OFFICE OF THE INSPECTOR GENERAL

U.S. NUCLEAR REGULATORY COMMISSION

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Audit of NRC's Process for Modifying and Communicating *Standard Technical Specifications*

OIG-18-A-15

June 18, 2018

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

OFFICE OF THE
INSPECTOR GENERAL

June 18, 2018

MEMORANDUM TO: Victor M. McCree
Executive Director for Operations

FROM: Dr. Brett M. Baker ***/RA/***
Assistant Inspector General for Audits

SUBJECT: AUDIT OF NRC'S PROCESS FOR MODIFYING AND COMMUNICATING *STANDARD TECHNICAL SPECIFICATIONS* (OIG-18-A-15)

Attached is the Office of the Inspector General's (OIG) audit report titled *Audit of NRC's Process for Modifying and Communicating Standard Technical Specifications*.

The report presents the results of the subject audit. Following the June 11, 2018, exit conference, agency staff indicated that they had no formal comments for inclusion in 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 followup 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 (301) 415-5915 or Paul Rades, Team Leader, at (301) 415-6228.

Attachment: As stated

Office of the Inspector General

U.S. Nuclear Regulatory Commission
Defense Nuclear Facilities Safety Board

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Results in Brief

Why We Did This Review

Technical specifications are part of a Nuclear Regulatory Commission (NRC) license authorizing the operation of a nuclear production or utilization facility. The *Standard Technical Specifications* are guidance for modifying the approved nuclear power plant's operating license in accordance with Section 36 of Part 50 of Title 10 of the *Code of Federal Regulations*, "Technical specifications" (10 CFR 50.36).

The *Standard Technical Specifications* are published for each of the reactor types in a set of NUREG-series publications. NRC modifies the *Standard Technical Specifications* through a process initiated by the industry-sponsored Technical Specifications Task Force, which submits proposed changes to NRC. The submissions are referred to as Travelers.

The audit objective was to assess the effectiveness and efficiency of NRC's process for modifying *Standard Technical Specifications* and communicating these modifications to staff and licensees.

Audit of NRC's Process for Modifying and Communicating Standard Technical Specifications

What We Found

NRC generally modifies *Standard Technical Specifications* in an efficient and effective manner. However, NRC's *Standard Technical Specification* modification process could be strengthened in the following areas:

- Implementation of structured knowledge management practices to fully implement knowledge sharing practices directed at succession planning, training, and guidance for the Traveler modification process. Establishing a more structured approach to knowledge management would reduce the risk of regulatory inconsistency and inefficiency.

- Implementation of quality assurance measures for Traveler data in the Replacement Reactor Program System—Licensing Module to prevent staff hour discrepancies and billing misallocations. NRC is taking corrective action to address the staff hour discrepancies and billing misallocations, however, these actions are not yet complete.

What We Recommend

This report makes eight recommendations to strengthen Technical Specifications Branch knowledge management practices and enhance quality assurance measures for program data.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

NRC	Nuclear Regulatory Commission
OIG	Office of the Inspector General
TSTF	Technical Specifications Task Force

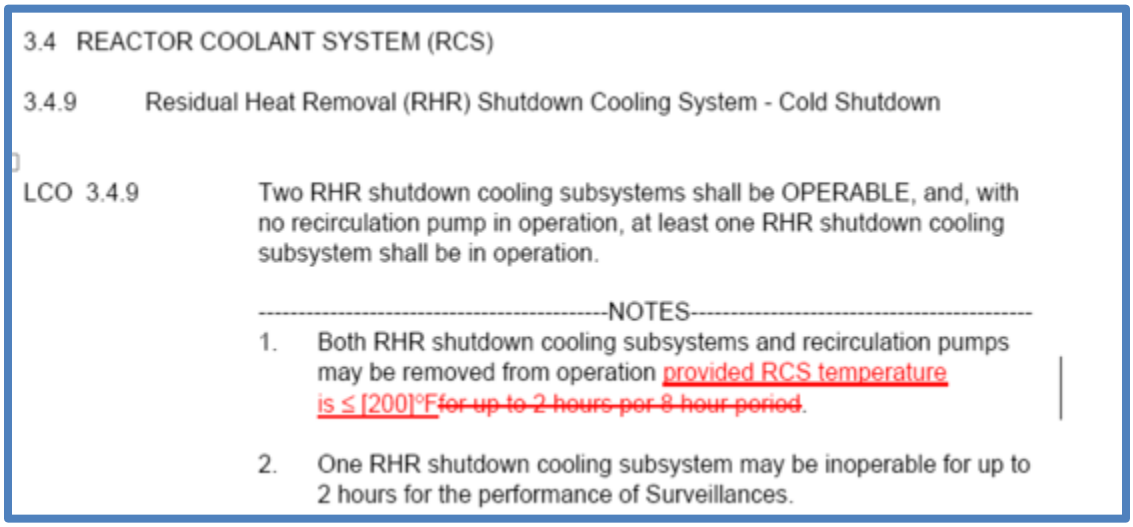
I. BACKGROUND

Technical specifications are part of an NRC license authorizing the operation of a nuclear production or utilization facility. An operating plant's technical specifications establish requirements for items such as safety limits, limiting safety system settings, limiting control settings, limiting conditions for operation, surveillance requirements, design features, and administrative controls, and are typically Appendix A of the NRC-approved operating license.

The *Standard Technical Specifications* are guidance for modifying the approved operating license. S*tandard Technical Specifications* are published for each of the reactor types in a set of NUREG-series publications. The *Standard Technical Specifications* clarify the content and form of requirements necessary to ensure safe operation of nuclear power plants in accordance with Section 36 of Part 50 of Title 10 of the Code of Federal Regulations, "Technical specifications" (10 CFR 50.36).

NRC modifies the *Standard Technical Specifications* as necessary improvements are identified. The process used to initiate changes to the *Standard Technical Specifications* involves the industry-sponsored Technical Specifications Task Force, which submits proposed changes to NRC for review, approval, and subsequent incorporation into revisions of the *Standard Technical Specifications*. The submissions are frequently referred to as TSTF Travelers, and in this report, Traveler(s). NRC reviews a submitted Traveler, with the end product being a model application, a model safety evaluation, and a review plan that licensees may use in license amendment requests. Figure 1 shows an example of a Traveler, with the requested change stricken in red.

Figure 1: Example Traveler for Residual Heat Removal Shutdown Cooling System



3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown

LCO 3.4.9 Two RHR shutdown cooling subsystems shall be OPERABLE, and, with no recirculation pump in operation, at least one RHR shutdown cooling subsystem shall be in operation.

----------NOTES----------

1. Both RHR shutdown cooling subsystems and recirculation pumps may be removed from operation provided RCS temperature is ≤ [200]°F ~~for up to 2 hours per 8 hour period~~.

2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for the performance of Surveillances.

Source: Office of Nuclear Reactor Regulation Office Instruction LIC-600, *Review of Technical Specifications Task Force (TSTF) Travelers and Creation of "CLIIP" Model Applications*.

NRC Oversight

The Technical Specifications Branch within NRC's Office of Nuclear Reactor Regulation, Division of Safety Systems, is responsible for the implementation, interpretation, and development of plant technical specifications. The Technical Specifications Branch consists of 12 full-time equivalent staff who provide project management for technical specification development activities. Staff include management officials, project managers, and technical reviewers who review and approve Travelers.

Role of Industry

Managed by EXCEL Services Corporation, the Owners Group Technical Specifications Task Force is the focal point for industry interaction with NRC on generic technical, regulatory, and compliance issues related to Technical Specifications. The Technical Specifications Task Force is an industry group consisting of representatives from the Boiling Water Reactor Owners Group, the Pressurized Water Reactor Owners Group/Westinghouse, the Pressurized Water Reactor Owners Group/Combustion Engineering, and the Pressurized Water Reactor Owners Group/Babcock & Wilcox. NRC and the Technical Specifications Task Force meet and communicate to address Travelers, as well as other Technical Specifications-related issues.

Traveler Review Process

The Traveler review process begins when the Technical Specifications Task Force submits proposed Travelers, which are subject to a 60-day acceptance review period by NRC. If accepted, the proposed Traveler will be reviewed by management officials, project managers, and technical reviewers in the Technical Specifications Branch and other NRC technical offices, as needed. Travelers are usually approved within 1 year. If there are technical questions with the proposed modification, NRC and the Technical Specifications Task Force work together to address those issues. In most cases, the proposed Traveler will be modified or, in some instances, withdrawn by the Technical Specifications Task Force if questions cannot be resolved. Once approved, NRC posts the Traveler in the *Federal Register* as a Federal Register Notice and licensees can then use the Traveler to modify their existing plant license in a License Amendment Request.

Traveler Review Work

Since 1992, NRC has approved 340 Travelers. As of October 24, 2017, the Technical Specifications Branch workload included 11 Travelers in various stages of dispositioning. Of these 11 Travelers, 5 Travelers were active, meaning the Travelers were undergoing the standard review process, and 6 had issues requiring additional work, including those that were previously approved, under review, and/or temporarily suspended.

Staff Guidance and Work Management Tools

The primary staff guidance for the Traveler modification process is LIC-600. According to NRC management, LIC-600 also serves as the Technical Specifications Branch's communication plan and knowledge management tool for the process.

To manage the Traveler modification process, staff use NRC systems for work planning, time and labor reporting, and financial reporting tasks. Branch staff use the Replacement Reactor Program System—Licensing Module for program planning and monitoring. Staff also use the Human Resources Management System, which is NRC's time and labor system. Until May 31, 2018, the Replacement Reactor Program System—Licensing Module used Central Reporting Information System data feed for actual labor hours. Traveler review and approval fees are billed to the Technical Specifications Task Force using data from NRC's core ledger system, the Financial and Accounting Integrated Management Information System.

II. OBJECTIVE

The audit objective was to assess the effectiveness and efficiency of NRC's process for modifying *Standard Technical Specifications* and communicating these modifications to staff and licensees. The report appendix contains information on the audit scope and methodology.

III. FINDINGS

NRC generally modifies *Standard Technical Specifications* in an efficient and effective manner. However, NRC could strengthen the program's internal and external communications, as well as its internal controls, by implementing (a) structured knowledge management practices and (b) quality assurance measures for program data.

A. Knowledge Management Practices Could Be Strengthened

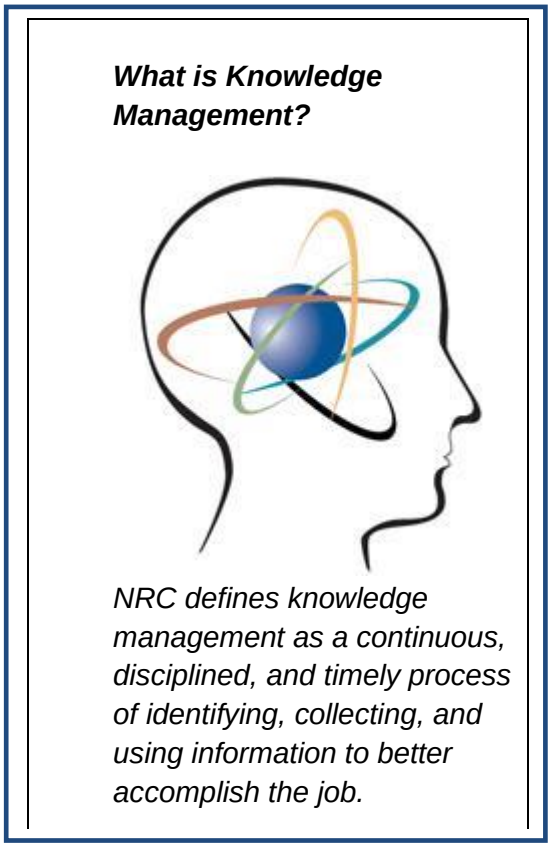
Federal agencies are required to define succession plans, capture critical knowledge from employees, and institutionalize knowledge sharing practices as part of their daily operations. However, Technical Specifications Branch management has not established a structured approach to knowledge management that fully captures critical knowledge from employees. Additionally, the Technical Specifications Branch has not fully implemented knowledge sharing practices for succession planning, training, and guidance for the Traveler modification process. A more structured approach to knowledge management has not been established because the Technical Specification Branch management considers knowledge management a lower priority relative to other mission-essential tasks. Establishing a more structured approach to knowledge management would reduce the risk of regulatory inconsistency and inefficiency.

What Is Required

Knowledge Management Implementation Requirements

In accordance with Federal and agency guidance, management should implement structured knowledge management practices. The Government Accountability Office's *Standards for Internal Control in the Federal Government* emphasizes management should define succession plans for key roles, train succession candidates, and implement processes to enable knowledge sharing with the succession candidate organization. Human Capital Strategy 3 contained in the *NRC Strategic Plan FYs 2014-2018* is to, "Improve knowledge management by identifying and capturing critical knowledge from employees, transferring critical knowledge to those who need it now, and making critical knowledge accessible for the future." Further, *NRC Knowledge Management Program*, SECY-06-0164, states the NRC policy for generating, capturing, and transferring knowledge when staff changes occur is primarily through staff training, mentoring and guidance.

Figure 2: NRC's Definition of Knowledge Management



Source: NRC Internal Website.

What We Found

Unstructured Knowledge Management Approach

Contrary to Federal internal control guidance and agency policy, the Technical Specifications Branch has not established a structured approach to knowledge management that adequately addresses succession planning, training, and guidance.

Succession Planning

Technical Specifications Branch succession planning is not consistently implemented. Although the current project manager has had an assigned backup since January 2017, and a succession candidate since March 2018, new staff are not consistently being prepared to take over operational roles. For example, new technical reviewers were not made aware of the Traveler review documentation that justified the approval decisions for previously approved Travelers. The project manager and alternate are the staff who coordinate work between NRC and the Technical Specifications Task Force. These staff may soon be eligible for retirement. Additionally, some staff may be assigned to rotations elsewhere within the agency. Staff characterized these succession planning and knowledge management efforts as inadequate.

Training

The Technical Specifications Branch has not fully implemented knowledge management training material. In April 2018, the Technical Specifications Branch staff finalized Division of Safety Systems, Office of Nuclear Reactor Regulation, *Technical Specification Knowledge Management Materials*, but staff never fully adopted it. Three, more experienced, Technical Specifications Branch staff recalled seeing the draft knowledge management training material. However, they thought it would be helpful to newer staff, but not for themselves. Upon full implementation, the draft knowledge management guidance would augment other risk-informed[1]

[1] The risk-informed approach to regulatory decision-making represents a philosophy whereby risk insights are considered together with other factors to establish requirements that better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety.

decision-making initiatives related to Traveler review, including, TSTF-505, Revision 1, *Provide Risk Informed Extended Completion Times-RITSTF [Risk-Informed TSTF] Initiative 4B*, approved on March 15, 2012 (77 FR 15399).

Guidance

The Technical Specifications Branch has not finalized LIC-600, which is the primary Traveler process guidance. The revised LIC-600 guidance would provide an expanded discussion of the Traveler modification processes. As of May 2018, agency management indicated that the revised guidance was close to being issued.

The LIC-600 revisions are important to knowledge management because the current LIC-600 guidance excludes key Traveler process information. For example, staff emphasized the need for revised LIC-600 guidance because it addresses suspension of approved Travelers, the disposition of problems with approved Travelers, identification of required concurrences on Travelers that affect license amendments, and clarification on requesting additional information.

Why This Occurred

Knowledge Management Is a Lower Mission Priority

Technical Specifications Branch management characterized knowledge management for Travelers as a lower priority relative to other mission-essential tasks. Agency management emphasized that implementation of the revised LIC-600 supports knowledge management within the Technical Specifications Branch as it will address processes for dispositioning suspended Travelers, such as TSTF-505. In addition, once fully implemented, knowledge management training material will address the processes for applying risk-informed decision making principles. However, the current LIC-600 revision has taken over 24 months to complete, primarily to address processes for dispositioning suspended Travelers.

Why This Is Important

Risk of Regulatory Inconsistency and Inefficiency

Regulatory inconsistency and inefficiency occurs when staff unknowingly issue requests for additional information on matters that have already been addressed by the agency. With staff changes, experienced staff are not always available to provide clarification or justification for previous regulatory decisions. As such, unnecessary requests for additional information to industry could continue, thereby promoting the perception of NRC not regulating in an efficient manner.

NRC's use of requests for additional information has come under scrutiny in the past. For example, an NRC OIG 2015 audit report[2] cited concerns about requests for additional information, including the amount of time it took to complete the requests for additional information process, and the resources required to do so. NRC has recently established requests for additional information training, which has received positive user feedback.

Recommendations

OIG recommends that the Executive Director for Operations

1. Establish Technical Specifications Branch knowledge management requirements relative to agency and office knowledge management policy.

2. Implement Technical Specifications Branch knowledge management procedures.

3. Finalize and implement the revised LIC-600.

[2] OIG-15-A-06, *Audit of NRC's Oversight of Spent Fuel Pools,* February 10, 2015.

B. Quality Assurance Measures for Traveler Data Could Be Improved

Federal internal control guidance recommends information system controls to ensure reliability of data used to carry out agency operations. NRC guidance also has similar requirements for information quality. However, Traveler data in the Replacement Reactor Program System—Licensing Module is unreliable, as evidenced by staff hour discrepancies and billing misallocations. Data reliability weaknesses occurred because NRC did not identify Technical Specifications Branch user needs during work planning system design and did not conduct sufficient integrated systems testing before migrating agency wide systems' data. In addition, the Technical Specifications Branch lacks sufficient quality assurance oversight for staff data inputs. Although NRC is taking corrective action to address the staff hour discrepancies and billing misallocations resulting from the migration, these actions are not yet complete. As a result, unreliable data may impair program monitoring and resource management, and requires additional NRC and industry resources to identify and fix errors.

What Is Required

Information System Control To Ensure Data Reliability

Federal internal control guidance recommends information system controls to ensure reliability of data used to carry out agency operations, and NRC guidance has similar requirements for information quality.

The Government Accountability Office's *Standards for Internal Control in the Federal Government* recommends that management employ information system and control activity design quality standards for producing reliable internal information. Management should obtain relevant data from reliable internal and external sources in a timely manner based on the identified information requirements. Further, management should evaluate both internal and external sources of data for reliability to ensure the data are reasonably free from error.

NRC Management Directive and Handbook 4.4, *Enterprise Risk Management and Internal Controls,* provides agency guidance for

implementing the Federal data reliability standards. This agency guidance states that NRC must obtain, report and use reliable information for sound decision making.

What We Found

Traveler Data is Unreliable

Traveler data in the Replacement Reactor Program System—Licensing Module is unreliable as evidenced by staff hour discrepancies and billing misallocations.

Staff Hour Discrepancies

For the five active Travelers under review as of October 24, 2017, OIG identified discrepancies between Replacement Reactor Program System—Licensing Module and Central Reporting Information System interface data amounting to approximately 572 staff hours. The number of discrepancies for each Traveler varied, as illustrated in Figure 3.

Figure 3: System Staff Hour Discrepancies for Active Traveler Review

Traveler	Hours in Replacement Reactor Program System	Hours in Centralized Reporting Information System	Total Discrepancy Between Systems
TSTF-541 Add Exceptions to Surveillance Requirements When the Safety function is Being Performed	417	400	17
TSTF-563 Revise Instrument Testing Definitions to incorporate the Surveillance Frequency Control Program	55	50	5
TSTF-564 Safety Limit Minimum Critical Power Ratio (SLMCPR)	0	353	353
TSTF-565 Revise the LCO 3.0.2 and LCO 3.0.3 Bases	165	55	110
TSTF-567 Add Containment Sump TS to Address GSI - 191	150	63	87
	Total Discrepancy		572 Hours

Source: OIG analysis of agency data.

NRC reported active Traveler data and other licensing project data to stakeholders; however, staff hour data was omitted. The NRC monthly status report to a Congressional committee[3] indicated that NRC is working through the system upgrades that caused the challenges with accounting for total project hours.

Billing Misallocations

The Technical Specifications Task Force communicated to NRC that they had received incorrect invoices from NRC. In particular, the Technical Specifications Task Force identified misallocated staff hours billed on four active Travelers. The agency identified $13,281 in misallocated billing on two of the four Travelers identified by the Technical Specifications Task

[3] *Status Report on the Licensing Activities and Regulatory Duties of the U.S. Nuclear Regulatory Commission for the Reporting Period through November 2017*, to The Honorable John A. Barrasso, Chairman, Committee on Environment and Public Works, United States Senate.

Force. In context, $13,281 in misallocated billing amounts to roughly 6 percent of the estimated $216,000 total cost to review the two Travelers.

Why This Occurred

Insufficient Information System Controls To Ensure Data Reliability

Data reliability weaknesses occurred because NRC staff did not implement sufficient system design controls prior to, during, or after a major data system upgrade. To date, the agency has not yet completed corrective actions for reliable data.

In October 2017, NRC conducted the Master Data Management Program systems migration, which changed how the agency's work planning, billing, and time and labor reporting systems interface with one another. These interfaces affected Traveler staff hours and billing data. However, prior to this migration, Technical Specifications Branch and responsible system owners did not identify and communicate licensing user needs during work planning system design. In addition, the agency did not conduct sufficient integrated systems testing to identify and fix significant errors.

During the migration, the time and labor system transmitted previously deleted Traveler Cost Activity Codes back into the supporting system interfaces, thereby causing unreliable data to exist within the Replacement Reactor Program System—Licensing Module. Technical Specifications Branch staff use the Cost Activity Codes, Enterprise Project Identifiers, and docket numbers for Traveler work planning and review.

After the migration, the Technical Specifications Branch and responsible system owners did not establish sufficient quality assurance oversight processes for staff monitoring of Cost Activity Codes use, such as management checks for user error. Moreover, the agency did not establish sufficient quality assurance processes for billing verification. Such processes would have included requirements for multiple individuals to verify that correct codes are billed and sent to the Technical Specifications Task Force.

The NRC Master Data Management Executive Steering Committee is addressing the staff hour discrepancies and billing misallocations, among other issues. The Committee's corrective action plan includes tasks to address the staff hour discrepancies and billing misallocations, but these actions are not yet complete.

Why This Is Important

Unreliable Data Impairs Program Monitoring and Resource Management

Unreliable data may impair program monitoring and resource management, and requires additional NRC and industry resources to identify and fix errors. Managers need reliable Traveler review staff hours to better monitor the staff's progress and make informed decisions about resource allocation. Additionally, efforts to address misallocated billing requires resources that NRC and industry could expend on higher-priority mission-related tasks.

Recommendations

OIG recommends that the Executive Director for Operations

4. Complete corrective action on open Master Data Management Executive Steering Committee identified items that affect the Traveler modification process.

5. Identify and communicate Technical Specifications Branch Traveler modification process user needs.

6. Incorporate Technical Specifications Branch Traveler modification process user needs and terminology into work planning and relevant systems.

7. Complete implementation of quality assurance measures to address oversight of Cost Activity Code use.

8. Implement quality assurance measures to address billing verification oversight.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

OIG recommends that the Executive Director for Operations

1. Establish Technical Specifications Branch knowledge management requirements relative to agency and office knowledge management policy.

2. Implement Technical Specifications Branch knowledge management procedures.

3. Finalize and implement the revised LIC-600.

4. Complete corrective action on open Master Data Management Executive Steering Committee identified items that affect the Traveler modification process.

5. Identify and communicate Technical Specifications Branch Traveler modification process user needs.

6. Incorporate Technical Specifications Branch Traveler modification process user needs and terminology into work planning and relevant systems.

7. Complete implementation of quality assurance measures to address oversight of Cost Activity Code use.

8. Implement quality assurance measures to address billing verification oversight.

V. AGENCY COMMENTS

An exit conference was held with the agency on June 11, 2018. After reviewing a discussion draft, agency management provided comments that have been incorporated into this report, as appropriate. As a result, agency management stated their general agreement with the findings and recommendations in this report and opted not to provide formal comments for inclusion in this report.

Appendix

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The audit objective was to assess the effectiveness and efficiency of NRC's process for modifying *Standard Technical Specifications* and communicating these modifications to staff and licensees.

Scope

The audit focused on the effectiveness and efficiency of NRC's process for modifying *Standard Technical Specifications* and communicating these modifications to staff and licensees. We conducted this audit from October 2017 through April 2018 at NRC headquarters in Rockville, Maryland. Internal controls related to the audit objective were reviewed and analyzed.

Methodology

OIG reviewed relevant criteria for this audit, including

- *Atomic Energy Act of 1954, as Amended*.
- 10 *Code of Federal Regulations* 50.36, "Technical specifications."
- Government Accountability Office, *Standards for Internal Control in the Federal Government*, GAO-14-704G.
- *NRC's Principles of Good Regulation*.
- SECY-15-0135, *Annual Update of the Risk-Informed Activities Public Website.*
- LIC-101, *License Amendment Review Procedures*.
- LIC-600, *Review of Technical Specifications Task Force (TSTF) Travelers and Creation of "CLIIP" Model Applications*.
- Management Directive and Handbook 4.4, *Enterprise Risk Management and Internal Control*.

To understand NRC's process for modifying and communicating *Standard Technical Specifications*, OIG interviewed NRC management and staff, as well as industry clients and stakeholders. OIG interviewed NRC

management and staff from NRR and, in particular, staff within the Technical Specifications Branch who review and approve *Standard Technical Specifications*. OIG observed an NRC staff demonstration of the Replacement Reactor Program System—Licensing Module. OIG also analyzed data within the Replacement Reactor Program System—Licensing Module pertaining to 11 Travelers, current as of October 24, 2017. OIG also reviewed draft training documents created for knowledge management purposes within the Technical Specifications Branch. OIG attended a Technical Specifications Task Force public meeting to observe communication between the NRC and licensees on proposed Technical Specifications amendments.

Industry stakeholders at EXCEL Services Corporation provided insight on the process for modifying and communicating *Standard Technical Specifications*. OIG spoke with personnel and analyzed documentation provided for additional information regarding this topic.

We conducted this performance audit 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.

Throughout the audit, auditors considered the possibility of fraud, waste, and abuse in the program.

The audit was conducted by Paul Rades, Team Leader; Vicki Foster, Audit Manager; Timothy Wilson, Senior Management Analyst; Ebaide Esoimeme, Auditor; Curtis Browne, Auditor; and John Thorp, Senior Technical Advisor.

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COMMENTS AND SUGGESTIONS

If you wish to provide comments on this report, please email OIG using this link.

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