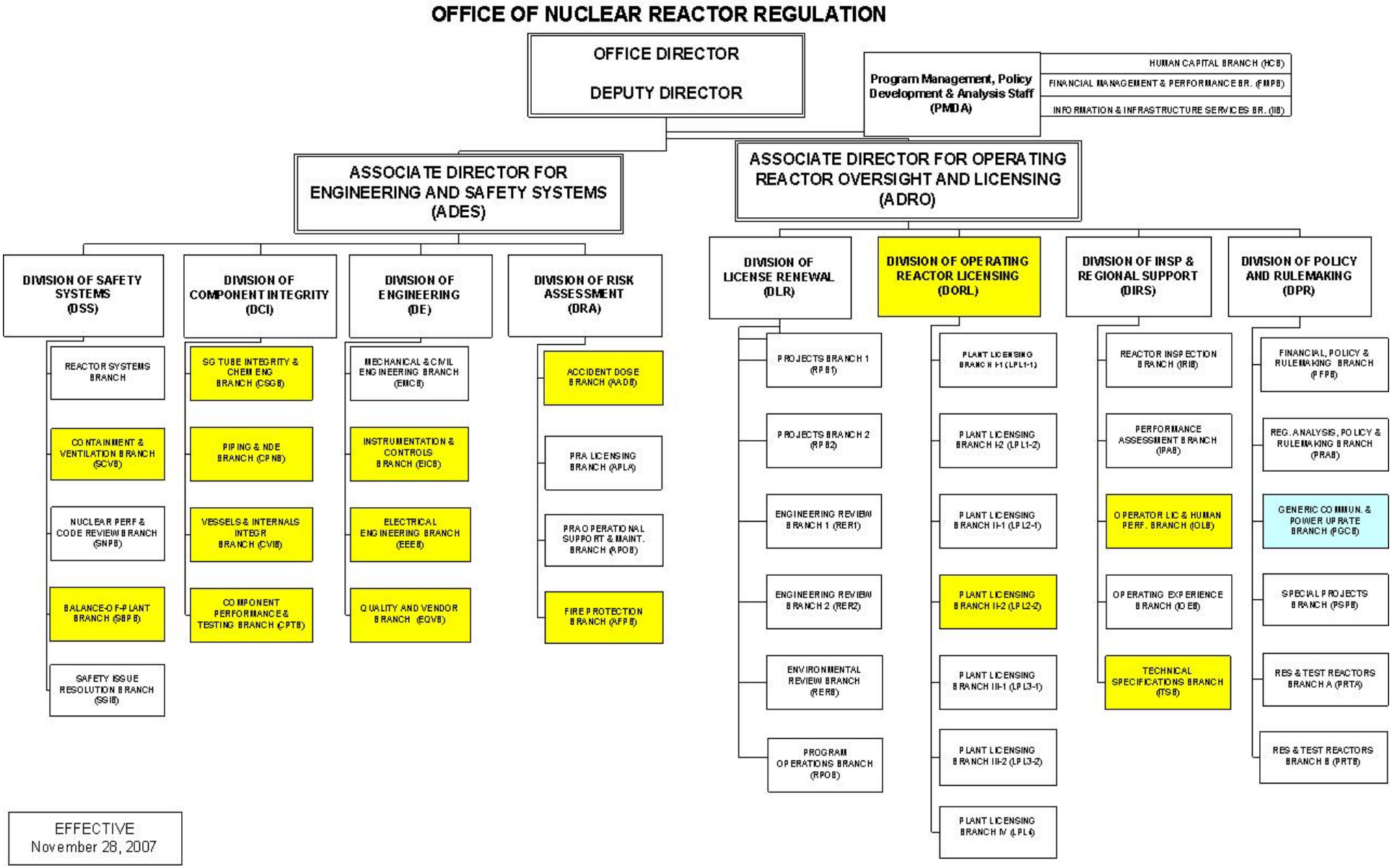
The chart on the following page depicts NRR's divisional and branch organization as of November 28, 2007. Note that the Generic Communication and Power Uprate Branch is designated in blue on the chart. The organizations designated in yellow on the chart were those that concurred on one of the agency's recent power uprate safety evaluations; specifically, for Browns Ferry Unit 1 in March 2007. Three additional branches concurred on the safety evaluation that are not shown on the current NRR organizational chart in the same name format.[16] They are:

- SBWB, the Boiling Water Reactor Systems Branch;
- IHPB, the Health Physics Branch; and
- EEMB, the Engineering Mechanics Branch.

The above illustrates that organizational consolidations and name changes have occurred since NRR's Review Standard for Extended Power Uprates (RS-001) was published in December 2003. In fact, RS-001 has not been revised to reflect any of NRR's organizational changes since that time.[17] Of the eight branches specified for having review responsibility in RS-001, only one branch appears to exist in the same form within the NRR organization today.

[16] The applicable region and resident inspectors are also stakeholders on a given power uprate. However, NRC concurrence process for the Safety Evaluation does not currently include these stakeholders.

[17] An internal NRR February 2006 memo titled "Power Uprate Review Guidance" provides a table showing anticipated number of hours for a power uprate review arranged by technical branch, based on NRR's organization at that time.


OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE DIRECTOR
DEPUTY DIRECTOR
Program Management, Policy Development & Analysis Staff (PMDA)
HUMAN CAPITAL BRANCH (HCB)
FINANCIAL MANAGEMENT & PERFORMANCE BR. (FMPB)
INFORMATION & INFRASTRUCTURE SERVICES BR. (IIB)
ASSOCIATE DIRECTOR FOR ENGINEERING AND SAFETY SYSTEMS (ADES)
ASSOCIATE DIRECTOR FOR OPERATING REACTOR OVERSIGHT AND LICENSING (ADRO)
DIVISION OF SAFETY SYSTEMS (DSS)
REACTOR SYSTEMS BRANCH
CONTAINMENT & VENTILATION BRANCH (SCVB)
NUCLEAR PERF & CODE REVIEW BRANCH (SNPB)
BALANCE-OF-PLANT BRANCH (SBPB)
SAFETY ISSUE RESOLUTION BRANCH (SSIB)
DIVISION OF COMPONENT INTEGRITY (DCI)
SG TUBE INTEGRITY & CHEM ENG BRANCH (CSGB)
PIPING & NDE BRANCH (CPNB)
VESSELS & INTERNALS INTEGR BRANCH (CVIB)
COMPONENT PERFORMANCE & TESTING BRANCH (CPTB)
DIVISION OF ENGINEERING (DE)
MECHANICAL & CIVIL ENGINEERING BRANCH (EMCB)
INSTRUMENTATION & CONTROLS BRANCH (EICB)
ELECTRICAL ENGINEERING BRANCH (EEEB)
QUALITY AND VENDOR BRANCH (EQVB)
DIVISION OF RISK ASSESSMENT (DRA)
ACCIDENT DOSE BRANCH (AADB)
PRA LICENSING BRANCH (APLA)
PRA OPERATIONAL SUPPORT & MAINT. BRANCH (APOB)
FIRE PROTECTION BRANCH (AFPB)
DIVISION OF LICENSE RENEWAL (DLR)
PROJECTS BRANCH 1 (RPB1)
PROJECTS BRANCH 2 (RPB2)
ENGINEERING REVIEW BRANCH 1 (RER1)
ENGINEERING REVIEW BRANCH 2 (RER2)
ENVIRONMENTAL REVIEW BRANCH (RERB)
PROGRAM OPERATIONS BRANCH (RPOB)
DIVISION OF OPERATING REACTOR LICENSING (DORL)
PLANT LICENSING BRANCH I-1 (LPL1-1)
PLANT LICENSING BRANCH I-2 (LPL1-2)
PLANT LICENSING BRANCH II-1 (LPL2-1)
PLANT LICENSING BRANCH II-2 (LPL2-2)
PLANT LICENSING BRANCH III-1 (LPL3-1)
PLANT LICENSING BRANCH III-2 (LPL3-2)
PLANT LICENSING BRANCH IV (LPL4)
DIVISION OF INSP & REGIONAL SUPPORT (DIRS)
REACTOR INSPECTION BRANCH (IRIB)
PERFORMANCE ASSESSMENT BRANCH (IPAB)
OPERATOR LIC & HUMAN PERF. BRANCH (IOLB)
OPERATING EXPERIENCE BRANCH (IOEB)
TECHNICAL SPECIFICATIONS BRANCH (ITSB)
DIVISION OF POLICY AND RULEMAKING (DPR)
FINANCIAL, POLICY & RULEMAKING BRANCH (PFPB)
REG. ANALYSIS, POLICY & RULEMAKING BRANCH (PRAB)
GENERIC COMMUN. & POWER UPRATE BRANCH (PGCB)
SPECIAL PROJECTS BRANCH (PSPB)
RES & TEST REACTORS BRANCH A (PRTA)
RES & TEST REACTORS BRANCH B (PRTB)
EFFECTIVE
November 28, 2007

Appendix D

FORMAL AGENCY COMMENTS

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 24, 2008

MEMORANDUM TO: Stephen D. Dingbaum
Assistant Inspector General for Audits
Office of the Inspector General

FROM: Luis A. Reyes
Executive Director for Operations

SUBJECT: COMMENTS ON DRAFT REPORT: "AUDIT OF NRC'S POWER UPRATE PROGRAM"

This is in response to your March 11, 2008, memorandum transmitting the Office of the Inspector General's (OIG) Draft Audit Report, "Audit of NRC's Power Uprate Program." I appreciate the time spent by the OIG staff in observing and evaluating the operating reactor power uprate program and the OIG's recommendations for improving the program.

The NRC has a strong, safe, and very successful power uprate program. The technical and legal reviews of the final safety evaluations that are issued with approved power uprates include an independent technical review by the Advisory Committee on Reactor Safeguards (for extended power uprates), a legal review by the Office of General Counsel, and a review by agency management. The resulting high-quality final safety evaluations, coupled with the extensive inspections performed by regional inspectors, provide a high level of confidence that public health and safety are protected. The staff has approved 118 power uprates to date with approximately 30 years of operating experience, and have had no significant safety problems.

The NRC staff has carefully reviewed the three findings and the eight specific recommendations presented in the draft report. The staff generally agrees with the report findings and six of the eight recommendations. Staff agrees with the six recommendations listed below:

- Recommendation 1, to enhance Inspection Procedure (IP) 71004 to provide more specificity.
- Recommendation 3, to enhance tracking of IP 71004 or other power uprate-related inspection activities so internal and external stakeholders can more easily retrieve the results.
- Recommendations 5, 6, and 7, to ensure communication of the safety evaluation, investigate plans to strengthen the coordination of all aspects of power uprate activities, and communicate roles and responsibilities for headquarters and regional points of contact for power uprates.

CONTACT: Thomas Alexion, NRR/DPR
(301) 415-1326

S. Dingbaum -2-

- Recommendation 8, to explore development of a community-of-practice website to support Project Managers with power uprate knowledge transfer.

Regarding Recommendation 2, revisions to the baseline and other inspection procedures are not needed to cross-reference back to IP 71004. Planned enhancements to IP 71004 coupled with strengthened coordination of all aspects of power uprate activities (Recommendation 6), will enhance coordination of power uprate-related inspection activities.

Recommendation 4 pertains to training on writing a safety evaluation. Training for this task already exists, but the staff believes this training can be enhanced.

Again, I appreciate your efforts to review our power uprate activities and for the opportunity for us to comment on your report. In addition, staff review concluded that the draft report does not contain any sensitive unclassified information.

cc: B. Mallett, DEDR
V. Ordaz, AO
J. Wiggins, NRR

Appendix E

OIG ANALYSIS OF AGENCY COMMENTS

OIG met with managers from the Office of Nuclear Reactor Regulation on February 6, 2008, and again during an exit meeting on February 22, 2008, to address agency concerns with a draft of this report. OIG modified the report as appropriate in response to comments made by agency officials. On March 24, 2008, the Executive Director for Operations provided a formal response to this report, in which the agency generally agrees with the report findings and six of the eight recommendations. The agency commented on the following two recommendations:

- Recommendation 2: Provide cross-references from baseline and other inspection procedures that are called for in IP 71004.

- Recommendation 4: Develop training for technical reviewers and project managers that is specifically focused on writing or contributing to a safety evaluation.

Below is OIG's analysis of the agency's formal written comments.

NRC Comments

Regarding recommendation 2, revisions to the baseline and other inspection procedures are not needed to cross-reference back to IP 71004. Planned enhancements to IP 71004 coupled with strengthened coordination of all aspects of power uprate activities (Recommendation 6), will enhance coordination of power uprate-related inspection activities.

OIG Response

The Office of the Inspector General (OIG) agrees that revising IP 71004 and strengthening the coordinating aspect of power uprate activities should enhance power uprate-related inspection efforts. However, the purpose of this recommendation is to increase awareness of IP 71004 among NRC inspectors, particularly those in the regions and located at the plants. Based on the analysis provided in this report, OIG concludes that providing cross-references from baseline and other inspection procedures that are called for in IP 71004 would significantly enhance awareness of the procedure among the NRC inspector community.

Recommendation 4 pertains to training on writing a safety evaluation. Training for this task already exists, but the staff believes this training can be enhanced.

OIG Response
In the report, OIG acknowledged that the agency has some training available in the form of mentoring partnerships and a qualification program for NRR staff, but that this training does not focus specifically on writing the safety evaluation. Therefore, OIG agrees with the agency that this training can be enhanced, and the recommendation is provided to the agency as a way to enhance the training by addressing the shortcomings specifically identified by OIG in its finding.