



# Capacity Assessment

For Statistics, Research,  
Evaluation, and Other Analysis  
Fiscal Year 2023

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## ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC or the agency) is an independent agency established by the Energy Reorganization Act of 1974, which began operations in 1975 as a successor to the Atomic Energy Commission. The NRC is required by the Foundations for Evidence-Based Policymaking Act of 2018 to generate a capacity assessment, which is an accounting of the NRC's capacity to carry out the evidence-building activities needed to meet its mission-related functions (i.e., to license and regulate the Nation's civilian use of radioactive materials, to provide for the reasonable assurance of adequate protection of public health and safety, and to promote the common defense and security and to protect the environment) and its general capacity to disseminate and use evidence. This capacity assessment relies on a structured, iterative approach for assessing and building the agency's capacity (e.g., staffing, funding, infrastructure, and processes) to carry out evidence-building activities (e.g., analysis, research, and evaluation) necessary to support agency functions. The purpose of this approach is to identify areas where new or different investments could strengthen or improve the agency's ability to meet its mission and strategic goals. The current year, Fiscal Year (FY) 2023, marks the NRC's second annual capacity assessment, which builds on the 27 findings documented in FY 2022 and identifies new areas of focus related to the NRC's capacity for evidence-building activities. The FY 2023 Capacity Assessment identifies five new crosscutting findings, as well as associated mitigating strategies, that represent opportunities to enhance the NRC's ability to perform evidence-building activities to support associated key agency functions.



# CAPACITY BUILDING

# TABLE OF CONTENTS

ABSTRACT .....	iii
TABLE OF CONTENTS .....	v
LIST OF FIGURES .....	vii
LIST OF TABLES .....	vii
EXECUTIVE SUMMARY .....	ix
<b>1. INTRODUCTION .....</b>	<b>1</b>
<b>2. PURPOSE .....</b>	<b>1</b>
<b>3. APPROACH AND METHODS .....</b>	<b>2</b>
AGENCY DATA SOURCES .....	2
CAPACITY ASSESSMENT SURVEY .....	3
<i>Survey Development and Design</i> .....	3
<i>Survey Participants</i> .....	4
<i>Data Analysis</i> .....	5
FOCUS GROUPS .....	6
<b>4. ASSESSMENT OF KEY AGENCY FUNCTIONS.....</b>	<b>6</b>
COVERAGE .....	6
<i>Understaffing</i> .....	7
<i>Recruitment and Attrition</i> .....	8
<i>Trends in Staff Morale and Satisfaction</i> .....	9
<i>Strategic Workforce Planning</i> .....	10
<i>Budget and Program Resources</i> .....	18
LICENSING .....	28
<i>Quality, Methods, Independence, and Effectiveness</i> .....	28
<i>Licensing-Specific Findings and Mitigating Strategies</i> .....	33
OVERSIGHT .....	34
<i>Quality, Methods, Independence, and Effectiveness</i> .....	35
<i>Oversight-Specific Findings and Mitigating Strategies</i> .....	39
EMERGENCY PREPAREDNESS & INCIDENT RESPONSE .....	41
<i>Key Themes</i> .....	42
RESEARCH .....	43
<i>Quality, Methods, Independence, and Effectiveness</i> .....	44
<i>Research-Specific Findings and Mitigating Strategies</i> .....	49
RULEMAKING .....	51
<i>Quality, Methods, Independence, and Effectiveness</i> .....	51
<i>Rulemaking-Specific Findings and Mitigating Strategies</i> .....	56
FINANCIAL MANAGEMENT .....	59
<i>Quality, Methods, Independence, and Effectiveness</i> .....	59
<i>Financial Management-Specific Findings and Mitigating Strategies</i> .....	63
EVALUATION .....	64
<i>Personnel</i> .....	65
<i>Updates to Ongoing Evaluations</i> .....	65

<i>Evaluation-Specific Findings and Mitigating Strategies</i> .....	66
<b>5. CROSSCUTTING FINDINGS</b> .....	<b>67</b>
NEW CROSSCUTTING FINDINGS IN FY 2023.....	68
<i>Skill Levels and Training</i> .....	68
<i>Workload Management</i> .....	70
<i>Communication</i> .....	71
<i>Evolving Hybrid Work Environment</i> .....	73
<i>Data Analysis and Analytics</i> .....	75
UPDATES TO CROSSCUTTING FINDINGS FROM FY 2022 .....	75
<i>Staffing Gaps</i> .....	76
<i>Knowledge Management</i> .....	77
<i>Competency Modeling</i> .....	79
<i>Artificial Intelligence</i> .....	82
<i>Environmental Justice</i> .....	83
<i>Recent Operational Experience</i> .....	84
<i>Workforce Planning Process</i> .....	85
<i>Reduction in Support Staff</i> .....	86
<i>Corporate Support Resource Limit</i> .....	88
<b>6. LIST OF EVIDENCE-BUILDING ACTIVITIES</b> .....	<b>89</b>
<b>APPENDIX A AGENCY ENVIRONMENTAL SCAN</b> .....	<b>A-1</b>
<b>APPENDIX B CAPACITY ASSESSMENT SURVEY</b> .....	<b>B-1</b>
<b>APPENDIX C CAPACITY ASSESSMENT FINDINGS SUMMARY</b> .....	<b>C-1</b>

## LIST OF FIGURES

Figure 1	Coverage Data Summary .....	7
Figure 2	Projected Workforce Gaps in 2027 .....	10
Figure 3	Nuclear Reactor Safety Program Licensing Resources and Actions .....	20
Figure 4	Nuclear Materials and Waste Safety Program Licensing Resources and Actions ....	22
Figure 5	Nuclear Reactor Safety Program Oversight Resources and Inspections.....	23
Figure 6	Nuclear Materials and Waste Safety Program Oversight Resources and Inspections .....	24
Figure 7	Nuclear Reactor Safety Program Research Resources and Projects.....	25
Figure 8	Nuclear Materials and Waste Safety Program Research Resources and Projects...	25
Figure 9	Nuclear Reactor Safety Program Rulemaking Resources and Activities .....	26
Figure 10	Nuclear Materials and Waste Safety Program Rulemaking Resources and Activities .....	27
Figure 11	Financial Management Resources.....	28
Figure 12	Licensing Data Summary.....	29
Figure 13	Licensing Key Themes .....	30
Figure 14	Oversight Data Summary.....	35
Figure 15	Oversight Key Themes .....	36
Figure 16	Research Data Summary.....	44
Figure 17	Research Key Themes .....	45
Figure 18	Rulemaking Data Summary .....	52
Figure 19	Rulemaking Key Themes.....	53
Figure 20	Financial Management Data Summary .....	60
Figure 21	Financial Management Key Themes.....	61
Figure 22	Technical and Support Staff Reductions .....	87

## LIST OF TABLES

Table 1	Survey Participants by Function Area .....	5
Table 2	Projected 2027 Workforce Gaps in Licensing by Gap Size .....	13
Table 3	Projected 2027 Workforce Gaps in Oversight by Gap Size .....	14
Table 4	Projected 2027 Workforce Gaps in Emergency Preparedness & Incident Response by Gap Size .....	15
Table 5	Projected 2027 Workforce Gaps in Research by Gap Size.....	16
Table 6	Projected 2027 Workforce Gaps in Rulemaking by Gap Size .....	17
Table 7	Projected 2027 Workforce Gaps in Financial Management by Gap Size .....	18
Table 8	FY 2022–FY 2023 Enacted and FY 2024 Requested Budget .....	19





## EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission's (NRC's or the agency's) Capacity Assessment uses a structured, iterative approach for assessing the agency's capacity (i.e., staff, funding, infrastructure, and processes) to carry out evidence-building activities (e.g., analysis, research, statistics, and evaluation) necessary to support agency functions. This approach identifies areas where new or different investments could strengthen or improve the agency's ability to meet its mission and strategic goals.

The NRC reviews and updates its Capacity Assessment annually to identify new findings, update past findings, and ensure that progress is being made towards the successful implementation of identified mitigating strategies. The current year, fiscal year (FY) 2023, marks the second annual capacity assessment conducted by the NRC, which builds on findings documented in FY 2022<sup>1</sup> and identifies new areas of focus related to the agency's capacity for evidence-building activities.

The NRC's Capacity Assessment focuses on the evidence-building activities used to support the key agency functions of Licensing, Oversight, Emergency Preparedness & Incident Response, Research, Rulemaking, and Financial Management. This Capacity Assessment also discusses coverage (staffing and budgeting) across key agency functions, as well as presenting an overview of agency evaluation activities and considerations.

Assessment activities conducted in support of this capacity assessment included the analysis of both quantitative and qualitative data. NRC staff worked with a contracted, independent assessment team to update the prior year's capacity assessment survey, conduct focus groups with NRC branch chiefs and team leaders, and analyze and integrate a variety of data sources. Through these efforts, the assessment team synthesized the available, relevant data to provide context for a series of identified findings.

In this year's capacity assessment, the independent assessment team identified five new crosscutting findings for FY 2023. Crosscutting findings are those findings that are not specific to a single function area but instead cut across many or all NRC functions. Such findings are expected to have a significant influence on the agency's capacity. Each of these five new crosscutting findings, summarized below, represent the collective perspectives of those who participated in the surveys or focus groups. (Section 5 of this report discusses crosscutting findings and proposed mitigating strategies in further detail.)

- **Skill Levels and Training:** Data indicate that staff are experiencing challenges that prevent them from consistently engaging in and taking advantage of training and other learning and development opportunities. Staff shared difficulties in prioritizing and finding time for training and development due to high workloads. Staff also shared challenges in prioritizing and securing funding for emergent external training requests.
- **Workload Management:** Within and across function areas, staff communicated challenges with handling high workloads. Some staff also communicated a perception that the distribution of tasks tends to be uneven, with the highest performing and/or highest skilled employees often carrying a disproportionately high workload. Task

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<sup>1</sup> NUREG-2251, "Capacity Assessment for Statistics, Research, Evaluation and Other Analysis, FY 2022," Volume 1, issued April 2022 ([ML22066B054](#)).

prioritization and distribution challenges can impact the stress, burnout, and retention of experienced, skilled staff, as well as supervisors' ability to lead and manage their teams while ensuring the successful completion of tasks.

- **Communication:** Staff expressed a desire for improved and more open communication within and across offices, especially from senior leaders. Staff are strongly aligned with the NRC's values of integrity, service, and openness, among others, and they highly value clarity, consistency, and transparency in communication from leaders, among offices/regions, and with industry. Further, staff communicated that they seek a better understanding of agency and leadership priorities and more authentic communications from senior management. Staff also seek consistent practices and policies that reflect the NRC's principle of ensuring independence from undue industry influence. To this end, staff also expressed that they seek increased transparency regarding NRC drop-in meetings with industry.
- **Evolving Hybrid Work Environment:** The evolving shift to a hybrid work environment, in the wake of the Coronavirus Disease 2019 pandemic, has been difficult for NRC leaders and staff to navigate. This shift has raised new challenges and complexities that are impacting staff morale, stress, and trust. Staff communicated that they are particularly impacted by changing norms and expectations regarding telework. The NRC has engaged in substantial efforts in the past year to better understand and pursue strategies to help address staff perspectives around the agency's hybrid work environment, telework policy, and use of physical office space.
- **Data Analysis and Analytics:** The information collected for the FY 2022 and FY 2023 capacity assessments indicates a need for more resources and development of skills in data analytics and analysis, based on the NRC's continuing transition to new technologies and systems.

In total, across the agency and within the specific function areas reviewed in detail, the NRC identified 27 findings, as documented in this capacity assessment, along with proposed mitigating strategies to address each finding, which are intended to enhance the NRC's ability to perform evidence-building activities to support associated key agency functions. Many of these 27 findings were first identified in the FY 2022 Capacity Assessment, and updates to these preexisting findings and their associated statuses are described where applicable.

The evidence-building activities applicable to the six NRC key agency functions discussed in this report are assessed against the attributes of coverage, quality, independence, methods, and effectiveness.<sup>2</sup> Future annual updates to the Capacity Assessment may expand to cover other key agency functions.

The Capacity Assessment includes a review of budget information, workload and workforce data, strategic workforce planning data, and data collected through an agencywide survey, as well as a series of focus groups with staff and management. Additional data sources, such as the Federal Employee Viewpoint Survey, are incorporated where relevant. Staff input was essential in developing the Capacity Assessment, and the NRC intends that, by reflecting that input, this document will empower the staff by building on their shared ideas to enhance the NRC's evidence-building capacity.

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<sup>2</sup> Office of Management and Budget Memorandum M-20-12, "Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices," dated March 10, 2020, discusses the details of many of these attributes.

# 1. INTRODUCTION

The U.S. Nuclear Regulatory Commission's (NRC's) Capacity Assessment provides unique insight into the challenges, needs, and opportunities to improve the agency's capacity. The current Capacity Assessment for fiscal year (FY) 2023 is the second conducted by the agency. It includes findings identified through the assessment process discussed below, as well as findings previously identified (i.e., in the FY 2022 Capacity Assessment) and are currently being mitigated. Since development of the NRC's initial capacity assessment for FY 2022, the agency has refined its approach to conducting this assessment. Annual updates to the Capacity Assessment will continue to document findings that may impact the agency's capacity. Previously identified findings and associated mitigating strategies documented in the Capacity Assessment will be monitored through agency strategic planning meetings with senior leadership and through the NRC's Enterprise Risk Management process, if appropriate.<sup>3</sup> The NRC will continue to use these processes to ensure agency coordination and progress. In addition, many of the findings included in this Capacity Assessment are complex in nature and cannot be solved simply with stopgap solutions. In those cases, implementation of the mitigating strategies may require measured approaches to gain additional information and data over the years ahead to ensure meaningful change and improvement. Findings are presented throughout the report, and Appendix C summarizes all findings, along with their completion statuses.

Readers should keep in mind that this document reflects an assessment of the agency's capacity at the time it was written. Importantly, the agency's capacity is not fixed; it is the agency's goal to be able to dynamically adapt its capacity to build and use evidence in keeping with the current and anticipated demands of its mission.

The NRC recognizes the importance and value of public communication and involvement as a cornerstone of strong, fair, and transparent regulation of the nuclear industry. The Capacity Assessment is an important part of the agency's efforts to communicate with the public. In addition to the Capacity Assessment, the public is kept informed of the NRC's regulatory activities through a variety of meetings open to the public, including Commission meetings, advisory committee meetings, hearings, and staff meetings. The NRC develops regulations, regulatory guidance, and various forms of externally directed communications. The agency strives to make its work publicly available through a variety of platforms, such as its public website and social media platforms including Facebook, Twitter, and YouTube.

## 2. PURPOSE

The NRC's Capacity Assessment is intended to assess, build, and maintain the agency's capacity to conduct evidence-building activities by (1) establishing baselines that enable measurable results over time for key agency functions; (2) identifying opportunities to enhance technical expertise for evidence-building; (3) increasing knowledge of evidence-building methodologies, practices, and standards; and (4) improving the agency's processes and ability to make evidence-based decisions. This second annual Capacity Assessment marks a continued effort for the NRC to achieve its full potential of strategically identifying those challenges that could impact the agency in pursuing its strategic goals. The NRC reviews and updates the Capacity Assessment annually to identify new findings, update past findings, and ensure that progress is being made toward established mitigating strategies.

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<sup>3</sup> Management Directive 4.4, "Enterprise Risk Management and Internal Control," dated April 3, 2023, is available at <https://www.nrc.gov/reading-rm/doc-collections/management-directives/index.html>.

### 3. APPROACH AND METHODS

The NRC contracted with Pacific Research and Evaluation, LLC (PRE), an independent expert in evaluation assessments, to conduct the FY 2023 Capacity Assessment. PRE worked with the NRC to update and expand upon the data collection and analysis efforts used in support of the FY 2022 Capacity Assessment. The overall capacity assessment design and analytic approach utilized a “mixed methods” strategy, meaning that multiple types of data were analyzed (i.e., both quantitative and qualitative).

As detailed below, PRE worked with NRC staff to update the prior year’s capacity assessment survey and conducted focus groups with NRC branch chiefs and team leaders. PRE also analyzed and integrated findings from other data sources (e.g., the Federal Employee Viewpoint Survey (FEVS), Strategic Workforce Planning (SWP) process, and the agency budget) to synthesize all relevant, available data and to provide additional context to this year’s findings.

#### AGENCY DATA SOURCES

Available agency data are integrated, where appropriate, throughout this capacity assessment. While these data were collected as part of initiatives outside of the Capacity Assessment, they are nonetheless relevant to certain attributes, themes, and/or function areas. The first such data source is the FEVS. The FEVS is an annual organizational climate survey distributed to employees of Federal agencies that collects data about employee perceptions of their work experience, their agency, and their leadership. FEVS data are aggregated at the office, region, and division level (depending on sample size); as a result, these data do not always neatly align with the NRC’s function areas. As such, FEVS data are integrated in this report at the agency level, where appropriate, and at the office level where there is considerable overlap between a function area and an office (e.g., the Financial Management function area and the Office of the Chief Financial Officer).

Second, data from the NRC’s SWP process are integrated to provide evidence related to NRC workforce gaps and surpluses. The NRC’s workforce is critical to performing the evidence-building activities necessary to carry out the agency’s mission. The SWP process is used to strategically recruit and retain the workforce needed for the expected workload over a duration of 5 years. The gaps and surpluses identified by the SWP process are analyzed throughout this report to provide a full understanding of potential workforce challenges for each key agency function. The data for workforce gaps are calculated and reported assuming that there is no hiring and the estimates of workload are correct.<sup>4</sup> While these data are most relevant to the attribute of coverage, the data have impacts on all other attributes addressed in the Capacity Assessment.

Third, data from the NRC’s budget are integrated to provide insight into resource availability relevant to evidence-building activities. The budgeted resources for each key agency function are segmented by business line to better show how evidence-building activities are distributed across the NRC.<sup>5</sup> Workload indicators for activities that are comprised of evidence-building

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<sup>4</sup> “Enhanced Strategic Workforce Planning Pilot Lessons-Learned Report,” Appendix B, “Enhanced Strategic Workforce Planning Process,” dated June 11, 2018 ([ML18162A073](#)).

<sup>5</sup> NRC business lines include Operating Reactors, New Reactors, Nuclear Materials Users, Decommissioning and Low-Level Waste, Fuel Facilities, Spent Fuel Storage and Transportation, and Corporate Support (which includes Financial Management).

activities (e.g., number of licensing actions and inspections completed, as supported by analysis) are used for comparison to the budgeted resources.<sup>6</sup>

Other supplemental data sources are integrated and described throughout this report as available, including two customer-oriented surveys—one specific to the Research function area and another specific to Financial Management, because of its corporate/mission support focus. Where relevant, these data, as well as data from the 2022 FEVS, SWP, and the budget analysis, are used to provide additional insights into evidence-building activities.<sup>7</sup>

## CAPACITY ASSESSMENT SURVEY

### *Survey Development and Design*

In collaboration with PRE, the NRC updated the FY 2022 Capacity Assessment survey to use for FY 2023. This year, nearly all NRC staff and managers were invited to complete an online survey, regardless of their function area or the extent to which they conduct evidence-building activities in their jobs. A total of 2,589 invitations were sent by email in May 2022. Each invitation contained an individualized, secure link to the survey, and NRC employees were given approximately 3 weeks to respond. During those 3 weeks, two reminder emails were sent to those who had not yet completed the survey.

The FY 2023 Capacity Assessment survey contained both qualitative and quantitative questions, separated into two main sections. An initial screening question first asked NRC employees to indicate the frequency with which their work over the past year involved directly performing analysis, research, statistics, and/or evaluation. Analyses for this capacity assessment include only responses from employees who reported they regularly engaged in these evidence-building activities (i.e., at least 30 percent of the time, on average); however, the other responses were shared with the NRC in an anonymous format for further insight into staff work experiences, beyond those tied to the agency's evidence-building activities.

The first section of the survey asked participants to respond to questions based on their experience working in the function area (e.g., Licensing) that they had most directly supported over the past year. Each page of the survey contained questions specific to an attribute considered essential to successfully engaging in evidence-building activities. There are five such attributes: coverage, quality, methods, effectiveness, and independence. Participants answered several questions specific to each attribute. Open-ended questions on each page gave respondents a chance to share additional perspectives and insights relevant to each attribute. Definitions for each attribute are as follows:

- **Coverage** refers to the distribution of evidence-building activities, workforce gaps and surpluses, and skill gaps in the workforce, as well as to the distribution of budgetary and program resources.

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<sup>6</sup> The budgeted resources are shown at the product line level, rather than for individual evidence-building activities.

<sup>7</sup> Appendix A contains the FY 2023 Agency Environmental Scan, which forecasts the environment that may affect the NRC's capacity over the next 5 years.

- **Quality** refers to the measure of an evidence-building activity in comparison to established standards such as rigor, relevance and utility, transparency, collaboration, independence and objectivity, and ethics.<sup>8</sup>
- **Methods** refers to the extent to which appropriate methodologies and standards are applied, as well as the extent to which agency guidance or procedures are followed.
- **Effectiveness** refers to the degree to which an activity is successful in achieving a desired result.<sup>9</sup> Effectiveness should produce clear and concise results, ensure that internal and external stakeholders needs are met, and create information useful to the agency's decision-making.
- **Independence** refers to the extent to which evidence-building activities are free from bias and inappropriate influence.

The second section of the survey asked NRC staff to identify and answer questions about additional NRC function areas whose work products they had consistently relied on over the past year. NRC staff who responded to these questions are described throughout this report as “customers.” Customer survey questions were very similar to the questions respondents answered about their own function area in the first section of the survey (i.e., questions related to the five attributes of coverage, quality, methods, effectiveness, and independence). Open-ended questions also gave customers the opportunity to write in comments specific to each attribute. Respondents had the opportunity to provide customer responses for up to three different function areas.

Appendix B to this report contains a complete listing of the questions included in the capacity assessment survey.

### **Survey Participants**

A total of 967 NRC employees, who indicated that they regularly engage in evidence-building activities, provided survey responses. Additionally, 496 NRC employees, who are customers of one or more function areas, responded to the survey. Table 1 displays, for each of the six function areas addressed in detail in this report, the numbers of employees directly engaging in evidence-building activities associated with each function area and the number of employees who consider themselves customers of the function area. The six function areas (Licensing, Oversight, Research, Emergency Preparedness & Incident Response, Rulemaking, and Financial Management) are the primary focus of this capacity assessment; data from other function areas are included where most relevant to the agency's ability to conduct evidence-building activities. To protect respondent confidentiality, all data in this capacity assessment are reported in an aggregated format, and no direct quotes from written comments are shared.

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<sup>8</sup> The NRC's "Evidence-Building and Evaluation Policy Statement," (<https://www.govinfo.gov/content/pkg/FR-2021-06-03/pdf/2021-11637.pdf>) and Management Directive 3.17, "NRC Information Quality Program," ([ML16105A321](#)) discuss standards for the attribute of quality.

<sup>9</sup> This is defined in the NRC Strategic Plan for fiscal years 2022–2026. ([ML22067A170](#))

**Table 1 Survey Participants by Function Area**

Function Area	Employees of Function Area (n)	Customers of Function Area (n)
Licensing	279	87
Oversight	258	29
Research	75	55
Emergency Preparedness & Incident Response	12	9
Rulemaking	48	42
Financial Management	50	39

**Data Analysis**

PRE conducted all data analyses specific to the capacity assessment survey and focus groups.

Quantitative questions in the survey were rated using a 7-point Likert scale indicating the frequency with which respondents felt their function area, or the function area in which they are a customer, exhibited facets of each attribute (i.e., coverage, quality, methods, effectiveness, and independence) over the last year. Response options were coded as follows: 1 = Never; 2 = Rarely (<10 percent of the time); 3 = Occasionally (~30 percent of the time); 4 = Sometimes (~50 percent of the time); 5 = Frequently (~70 percent of the time); 6 = Usually (~90 percent of the time); and 7 = Every Time. Participants were also able to select “Not applicable” or “I don’t know” as a response option.

Survey data were inspected and cleaned to ensure responses were valid (e.g., participants who selected the same response option for all questions in the survey were excluded because of the likelihood of inattentive responding). Analyses were conducted to examine questions at both the item level (i.e., examining average responses to each question individually) and at the attribute level (i.e., examining average scores across all questions related to an attribute). Results presented in this capacity assessment use the term *frequently* to refer to respondents who selected *Frequently* (~70 percent of the time), *Usually* (~90 percent of the time), or *Every Time* to a specific question.

Qualitative data were analyzed by thematic analysis. This process involved multiple coders from PRE reading and categorizing written responses into themes. These themes were considered together with average scores of relevant items and attributes; this combination of qualitative and quantitative data (see below for additional sources of quantitative data) helped inform the findings of this capacity assessment.

Data were analyzed both by function area (e.g., Licensing) and by attribute (e.g., quality). Six focal function areas are described in depth in this report (Licensing, Oversight, Emergency Preparedness & Incident Response, Research, Rulemaking, and Financial Management). These six function areas are highlighted because they make up the bulk of the NRC’s analysis, research, statistics, and evaluation activities. The attributes of quality, methods, effectiveness, and independence are discussed in relation to each key function area. The attribute of coverage is separated into its own section and discussed holistically across the agency, as findings related to coverage were applicable to all function areas. Data collected for this capacity

assessment also informed findings related to evaluation, which is included as another section in this report. Evaluations play a critical role in the NRC's ability to measure, monitor, and improve the effectiveness and efficiency of the agency, and findings specific to evaluation will continue to be important as the NRC integrates newly hired evaluation staff.

## **FOCUS GROUPS**

PRE conducted seven focus groups with NRC branch chiefs and team leaders in May and June 2022. Each focus group contained between three and six supervisors from a specific function area (i.e., Licensing, Oversight, Research, Rulemaking, Financial Management, Acquisitions, and Emergency Preparedness & Incident Response). Data from the focus groups were used to provide additional context and insights into evidence-building activities within each of the key function areas. A total of 32 branch chiefs and team leaders participated in focus groups. To protect confidentiality, no identifying information or quotes from these individuals are included in the Capacity Assessment; only broad themes are discussed in relation to the function areas and associated evidence-building activities.

## **4. ASSESSMENT OF KEY AGENCY FUNCTIONS**

The evidence-building activities associated with the key agency functions are analysis, research, statistics, and evaluation. As discussed in Section 3, the Capacity Assessment includes an in-depth assessment of key agency functions and the associated evidence-building activities. Section 4 documents the capacity assessment findings and mitigating strategies for each key agency function. Finally, Section 5 outlines the crosscutting issues that were identified across multiple key agency functions.

## **COVERAGE**

Coverage is one of five attributes measured in the FY 2023 Capacity Assessment and focuses on the distribution of evidence-building activities, workforce gaps and surpluses, and skill gaps in the workforce. As discussed above, coverage refers to the distribution of evidence-building activities, workforce gaps and surpluses, and skill gaps in the workforce, as well as to the distribution of budgetary and program resources. Data collected on coverage for the FY 2023 Capacity Assessment were very consistent across function areas, and thus this attribute is discussed holistically across the agency, with divergences among function areas noted. Other attributes (i.e., quality, effectiveness, methods, and independence) are discussed in relation to specific function areas, as data related to these attributes revealed important differences among the assessed function areas.

Data collected for the FY 2023 Capacity Assessment included a total of 967 survey responses from participants. The three largest function areas surveyed were Licensing (n = 279), Oversight (n = 258), and Research (n = 75). The capacity assessment survey included five quantitative and one qualitative (i.e., open-ended) question specific to coverage. Quantitative and qualitative data specific to coverage were also collected, through the survey, from NRC staff who are customers of the assessed function areas. Focus groups with branch chiefs and team leaders also addressed coverage. Summary findings and emerging themes related to coverage are discussed below, with additional data sources (e.g., budget, SWP, and FEVS data) incorporated where relevant.



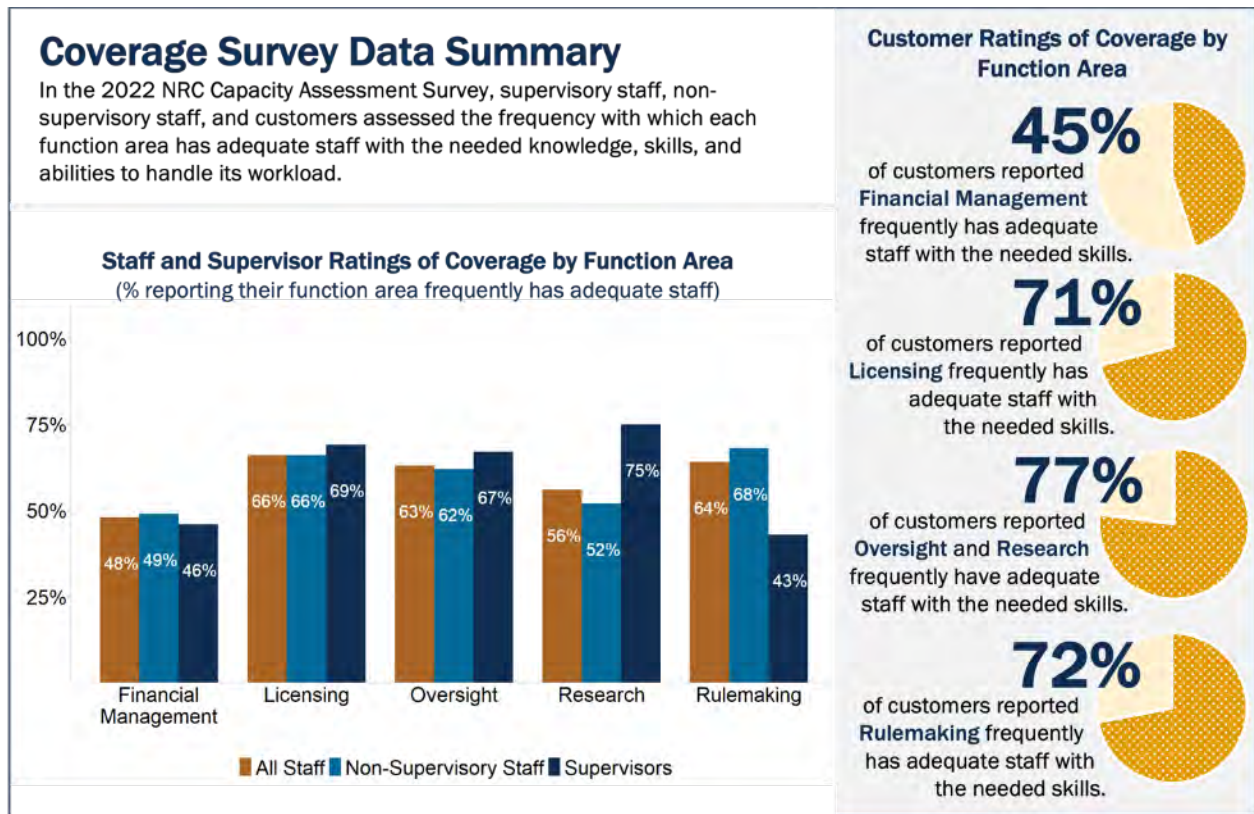


Figure 1 Coverage Data Summary

### Understaffing

As described in the Agency Environmental Scan for Fiscal Years 2023 through 2028 (see Appendix A), the NRC has 24 percent fewer full-time equivalents (FTEs) now than in FY 2014; this is due in large part to both internal and external factors affecting the agency’s staffing levels and staffing needs. Survey respondents and focus group participants in all function areas reported feeling pressures due to insufficient staffing levels relative to their workload. In each of the six focal function areas examined for the current (FY 2023) capacity assessment (i.e., Licensing, Oversight, Emergency Preparedness & Incident Response, Research, Financial Management, and Rulemaking), staff—supervisory and nonsupervisory alike—consistently identified the need to increase staffing levels. The impact of staffing shortages was not limited to NRC staff members’ own function areas; NRC internal customers of function areas also shared similar observations of the function areas on whose work products they depend. Quantitative survey results, which are displayed in Figure 1, showed that, on average, half to two-thirds of staff in each function area reported that their function area frequently had adequate staff with the needed knowledge, skills, and abilities to handle the workload—meaning they felt their function area had adequate staff 70 to 100 percent of the time. This leaves about one-third to one-half of staff reporting that their function area did *not* frequently have adequate staff. In terms of having the capacity to conduct evidence-building activities, coverage through staffing is perhaps the mostly widely identified issue of any discussed in this capacity assessment.

As shown in Figure 1, Licensing staff (aggregating nonsupervisory and supervisory staff) reported feeling that they had adequate staff with sufficient skills most often of the six focal function areas examined, with 66 percent reporting that Licensing frequently has adequate staff

to conduct evidence-building activities. At the other end of the spectrum, only 48 percent of Financial Management staff (aggregating nonsupervisory and supervisory staff) said their function area frequently has adequate staff. Although nonsupervisory and supervisory staff largely agreed on their ratings of staffing in Financial Management, Licensing, and Oversight, there were noticeable disparities in ratings by job role in Research and Rulemaking. In Research, 75 percent of supervisors reported that their function frequently has adequate staffing, compared to only 52 percent of nonsupervisory staff. Conversely, in Rulemaking, just 43 percent of supervisors reported that their function area frequently has adequate staffing, compared to 68 percent of nonsupervisory staff.

Data were also collected from customers of each function area (i.e., NRC staff who rely on work products from a particular function area but do not themselves work within that function area). A total of 265 customers provided survey responses, across all of the examined function areas, as to whether the function areas had adequate staff with the needed knowledge, skills, and abilities to handle workload (see Figure 1). Among customers in both Oversight and Research, 77 percent responded that those function areas frequently have adequate staff with the necessary skills, compared to just 45 percent of customers of the Financial Management function area.

### ***Recruitment and Attrition***

Recruiting and retaining skilled staff is a challenge that both staff and supervisors expressed in survey responses and focus groups. Perceived recruitment and retention challenges appear to be three-fold: a lack of incentives to draw in potential applicants and retain current employees, a slow hiring process, and difficulty attracting candidates with the proper skillset.

First, participants shared that job offers from industry, as well as other government agencies, provide enticing incentives that tend to sway candidates away from accepting positions at the NRC and contribute to attrition of current staff. Limited flexibility, particularly the NRC's telework policy—limited when compared with the policies of other organizations—was the most commonly cited policy that staff believe is deterring candidates from accepting job offers at the NRC and causing turnover of current employees.

Second, staff across all six focal function areas referred to a slow and cumbersome hiring process as a substantial barrier to recruiting top candidates. Leaders in Licensing, Oversight, and Rulemaking shared similar sentiments in focus groups, noting that long lag times for hiring are a barrier to coverage and place added burden on existing staff. When each office and region was asked in fall 2022 to identify the top workload burdens experienced by their first-line supervisors, several offices and regions mentioned slow hiring processes and a critical need to address staffing gaps as among their top needs and workload burdens.

Finally, staff noted difficulties attracting candidates with the right skillsets and skill levels. Staff from all six function areas echoed the challenge related to the level of effort to bring new staff to competency (e.g., productivity, organizational effectiveness) and qualification in a timely manner.

## ***Trends in Staff Morale and Satisfaction***

A common theme in relation to staff's ability to carry out the NRC's mission over the past year—a time when understaffing has been prevalent across the agency, as described in earlier sections of this report—is that there has been an adverse shift in NRC employee morale and satisfaction. Data sources specific to the Capacity Assessment, as well as results of other data collection efforts at the NRC, such as the FEVS and data collection efforts that took place as part of the Hybrid Environment Assessment and Review Team (HEART) efforts, indicate that low staffing, the Coronavirus Disease 2019 (COVID-19) pandemic, and other external and internal factors have contributed to many staff feeling burned out or experiencing lower morale and satisfaction than in previous years.

In general, the NRC has seen a drop in staff satisfaction in the past 2 years. The FEVS has asked NRC employees to rate their satisfaction with their jobs and their organization each year since 2011. The percentage of NRC employees who provided a positive response when asked, "Considering everything, how satisfied are you with your job?" reached its lowest points on record in 2021 and 2022. In both years, approximately 70 percent of staff provided a positive response, compared to 73 to 81 percent in previous years. The percentage of staff who responded positively when asked, "Considering everything, how satisfied are you with your organization?" is equally telling. In 2022, 64 percent of NRC staff provided a positive response, compared to 67 to 78 percent in all prior years since 2011. These trends in satisfaction, while only a few percentage points different, are noteworthy in combination with other data.

Capacity assessment survey respondents and focus group participants—across function areas and levels of the organization, including both nonsupervisory staff and senior managers—tied staff satisfaction and morale to impacts on coverage. Staff consistently shared that understaffing has made it very difficult for them to meet work demands without experiencing burnout and stress. Other data sources confirm that many staff perceive high workloads. For example, the FEVS asks employees to rate the extent to which they agree that their workload is reasonable on an annual basis. In 2022, 66 percent of NRC staff agreed their workload was reasonable. However, the percentage of agreement ranged by office/region from 47 percent to 100 percent; at the division level, it varied even more widely, with as few as 36 percent of one division agreeing that their workload was reasonable. It is also important to note that this rate of agreement (66 percent) was the lowest for the NRC of any year the FEVS has been conducted. From 2011 to 2020, the rate of agreement for the item "My workload is reasonable" ranged from 69 percent to 74 percent.

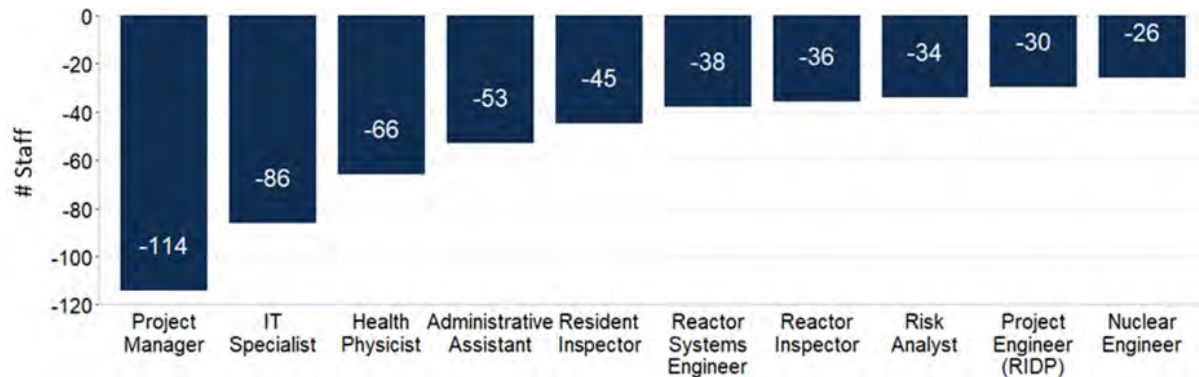
An important factor that staff tied to lower morale and motivation, as well as to burnout, is the COVID-19 pandemic and resulting shift to a primarily telework environment, followed by further shifts to a hybrid work environment. In capacity assessment survey responses, many staff across function areas raised telework as a key factor affecting their stress and well-being, in addition to staffing within their function areas. When identifying top workload burdens of first-line supervisors, at least one office indicated that navigating the complexity of the current telework request process is among their heaviest burdens. Additionally, as part of the HEART efforts initiated by the NRC's Executive Director for Operations (EDO) to provide recommendations to optimize organizational health in a hybrid work environment, focus groups were conducted with 113 NRC staff members from across all levels of the organization. The HEART focus group data indicated that communication challenges surrounding hybrid work have also contributed to feelings of decreased morale and motivation. Staff noted, for example, that they felt praised for their remote work throughout the first 2 years of the COVID-19 pandemic, but that being required to come back to the office some days felt like a punishment. Section 5 discusses staff

experiences in the hybrid work environment as a crosscutting finding of this report, along with associated mitigating strategies.

### Strategic Workforce Planning

SWP is a process designed to proactively identify anticipated staffing gaps and surpluses at the NRC 5 years into the future in order to inform current hiring practices. SWP data are designed to be analyzed at both global (e.g., agencywide) and granular (e.g., office, role) levels; however, some staff, particularly those from Oversight, Rulemaking, and Emergency Preparedness & Incident Response expressed confusion over data related to staffing and the application of SWP to address staffing needs. To ensure that SWP data are useful, timely, and acted on in a well-informed manner, the NRC is actively engaged in an evaluation of its SWP program; section 5 of this report describes the ongoing evaluation.

To inform the current (FY 2023) capacity assessment, SWP data were first used to identify the largest and most impactful staffing gaps across the NRC. Figure 2 displays the top 10 core positions with the largest projected workforce gaps across the agency.



**Figure 2 Projected Workforce Gaps in 2027**

Agencywide, the role of project manager is expected to have the largest gap by the year 2027 (-114 staff). Most of this gap (-94 staff) is associated with the Licensing function area. In total, project manager gaps constitute nearly one-third (31 percent) of the total expected gap across all Licensing staff. As described in the Agency Environmental Scan (see Appendix A), the NRC anticipates that license renewal work will increase through 2028, in addition to new licensing activities anticipated for light-water small modular reactors and non-light-water reactors (non-LWRs). These increases in licensing activities contribute to the need to ensure that project manager roles are filled in the Licensing function area. A projected deficit of project managers was also identified as contributing to substantial gaps in the Research, Rulemaking, and State, Tribal, and Federal Programs function areas, indicating that the need for additional project managers impacts the NRC’s capacity to conduct evidence-building activities beyond those in Licensing.

The NRC’s information technology (IT) specialist core position emerged as the second largest expected gap in projections of 2027 workforce needs. This gap of 86 staff makes up nearly three-quarters (73 percent) of the total gap in IT and information management and is likely due, in part, to competition from other agencies and organizations. Although this gap was not presented in the previous (FY 2022) capacity assessment, retrospective review indicated that the projected gap for IT specialists has widened by three staff members since that report.

HEART focus groups (designed to support the NRC's efforts to optimize its hybrid work environment) suggested that the agency's approach to hybrid work and telework arrangements may also be hindering recruitment and retention efforts for IT specialists. If the NRC is unable to mitigate this anticipated IT specialist gap, the agency's capacity to address cybersecurity threats and increasing demand for data management, automation, and agile development may be impacted (see Appendix A).

Another particularly substantial gap is apparent for NRC's health physicist roles, which showed the third largest projected gap. This gap of 66 staff was split among Oversight (-37 staff), Licensing (-21 staff), and Research (-8 staff)—constituting 17 percent, 7 percent, and 11 percent of the total gaps for Oversight, Licensing, and Research, respectively. Health physicists were identified in the Agency Environmental Scan (see Appendix A) as tied to an important anticipated increase in workload, based on emerging medical technologies. Shortages in qualified medical and health physicists have been identified in recent publications,<sup>10</sup> indicating that the NRC may need additional, targeted efforts to hire health physicists at a rate that would ensure coverage of anticipated gaps for health physicists in the key NRC function areas throughout the next 5 years. The NRC has some such efforts already in place, such as including apprenticeships for Nuclear Regulator Apprenticeship Network cohort members in jobs related to health physics, both at the NRC and in Agreement States; holding seminars for new hires on health physics opportunities; and posting multiple external vacancies for health physics jobs. The NRC should continue these targeted efforts.

The administrative assistant core position is projected to have the fourth largest agencywide gap by the year 2027. The Nuclear Energy Innovation and Modernization Act (NEIMA) limits corporate support costs included in the NRC's budget formulation. The agency has already experienced significant challenges related to such budget caps (see Appendix A). With cuts to corporate support staff, current staff have taken on additional work previously performed by multiple employees.<sup>11</sup> The gap in administrative assistants is expected to further contribute to this challenge. Figure 2 displays additional top agencywide gaps, many of which are also described in function-specific SWP results below.

Further analyses were conducted for the six focal function areas featured in the current (FY 2023) capacity assessment (Licensing, Oversight, Emergency Preparedness & Incident Response, Research, Rulemaking, and Financial Management). Tables 2–7 show the results of gap analyses for each function area. Specifically, these tables display each core position's projected workforce gap, current workforce (i.e., current supply of staff), projected workforce attrition (i.e., number of current staff expected to leave their position), projected workforce attrition percent (i.e., projected workforce attrition divided by current workforce), and the projected 2027 workforce (i.e., staff demand associated with projected workload). Core positions displayed are those with the largest workforce gaps or projected workforce attrition of at least 40 percent within a 5-year period (highlighted in blue).

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<sup>10</sup> For example, the following reference concludes that the current U.S. workforce is experiencing shortages of qualified medical physicists: Jordan, David W., Newhauser, Wayne D., and Mills, Michael, D., "Current State of the Imaging Physics Workforce and Financial Model," *Journal of Applied Clinical Medical Physics*, Volume 12, 2021.

<sup>11</sup> "Nuclear Energy Innovation and Modernization Act (NEIMA)—Implementation, Impacts, and Recommendations for Improvement of the U.S. Nuclear Regulatory Commission's Annual Budget Justification; Fees and Charges; Performance and Reporting; and Accurate Invoicing," issued October 2021 ([ML21237A033](#)).

It is important to note that many of the most substantial gaps in the Licensing, Oversight, Research, Rulemaking, and Financial Management function areas described below fall within highly technical, specialized fields and professions—many of which are also unique to the nuclear energy field (e.g., nuclear engineers, resident inspectors). In December 2022, the Organization for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA)<sup>12</sup> published a policy brief specific to the importance of education systems in addressing climate change, in part through nuclear science. The policy brief noted that workforce growth specific to nuclear energy has not increased to keep up with significant global increases in energy consumption, and there has been a declining number of qualified graduates to fill nuclear energy roles in many countries. Combined with the fact that an increasingly high number of nuclear experts are retiring or becoming eligible for retirement, the NEA found that education plays a particularly critical role in the ability to keep up with nuclear energy workforce needs. The brief recommended that agencies like the NRC should invest in “continuous and stable engagement in human resource development planning for the long-term timescales that transcend fluctuations in economic cycles” and “include regular, active monitoring of demand and supply capacity” with respect to the ability to complete their work. The NRC’s ongoing SWP program falls directly in line with these recommendations, and the data presented here should be considered within the context of both increasing retirement rates and decreasing graduation rates specific to nuclear energy roles.

### *Licensing*

In the Licensing function area, there are 573 staff members in core positions. The Licensing function area’s overall projected gap of 300 staff by 2027 is attributable to a projected attrition of 181 staff and an increased workload requiring an additional 119 staff. Table 2 displays Licensing’s top 10 core positions with the largest projected workforce gaps alongside core positions that are expected to face 40 percent or greater attrition. Among the top 10 largest projected gaps, there is a relatively equal amount of projected staff attrition (-76 staff) and workload increases (72 staff) accounting for gaps associated with the following: project manager (-94 staff), nuclear engineer (-25 staff), risk analyst (-18 staff), and emergency preparedness specialist (-11 staff). Gaps for other positions—health physicist (-21 staff), electrical/electronics engineer (-13 staff), materials engineer (-13 staff), mechanical engineer (-13 staff), and security specialist (-13 staff)—are mostly attributable to projected staff attrition (-39 staff), but projected workload increases will also require an additional 23 staff. For operations engineer (licensing examiner), there is a very small projected decrease in demand of 1 staff, and thus the gap (-16 staff) is attributable almost entirely to expected attrition (-17 staff).

It is important to note that many of the Licensing roles with the largest projected gaps are highly technical in nature and are likely to substantially impact the NRC’s capacity to conduct evidence-building activities. Gaps may be attributable in part to decreases in availability of relevant training and education programs (e.g., nuclear engineering programs). Additionally, some Licensing gaps may be attributable to competition for qualified graduates and candidates. For example, health physicists and electronics, materials, and mechanical engineers all have broad employment opportunities, and few receive specialized training specific to nuclear energy. Those graduates or candidates who are most qualified to work at the NRC may be lost, in some

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<sup>12</sup> NEA, “Advanced Technology Answers to the Climate Challenge: The Vital Importance of Nuclear Science and Technology Education,” OECD Publishing, Paris, issued 2022. The NEA is an intergovernmental agency with a goal of facilitating cooperation among countries with advanced nuclear technology infrastructures, including the United States. ([https://www.oecd-nea.org/jcms/pl\\_76565](https://www.oecd-nea.org/jcms/pl_76565))

cases, to competing agencies or industry—an issue further exacerbating the difficulty of addressing identified workforce gaps.

**Table 2 Projected 2027 Workforce Gaps in Licensing by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Project manager	179	-50	28%	223	-94
Nuclear engineer	44	-12	27%	57	-25
Health physicist	35	-15	43%	41	-21
Risk analyst	44	-9	20%	53	-18
Operations engineer (licensing examiner)	43	-17	40%	42	-16
Electrical/electronics engineer	25	-9	36%	29	-13
Materials engineer	34	-3	9%	44	-13
Mechanical engineer	18	-12	67%	19	-13
Security Specialist	26	11	42%	28	-13
Reactor systems engineer	24	-6	25%	30	-12
Emergency preparedness specialist	6	-5	83%	12	-11
Information technology specialist (Security)	10	-4	40%	15	-9
Project manager (reactor decommissioning)	9	-7	78%	9	-7
Attorney	11	2	18%	16	-7
Senior attorney	16	2	13%	18	-4
Program manager (Security)	15	-7	47%	13	-5
Structural engineer (NMSS)	4	-3	75%	6	-5
Project manager (transportation)	5	-3	60%	6	-4
Biologist	2	-1	50%	4	-3
Chemical engineer	2	-1	50%	5	-4
Intelligence analyst (Security)	6	0	0%	9	-3
Licensing assistant	14	-6	43%	16	-8
Senior paralegal specialist	1	0	0%	2	-1

\* Core positions with a projected attrition of at least 40% are highlighted in blue.

Results for Licensing in the current (FY 2023) capacity assessment show some notable differences compared to those reported in FY 2022, including the following:

- The gap for project manager nearly doubled, widening by 45 staff.
- The gap for nuclear engineer increased by six staff.
- The gaps for both risk analyst and mechanical engineer increased by three staff.
- For reactor engineer, the previous projected gap was halved, shrinking by nine staff; this core position was not in the top 10 core positions with the largest projected workforce gaps for Licensing.

To further assess risks to the NRC’s capacity to conduct evidence-building activities, the analysis also identified positions with at least 40 percent attrition and a workforce gap of at least three staff projected over the 5-year period from FY 2022 through FY 2027. Within the Licensing function area, the core positions highlighted in blue in Table 2 (above) are projected to face substantial attrition; therefore, these positions also warrant additional attention to ensure that the NRC’s capacity to perform evidence-building activities is not negatively impacted.

### Oversight

In the Oversight function area, there are 492 staff in core positions. This function area’s overall projected gap of 219 staff is attributable to a projected attrition of 160 staff and an increased workload requiring an additional 59 staff by 2027. Among Oversight’s top 10 core positions with the largest projected workforce gaps, there is a relatively equal amount of projected staff attrition (-24 staff) and workload increases (29 staff) accounting for gaps associated with the following: project engineer (Resident Inspector Development Program (RIDP), -30 staff), enforcement specialist (-9 staff), fuel facilities inspector (-8 staff), and reactor systems engineer (-6 staff). Projected staff attrition (-89 staff) rather than workload increases (7 staff) largely accounts for the gaps associated with resident inspector (-45 staff), reactor inspector (-29 staff), and reactor operations engineer (-9 staff). For the physical security inspector position, workload demand is expected to decrease (-4 staff), but there is still an overall gap for this position (-9) due to projected staff attrition by 2027. Gaps for health physicist (-37 staff) and investigator (-15 staff) are slightly more attributable to projected attrition (-34 staff), but projected workload increases will also require an additional 23 staff by 2027.

**Table 3 Projected 2027 Workforce Gaps in Oversight by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Resident inspector	110	-41	37%	114	-45
Health physicist	88	-21	24%	104	-37
Project engineer (RIDP)	47	-14	30%	63	-30
Reactor inspector	83	-26	31%	86	-29
Investigator	18	-10	56%	23	-15
Enforcement specialist	14	-4	29%	19	-9
Reactor operations engineer	28	-9	32%	28	-9
Physical security inspector	37	-13	35%	33	-9
Fuel facilities inspector	4	-3	75%	9	-8
Reactor systems engineer	7	-3	43%	10	-6
Senior attorney	6	-2	33%	5	-1
Reactor inspector (fire protection)	7	-5	71%	7	-5
Fuel materials controls and accounting inspector	2	-1	50%	4	-3
Senior reactor analyst	11	-5	45%	10	-4

\* Core positions with a projected attrition of at least 40% are highlighted in blue.



When comparing the results from the FY 2022 Capacity Assessment to the current (FY 2023) capacity assessment, gaps for both project engineer (RIDP) and the specific health physicist (materials inspector/license reviewer) core positions slightly increased by four staff. Another particularly notable difference when comparing results from the FY 2022 and FY 2023 Capacity Assessments is that gaps for the resident inspector and reactor inspector positions more than doubled, increasing by 27 staff and 18 staff, respectively. During HEART focus groups conducted in the summer of 2022, resident inspectors described the uniqueness of their roles and reiterated the value of any additional flexibility that the NRC could offer to retain resident inspectors in its hybrid work environment. These gaps were already among the most critical identified at the NRC, so it is especially important that attention be paid in the years ahead to filling these roles, optimizing the agency's ability to meet the specific needs of resident inspectors and, ultimately, recruiting and retaining resident inspectors.

The core positions highlighted in blue in Table 3 (above) are projected to face substantial attrition within Oversight. In addition to the other gaps identified above for the Oversight function area, these positions are at risk of high rates of attrition by 2027 that may impact the NRC's capacity to perform evidence-building activities if not mitigated.

*Emergency Preparedness & Incident Response*

In the Emergency Preparedness & Incident Response function area, there are 51 staff members in core positions. This function area's overall projected gap of 37 staff is attributable to a projected attrition of 23 staff and an increased workload requiring an additional 14 staff by 2027. Among Emergency Preparedness & Incident Response core positions with the largest projected workforce gaps, the most significant gaps identified were for emergency response coordinators (-13 staff) and emergency preparedness specialists (-11 staff), with projected staff attrition and workload increases contributing to both gaps. Gaps for emergency preparedness inspectors (-5 staff), headquarters operations officers (HOOs)/headquarters emergency response officers (HEROs) (-5 staff), and emergency preparedness specialists (-3 staff) are slightly more attributable to projected attrition (-9 staff), but projected workload will also require an additional 4 staff by 2027.

**Table 4 Projected 2027 Workforce Gaps in Emergency Preparedness & Incident Response by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Emergency response coordinator	18	-8	44%	23	-13
Emergency preparedness specialist (Licensing)	7	-6	86%	12	-11
Emergency preparedness inspector	8	-3	38%	10	-5
HOO/HERO	12	-4	33%	13	-5
Emergency preparedness specialist (Oversight)	6	-2	33%	7	-3

\* Core positions with a projected attrition of at least 40% are highlighted in blue.

The core positions highlighted in blue in Table 4 (above) are projected to face substantial attrition within Emergency Preparedness & Incident Response by 2027, which warrants further consideration of mitigating strategies to prevent the NRC from experiencing a reduced capacity to conduct emergency preparedness and incident response activities in the years ahead.

### Research

In the Research function area, there are 127 staff in core positions. This function area’s projected gap of 75 staff by the year 2027 is attributable to a projected attrition of 48 staff and an increased workload requiring an additional 27 staff. Among Research’s core positions with the largest projected workforce gaps, an equal amount of projected staff attrition (-12 staff) and workload increases (12 staff) account for gaps associated with the following: materials engineer (-12 staff), health physicist (-8 staff), and reactor systems engineer (severe accident/source term; -4 staff). Projected staff attrition (-16 staff), rather than workload increases (4 staff), largely accounts for the gaps associated with risk analyst (-12 staff), reactor systems engineer (thermal hydraulic; -4 staff), and project manager (-4 staff) positions. The gaps for reactor systems engineer (neutronics; -8 staff) and reactor engineer (-4 staff) are attributable almost entirely to a projected increase in workload (11 staff), with expected attrition of one staff member for the latter. Table 5 displays the results of Research SWP analyses.

It is important to note that these Research core positions represent highly technical roles that substantially contribute to the NRC’s ability to conduct evidence-building activities. The largest gaps—those for the positions of materials engineer, risk analyst, health physicist, and reactor systems engineer (neutronics)—all represent fields that either allow graduates/candidates to explore numerous job opportunities outside of nuclear energy or are so specific to nuclear energy that they are subject to substantial impact from declining nuclear education programs. These factors, accompanied by projected attrition and projected increases in workforce demand, indicate that the gaps described here may be particularly difficult to fill and warrant substantial attention.

**Table 5 Projected 2027 Workforce Gaps in Research by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Materials engineer	19	-6	32%	25	-12
Risk analyst	20	-9	45%	23	-12
Health physicist	6	-4	67%	10	-8
Reactor systems engineer (neutronics)	3	0	0%	11	-8
Reactor systems engineer (severe accident/source term)	3	-2	67%	5	-4
Reactor systems engineer (thermal hydraulic)	13	-3	23%	14	-4
Project manager	10	-4	40%	10	-4
Reactor engineer	3	-1	33%	6	-4

\* Core positions with a projected attrition of at least 40% are highlighted in blue.

When comparing FY 2022 and FY 2023 Capacity Assessment results regarding SWP data, some differences are apparent, including the following:

- The gaps for risk analyst and reactor systems engineer (neutronics) more than doubled, increasing by seven staff and five staff, respectively.
- The gap for reactor systems engineer (severe accident/source term) increased minimally by one staff member.
- Human factors analyst/engineer had a notable gap in the FY 2022 Capacity Assessment but not in the current results; its associated gap decreased minimally by one staff.

Finally, the core positions identified with blue highlighting in Table 5 (above) showed high projected attrition rates that warrant further consideration of mitigating strategies to prevent the NRC from experiencing a reduced capacity to conduct evidence-building activities in the years ahead.

### *Rulemaking*

In the Rulemaking function area, there are 39 staff in core positions. This function area’s projected gap of 26 staff is attributable to the projected attrition of 15 staff and increased workload requiring an additional 11 staff by 2027. The following five core positions constitute all of Rulemaking’s workforce gaps: project manager (-11 staff), regulations specialist (-6 staff), cost analyst (-5 staff), senior attorney (-3 staff), and attorney (-1 staff). Gaps in project manager and regulations specialist roles are attributable to a projected increase in workload requiring 11 additional staff, as well as projected attrition of 6 staff, whereas the projected gaps in cost analyst and attorney roles are entirely attributable to attrition (-9 staff) with no expected increase in workload.

**Table 6 Projected 2027 Workforce Gaps in Rulemaking by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Project manager	19	-4	21%	26	-11
Regulations specialist	5	-2	40%	9	-6
Cost analyst	5	-5	100%	5	-5
Senior attorney	4	-2	50%	5	-3
Attorney	6	-2	33%	5	-1

\* Core positions with a projected attrition of at least 40% are highlighted in blue.

Current SWP findings for Rulemaking show some slight differences compared to those reported in the FY 2022 Capacity Assessment:

- The gap for project manager increased by four staff.
- The gap for regulations specialist increased by three staff.
- The gap for cost analyst increased by two staff.

Four of the five core positions in Table 6 are highlighted in blue to reflect that they are at risk of substantial attrition. Given high projected rates of attrition, these positions may represent high

degrees of risk to the NRC’s capacity to perform rulemaking activities unless mitigating strategies are undertaken in the years ahead.

### *Financial Management*

In the Financial Management function area, there are a total of 125 staff in core positions. This function area’s overall projected gap of 55 staff is attributable to the projected attrition of 45 staff and workload increases of 10 staff. In Financial Management, four core positions have substantial workforce gaps projected by 2027: management and program analyst (-23 staff), financial management specialist (-13 staff), budget analyst (-10 staff), and accountant (-7 staff). Table 7 displays these four substantial gaps. Across the four identified core positions, gaps are largely attributable to projected staff attrition (-40 staff), rather than to expected workload increases (13 staff). Compared to the gaps reported in the FY 2022 Capacity Assessment, the gap for accountant increased minimally by three staff, and the gap for budget analyst increased minimally by two staff.

**Table 7 Projected 2027 Workforce Gaps in Financial Management by Gap Size**

Core Position	Current Workforce (Supply)	Projected Workforce Attrition	Projected Workforce Attrition %*	Projected 2027 Workforce (Demand)	Projected Workforce Gap
Management and program analyst	54	-22	41%	55	-23
Financial management specialist	24	-9	38%	28	-13
Budget analyst	19	-6	32%	23	-10
Accountant	20	-3	15%	24	-7

\* Core positions with a projected attrition of at least 40% are highlighted in blue.

Financial Management SWP data were also analyzed to identify core positions that may be particularly susceptible to attrition. In the Financial Management function area, the projected attrition of 22 management and program analyst staff represents 41 percent of the current supply; as such, this position warrants particular attention to ensure that the NRC’s capacity to perform evidence-building activities is not negatively impacted.

It is important to note that the identified Financial Management roles are generally subject to substantial competition from other agencies and organizations. Although the NRC’s Financial Management staff come with or acquire agency- and field-specific knowledge that substantially benefits the agency, they are generally not tied specifically to the nuclear industry and may leave the NRC for roles at other agencies and organizations. Thus, efforts to retain highly qualified and highly performing staff within Financial Management would be particularly valuable to the NRC’s capacity to conduct evidence-building activities in support of the agency’s mission.

### ***Budget and Program Resources***

To further explore trends and potential challenges related to the NRC’s capacity for conducting evidence-building activities, the agency’s budgetary resources were examined over time. The NRC’s budget decreased by 4.1 percent between FY 2015 and FY 2024. Since FY 2015, the 3 years with the smallest enacted budgets were FY 2020, FY 2021, and FY 2022—budgets made up of approximately \$150 million less than that of FY 2014.

Within the NRC’s budget, resources for each key agency function are segmented by business line, each representing a set of services and products the agency provides to the public. The Nuclear Reactor Safety Program includes two business lines: Operating Reactors and New Reactors. An additional budget line, Advanced Reactors, is included in this program, with resources combined with the New Reactors budget line where applicable. The Nuclear Materials and Waste Safety Program includes four business lines: Spent Fuel Storage and Transportation, Nuclear Materials Users, Decommissioning and Low-Level Waste, and Fuel Facilities. Other business lines include Corporate Support, High-Level Waste, and the University Nuclear Leadership Program. Of these additional business lines, only Corporate Support is included in the current FY 2023 Capacity Assessment, as it is the sole business line under which resources are allocated to the Financial Management function area—a focal function area throughout this report.

Table 8 displays the FY 2022 enacted appropriations, FY 2023 enacted appropriations, and FY 2024 requested budget by function area, showing dollar amounts in millions and percent allocated per program or individual business line. Looking across FY 2022 and 2023, nearly all budgeted amounts increased from the FY 2022 enacted budget to the FY 2023 enacted appropriations, with the exception of the Research function area’s Nuclear Materials and Waste Safety Program budget (decrease of \$1.3 million). Across FY 2023 and 2024, most budgeted amounts again increased from the FY 2023 enacted appropriations to the FY 2024 requested budget, with the exception of the Research and Rulemaking function areas’ Nuclear Materials and Waste Safety Program budgeted amounts remaining flat at \$4.0 million. Following Table 8, additional details are provided about each of the five focal function areas listed in the table.

**Table 8 FY 2022–FY 2023 Enacted and FY 2024 Requested Budget**

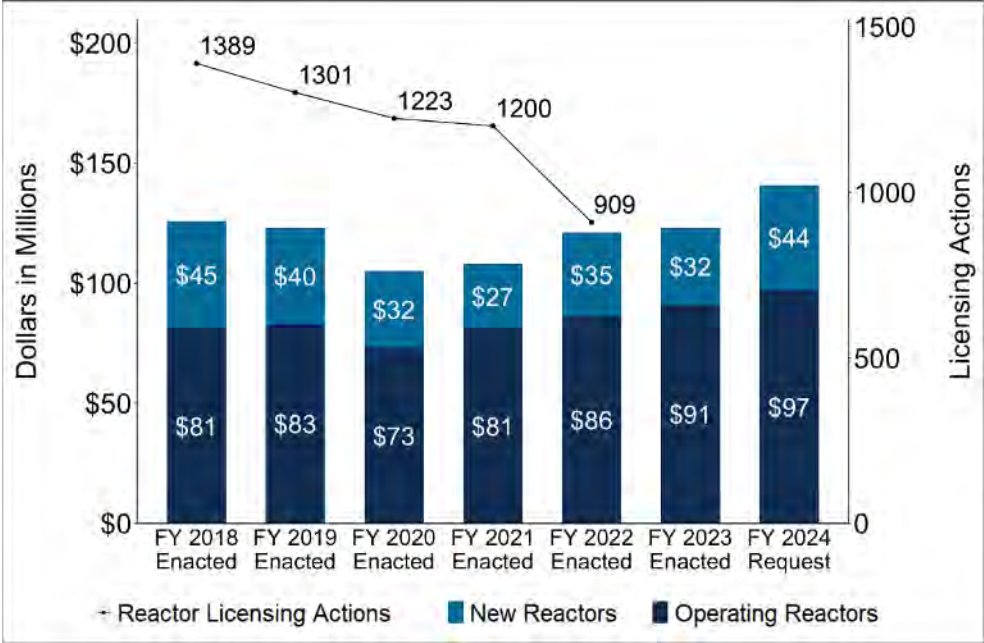
Function Area	Business Line/ Program	FY 2022 Enacted (% of Function Area’s Total)	FY 2023 Enacted (% of Function Area’s Total)	FY 2024 Request (% of Function Area’s Total)
Financial Management	Corporate Support	\$30.7M <sup>13</sup> (100.0%)	\$33.1M (100.0%)	\$35.5M (100%)
Licensing	Nuclear Reactor Safety Program	\$121.5M (76.2%)	\$123.1M (74.7%)	\$140.3M (74.0%)
	Nuclear Materials and Waste Safety Program	\$37.9M (23.8%)	\$41.7M (25.3%)	\$49.2M (26.0%)
Oversight	Nuclear Reactor Safety Program	\$130.1M (83.3%)	\$133.4 (82.9%)	\$135.1M (81.6%)
	Nuclear Materials and Waste Safety Program	\$26.1M (16.7%)	\$27.8M (17.1%)	\$30.5M (18.4%)
Research	Nuclear Reactor Safety Program	\$76.1M (93.5%)	\$78.4M (95.1%)	\$92.3 (95.8%)

<sup>13</sup> “M” is used throughout Table 8 as an abbreviation for million.

	Nuclear Materials and Waste Safety Program	\$5.3M (6.5%)	\$4.0M (4.9%)	\$4.0 (4.2%)
Rulemaking	Nuclear Reactor Safety Program	\$14.6M (76.4%)	\$16.1M (77.0%)	\$16.8 (77.4%)
	Nuclear Materials and Waste Safety Program	\$4.5M (23.6%)	\$4.8M (23.0%)	\$4.9 (22.6%)

*Licensing*

Trends in the Licensing function area’s resources and work were examined to determine any potential challenges to the NRC’s capacity to conduct evidence-building activities. Figure 3 shows the trend in resources for reactor licensing along with the number of licensing actions completed. It is important to note that resources and licensing action counts apply to the entire licensing program rather than evidence-building activities alone.



**Figure 3 Nuclear Reactor Safety Program Licensing Resources and Actions<sup>14</sup>**

Approximately three-quarters of the Licensing function area’s budget is associated with the Nuclear Reactor Safety Program. Licensing resources for the Nuclear Reactor Safety Program increased from \$108 million in FY 2021 to \$121 million in FY 2022 (approximately 12 percent increase). As described in the Agency Environmental Scan (see Appendix A), over the next 5 years and beyond, the nuclear industry is expected to grow gradually with the addition of new technologies, designs, and new applications outside the traditional power plants. The FY 2023

<sup>14</sup> Resources shown in Figures 3–11 may not match those listed in Table 8 due to rounding.

enacted appropriations and the FY 2024 budget request for Licensing reflect this anticipated growth.

Nuclear Reactor Safety Program Licensing actions decreased from 1,200 in FY 2021 to 909 in FY 2022. Although this decrease appears substantial, 263 of the Licensing actions completed in FY 2021 were COVID-19-related actions, compared to only 23 COVID-19-related actions completed in FY 2022. COVID-19-related actions thus account for most of the difference in Licensing actions between FY 2021 and FY 2022. When COVID-19-related actions are subtracted out from the total reported actions within each fiscal year, a total of 937 actions were completed in FY 2021, compared to 886 completed in FY 2022; this difference represents a decrease of approximately 5 percent in Licensing actions completed.

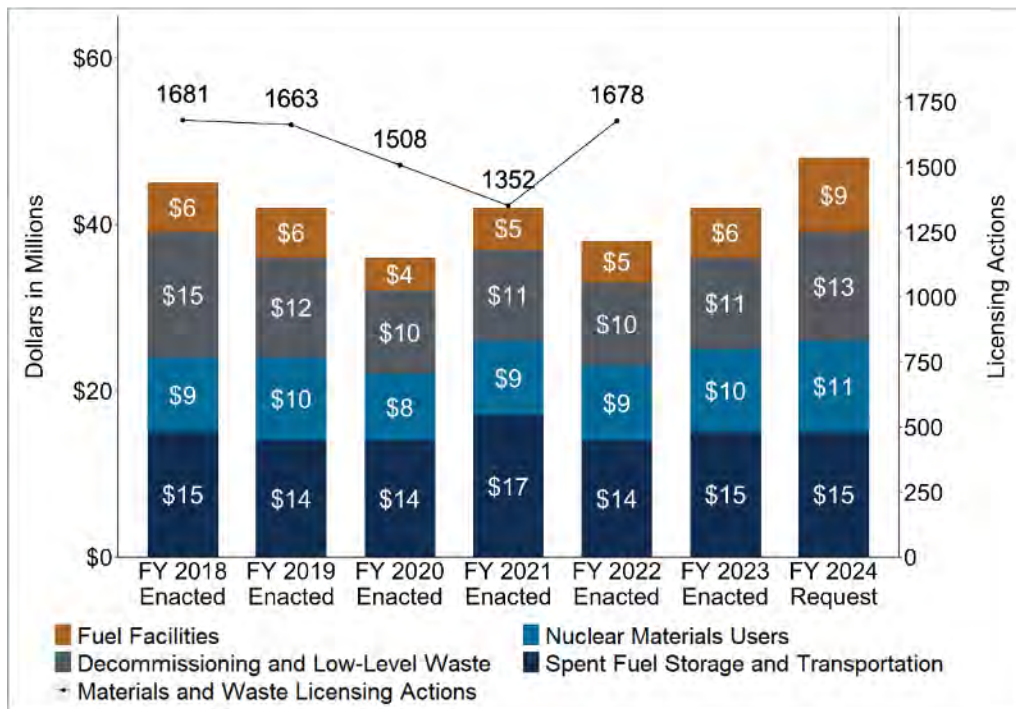
It is also important to note that the complexity of licensing actions has increased over time, corresponding with an increase in the number of licensing applications related to new reactor designs and significant modifications to existing designs (e.g., digital modernization projects for control systems at operating power reactors). The review of such applications typically requires a greater expenditure of resources. Therefore, the downward trend observed in the total number of licensing actions completed does not necessarily reflect a commensurate decrease in NRC staff licensing efforts. Additionally, the agency has established a priority question related to the efficiency of its licensing processes, as discussed in the NRC's Evidence-Building Plan,<sup>15</sup> and the agency plans to conduct a systematic process evaluation to identify potential opportunities to increase efficiency, as discussed in the FY 2024 Evaluation Plan.<sup>16</sup>

Figure 4 displays similar data for the Nuclear Materials and Waste Safety Program, showing that this program saw a slight decrease in Licensing-specific resources from \$42 million in FY 2021 to \$38 million in FY 2022 (approximately 10 percent decrease) and an increase in licensing activities from 1,352 in FY 2021 to 1,678 in FY 2022 (approximately 24 percent increase). The FY 2023 enacted appropriations and the FY 2024 budget request for Licensing reflect an increased need for resources in the Nuclear Materials and Waste Safety Program, partially driven by Licensing actions for power reactors entering decommissioning, reviews of transportation packages for accident tolerant fuel (ATF), one transportable microreactor application, and one new fuel facility license application (see Appendix A).

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<sup>15</sup> NUREG-2252, "Evidence-Building Plan Fiscal Year 2022," Volume 1, issued April 2022 ([ML22066B056](#)).

<sup>16</sup> The FY 2024 Annual Evaluation Plan is available in ADAMS at Accession No. [ML23073A062](#).



**Figure 4 Nuclear Materials and Waste Safety Program Licensing Resources and Actions**

*Oversight*

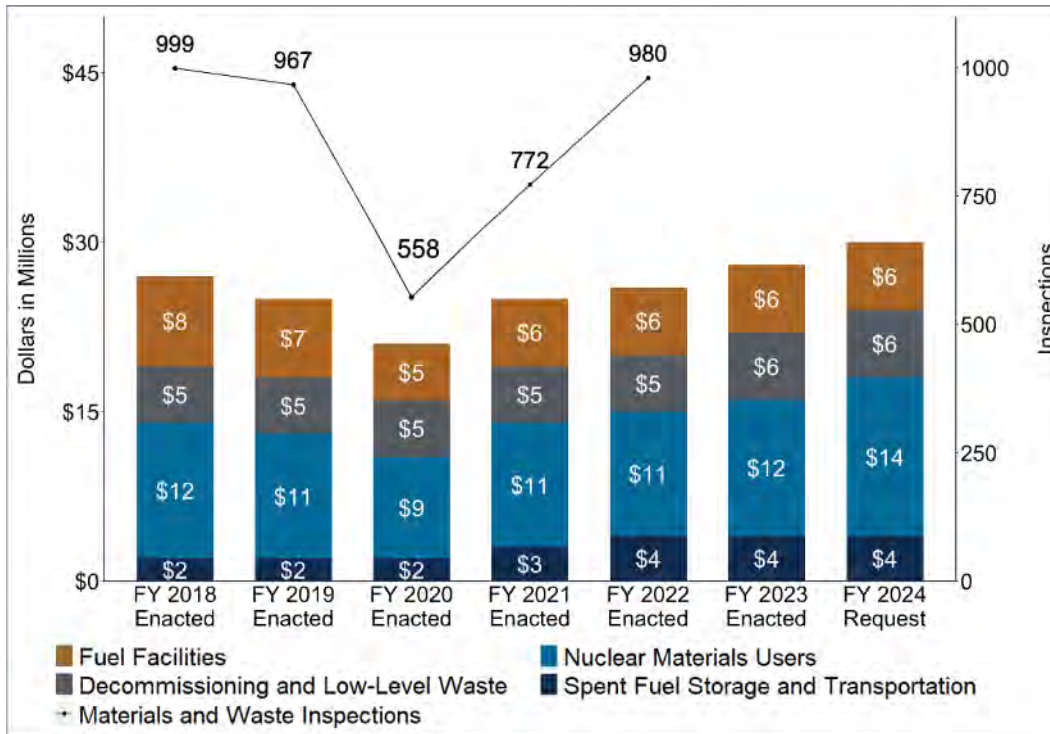
Trends in resources and work were also examined to identify any challenges to the NRC’s capacity to conduct evidence-building activities in the Oversight function area. More than 80 percent of the NRC’s Oversight budget in recent years is associated with the Nuclear Reactor Safety Program. Oversight’s role in the Nuclear Reactor Safety Program largely focuses on inspections of operating reactors, for which fewer innovations are being seen (see Appendix A). As shown in Figure 5, the number of Nuclear Reactor Safety Program inspections increased approximately 9 percent from FY 2021 to FY 2022. Oversight resources for this program largely remained flat from \$128 million in FY 2021 to \$130 million in FY 2022 (approximately 2 percent increase; see Figure 5). The percentage of resources allocated to new reactors has decreased since FY 2018.





**Figure 5 Nuclear Reactor Safety Program Oversight Resources and Inspections**

As shown in Figure 6, from FY 2021 to FY 2022, the Nuclear Materials and Waste Safety Program’s resources within the Oversight function remained relatively flat, minimally increasing from approximately \$24 million to approximately \$26 million (approximately 4 percent increase); however, the annual number of inspections increased from 772 in FY 2021 to 980 in FY 2022 (approximately 27 percent increase). NRC Oversight staff indicated that this increase in inspections stems largely from the effects of the pandemic waning and postponed inspections being completed. The FY 2023 enacted Oversight appropriations and the FY 2024 requested Oversight budget for the Nuclear Materials and Waste Safety Program increase from approximately \$28 million to approximately \$31 million, respectively. An increased need for Oversight support is anticipated in areas such as decommissioning, facilities implementing aging management programs, amendments for higher enrichments above 5 weight percent, a construction inspection program, and new fuel fabrication and medical isotope production facilities. These needs are noted in the Agency Environmental Scan (see Appendix A).



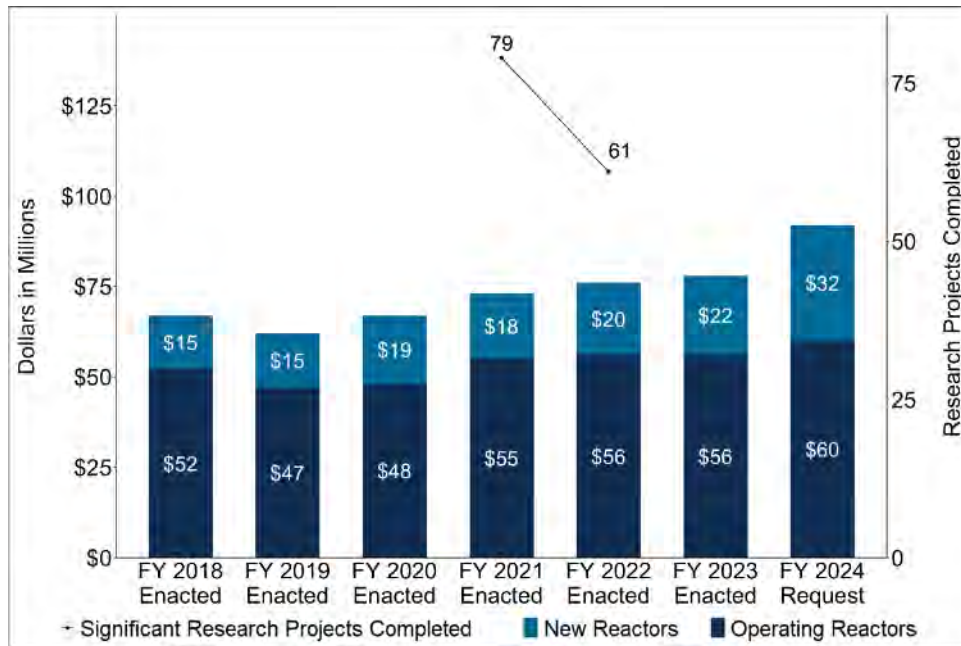
**Figure 6 Nuclear Materials and Waste Safety Program Oversight Resources and Inspections**

*Research*

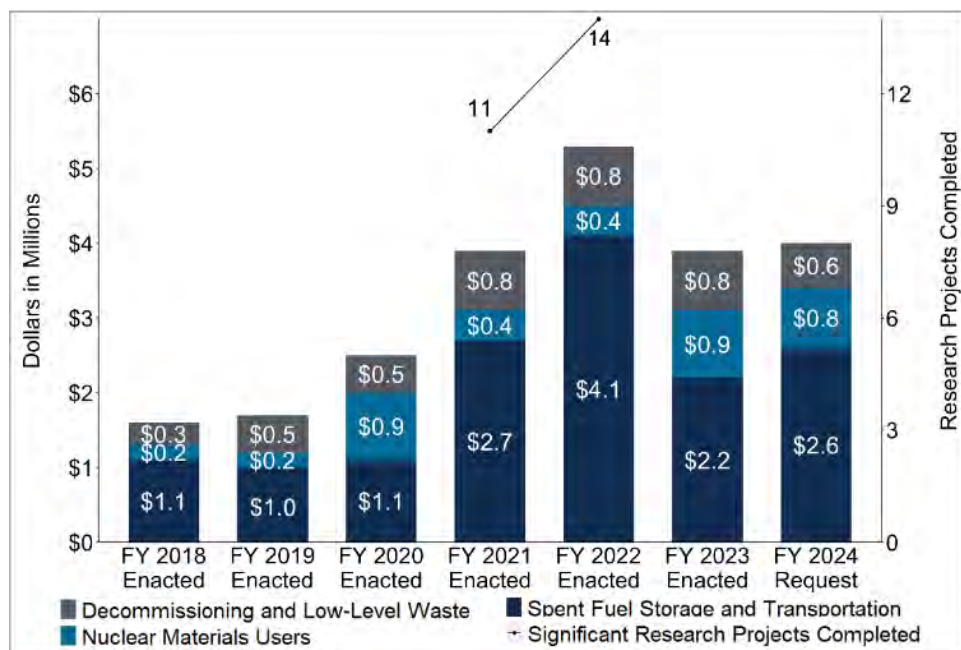
In recent years, more than three-quarters of the NRC’s Research budget has supported the Nuclear Reactor Safety Program. As shown in Figure 7, from FY 2021 to FY 2022, Research resources for this program increased from \$73 million to \$76 million (approximately 4 percent increase). At the same time, the number of completed significant projects (those designated by an office-level or higher deliverable) in Research decreased from 79 to 61 (approximately 23 percent decrease). However, it is important to note that projects in Research differ dramatically in scope and level of effort; and, thus, the number of projects completed does not provide a full view of the work conducted in the Research function area. For example, in FY 2022, the Research program completed larger, more resource-intensive deliverables associated with readiness for ATF and non-LWR technologies. To better track work products, the Research program is developing an enhanced operating plan tool to better track deliverables and will better define significant projects to ensure consistency across the office. Completion of significant research projects was first tracked in FY 2021, so trends are expected to become useful as more datapoints accumulate in the coming years. The FY 2023 enacted appropriations and the FY 2024 requested Research budget for the Nuclear Reactor Safety Program increased from \$78 million to \$92 million (approximately 18 percent increase). Staff efforts are focused on continuing to prepare for and support licensing and oversight of the operating fleet, small modular reactors, and advanced reactors. Additionally, staff are supporting innovative efforts related to advanced construction techniques and applications of artificial intelligence, among others (see Appendix A).

Compared to the Nuclear Reactor Safety Program, the Nuclear Materials and Waste Safety Program makes up substantially less of the allocated Research budget. Figure 8 shows

resources and completed projects specific to the Nuclear Materials and Waste Safety Program. From FY 2021 to FY 2022, the Research budget allocated to this program increased from \$3.9 million to \$5.3 million (approximately 36 percent increase), while the number of significant projects completed increased from 11 to 14 (approximately 27 percent increase). Utilizing these resources, the NRC plans, among other activities, to continue ATF technologies research, as well as research on associated enrichment, fabrication, transportation, and storage aspects to ensure that public health and safety are maintained (see Appendix A).



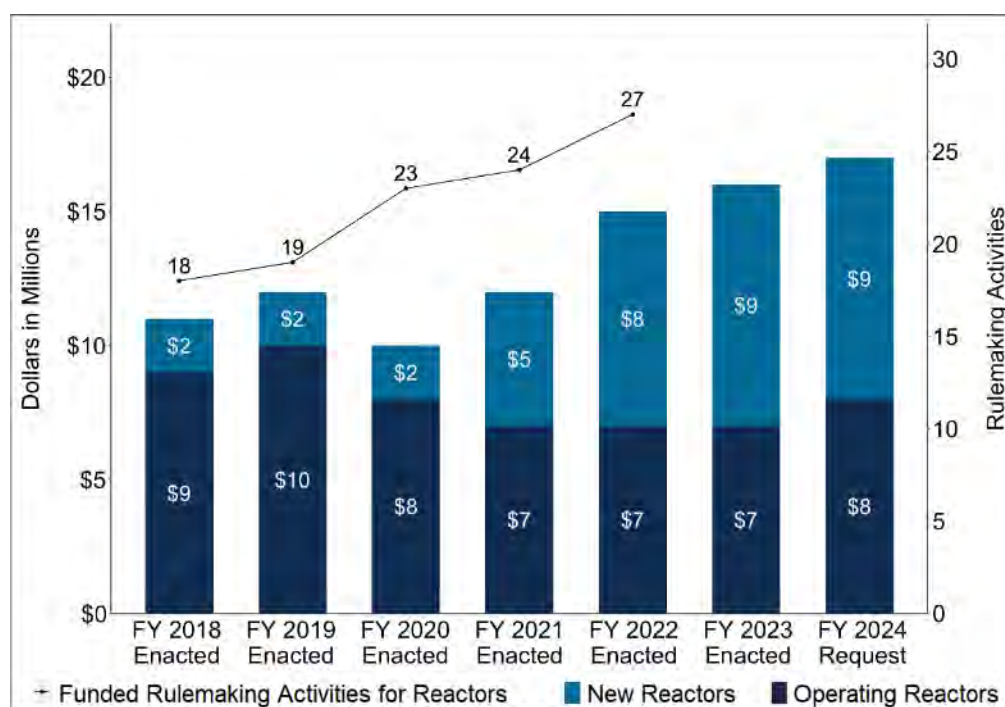
**Figure 7 Nuclear Reactor Safety Program Research Resources and Projects**



**Figure 8 Nuclear Materials and Waste Safety Program Research Resources and Projects**

## Rulemaking

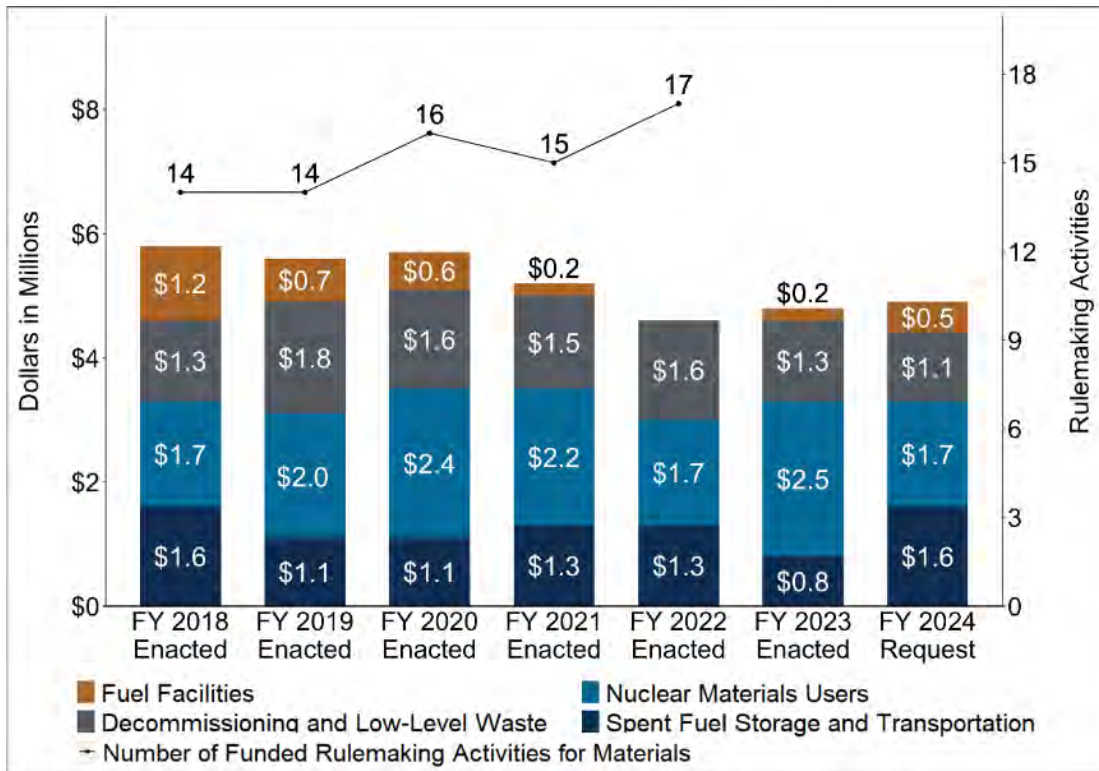
Trends in resources and work were also examined to explore any possible challenges to the NRC’s ability to conduct evidence-building activities in the Rulemaking function area. The agency is currently undertaking efforts to improve and innovate the rulemaking product development cycle (see Appendix A). More than three-quarters of the NRC’s Rulemaking budget supports the Nuclear Reactor Safety Program. From FY 2021 to FY 2022, resources for this program increased from \$12 million to \$15 million (approximately 25 percent increase), and the number of rulemaking activities completed increased from 24 to 27 (approximately 13 percent increase). Moreover, within Rulemaking, the FY 2023 enacted appropriations to the FY 2024 requested budget for this program increased from \$16 million to \$17 million (approximately 6 percent increase). Figure 9 depicts an overall upward trend of resources and activities dedicated to the Nuclear Reactor Safety Program within the Rulemaking function area. Rulemaking activities for this program are projected to further increase from FY 2022 to FY 2023 and FY 2024 (see Appendix A). The increase in resources and activity for this program within Rulemaking are attributable, in part, to factors such as the expected 2026 publication of the Increased Enrichment final rule, the Subsequent License Environmental Directorate’s efforts, and the development of draft proposed rules for the Alternative Physical Security Requirements for Advanced Reactors and the Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (Part 53; see Appendix A).



**Figure 9 Nuclear Reactor Safety Program Rulemaking Resources and Activities**

Compared to the Nuclear Reactor Safety Program, the Nuclear Materials and Waste Safety Program makes up less of the allocated Rulemaking budget. From FY 2021 to FY 2022, the budget allocated to this program within Rulemaking decreased from \$5.2 million to \$4.5 million (approximately 13 percent decrease), whereas the number activities completed increased from 15 to 17 (approximately 6 percent increase). Minimal increases to the budget and activities

associated with this program are projected for FY 2023 and FY 2024 (see Figure 10 and Appendix A). Ongoing rulemaking efforts for this program involve the anticipated 2024 publication of a final Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning rule and other rulemaking activities accommodating the use of emerging medical technologies (see Appendix A).



**Figure 10 Nuclear Materials and Waste Safety Program Rulemaking Resources and Activities**

*Financial Management*

Budgeted resources for Financial Management as a function area have changed little since FY 2018, ranging from \$30 million to \$36 million (see Figure 11). The FY 2024 NRC Request for corporate support functions (of which financial management is a part) reflects the agency’s efforts to comply with the corporate support cap the Nuclear Energy Innovation and Modernization Act (NEIMA) to the maximum extent practicable. The increase in the FY 2024 Request is primarily driven due to increases in salaries and benefits, consistent with OMB guidance. The budgetary constraints imposed by NEIMA have created challenges for the NRC. It will be important for the agency to identify opportunities (e.g., shared services, seat management) that would enable corporate support functions to operate effectively with available resources (see Appendix A).



**Figure 11 Financial Management Resources**

## LICENSING

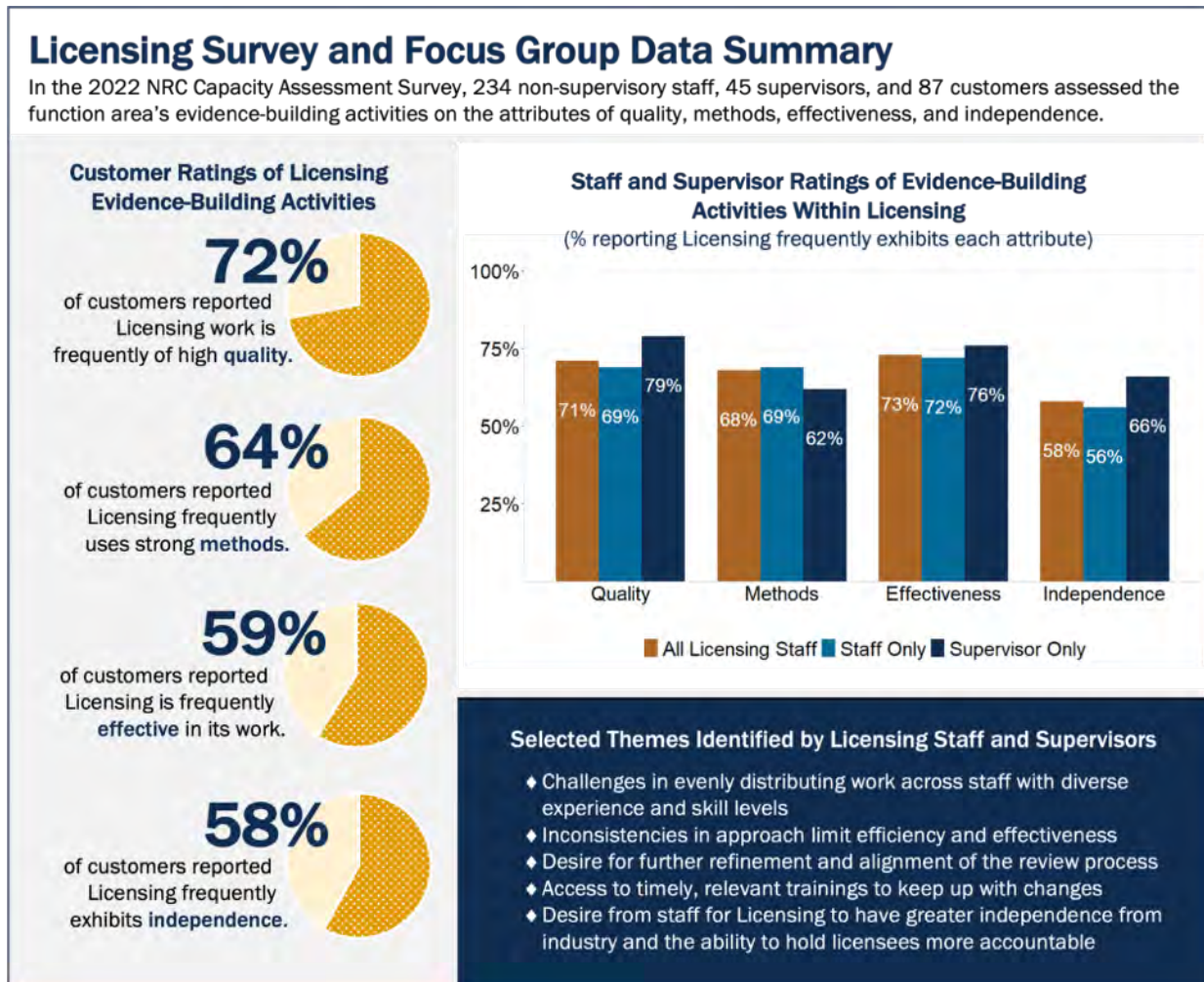
The NRC's Licensing function area supports the agency's mission of protecting public health and safety by reviewing applications for the use of radioactive materials to ensure that the applicant's assumptions are technically correct and that the proposed activities can be conducted safely and will not adversely impact the environment. The NRC issues licenses (or certificates, in the case of spent fuel storage casks and nuclear materials transportation packages) to possess and use nuclear materials and operate nuclear facilities. Upon receipt of an application, the NRC performs analyses to determine whether the proposed activity can be conducted safely and securely in conformance with applicable regulations. Through the licensing process, the NRC may authorize an applicant to conduct any of the following activities:

- Construct and operate commercial reactors and fuel cycle facilities, including decommissioning and license termination.
- Possess, use, process, export, and import nuclear materials and waste and handle certain aspects of their transportation.
- Site, design, construct, operate, and close waste disposal sites.

### ***Quality, Methods, Independence, and Effectiveness***

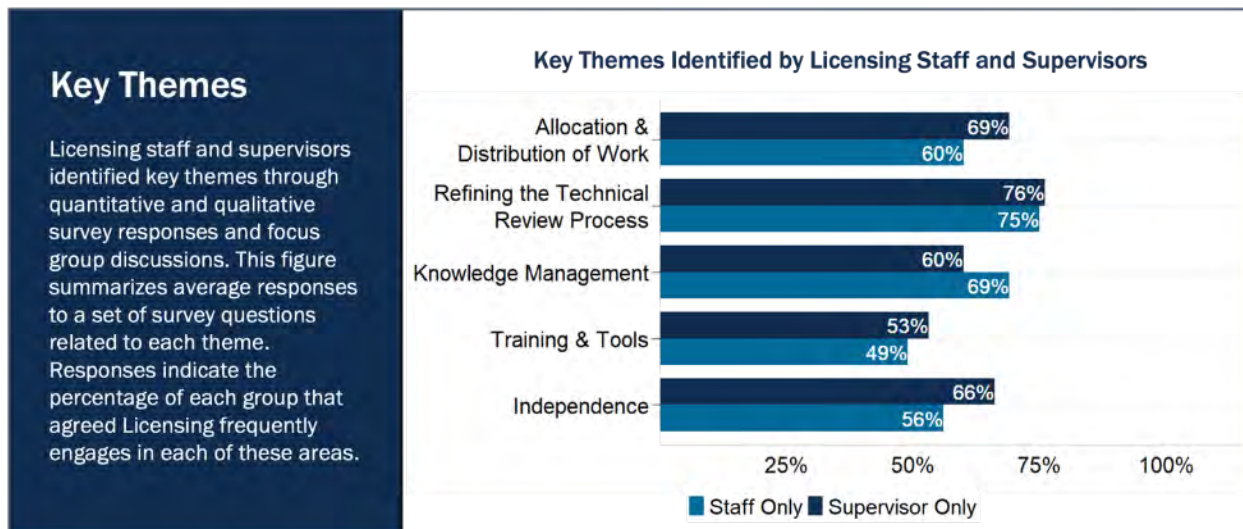
Data collection for the FY 2023 Capacity Assessment included survey responses from 279 participants who identified that they most directly supported the Licensing function area over the past year. Of the 279 respondents, 234 were nonsupervisory staff, 31 were branch chiefs or team leaders, and 14 were senior managers. In addition to the survey, five branch chiefs and team leaders from the Licensing function area participated in a focus group. Figure 12 presents a summary of aggregated survey and focus group results specific to the Licensing function area.

Licensing staff rated the extent to which the following four attributes are exhibited throughout the conduct of evidence-building activities in their function area: quality, methods, effectiveness, and independence. Figure 12 displays the percentage of respondents who indicated, based on an aggregation of their responses to survey questions, that Licensing staff are integrating these attributes into evidence-building activities between 70 and 100 percent of the time, which is defined by the term “frequently” throughout this section.



**Figure 12 Licensing Data Summary**

Qualitative and quantitative data revealed five key themes related to Licensing, including allocation and distribution of work, refining the technical review process, increasing efficiencies, training and tools, and independence. Figure 13 summarizes the key themes specific to the Licensing function area.



**Figure 13 Licensing Key Themes**

**Allocation and distribution of work** emerged as the first theme, focusing specifically on the challenges of evenly distributing workloads across staff with varying levels of expertise. Two survey items are associated with this theme, and they focus on the extent to which (1) staff time and effort are allocated appropriately based on mission significance and (2) resources are expended efficiently. Supervisors were slightly more likely (69 percent) than staff (60 percent) to report that these activities are happening frequently. Staff, particularly from the Office of Nuclear Reactor Regulation (NRR) and the Office of Nuclear Material Safety and Safeguards (NMSS), shared that workloads tend to be unevenly distributed, with a few senior staff members carrying a disproportionately heavy workload. Additionally, staff shared a desire for tasks to be better matched with an employee’s skill level, with more experienced staff working on projects that feature a high level of mission significance. Other comments suggested more clearly defining roles and responsibilities, holding staff more accountable for completing work in a timely manner, and providing more in-depth feedback for lower performers to help improve the quality of outputs coming from Licensing.

**Refining the technical review process** emerged as the second theme, relating to the need for greater coordination and communication throughout licensing activities. This theme is associated with two survey items that inquire about the frequency with which Licensing staff use appropriately high-quality data and are able to determine when to apply simple versus complex methods. Supervisor and staff responses to these items were very similar, with 76 percent of supervisors and 75 percent of staff saying they are frequently able to achieve these outcomes. To improve effectiveness, staff suggested ensuring that project managers have expertise in licensing principles and are involved in upper management briefings, retaining core teams whenever possible to reduce gaps in communication, and ensuring alignment with the Office of Nuclear Regulatory Research (RES). In particular, staff from NRR expressed a desire for greater intra-agency coordination and communication. Staff from both NRR and NMSS also commented on the use of data throughout the licensing process. For example, some said that making use of data and operating experience should be a more integral part of the licensing process. Multiple nonsupervisory staff from NRR also shared that mandatory or formal peer reviews should be instated to increase quality in Licensing. Branch chiefs and team leaders noted the value in limiting the scope of licensing reviews and setting clear expectations from the



beginning of each review, as well as documenting processes and expectations to maintain consistency throughout staffing changes and turnover.

**Knowledge management** is the third theme and is related to two survey items, the first of which focuses on being able to rely on established procedures, guides, and standards, while the second relates to capturing best practices and lessons learned. Staff were somewhat more likely to report that these practices occur frequently, with 69 percent of staff providing these ratings compared to 60 percent of supervisors. Qualitative comments revealed differing experiences between offices, with staff from NRR and the four regional offices expressing the need for more consistency within procedures (e.g., approach to work and capturing lessons learned) to optimize efficiency, while staff from NMSS requested more flexibility in their approach to adapt to challenges and keep projects progressing. Branch chiefs also emphasized differing experiences with processes and procedures. Generally, most shared the perspective that there are processes and procedures in place—with some exceptions for particularly novel or time-sensitive work—but keeping processes and procedures up to date requires a high degree of manual, labor-intensive work.

**Training and tools** emerged as the fourth theme, emphasizing the continued need to provide access to trainings and updated technology and tools. This theme is related to three survey items that assess (1) perceptions regarding use of internal trainings, (2) perceptions regarding the use of external trainings, and (3) access to software and computational tools needed for the job. Of the five themes, supervisor and staff ratings of these items were the lowest, on average; in other words, use of trainings and access to needed software and tools were reported to be less frequent than the outcomes associated with any other Licensing theme. Approximately half of supervisors (53 percent) and staff (49 percent) said that Licensing frequently takes advantage of internal and external trainings and that staff have the necessary software and computational tools. Staff requested more timely and relevant trainings, including additional skill-building in computational tools and analyses used by licensees and applicants. Staff, primarily from NMSS, also noted that technologies used by applicants and licensees tend to outpace those used by the NRC, and staff find it difficult to stay current with the latest advances. Branch chiefs also emphasized that additional training is needed to increase the consistency of skill levels among staff.

**Independence** emerged as the final theme related to evidence-building activities within the Licensing function area. Data from four survey items aligned with this theme; these survey items measured staff perception of the extent to which (1) staff are supported in performing work in a manner that is free from undue external influences, (2) staff are supported in performing work in a manner that is free from undue internal agency influences, (3) reasonable measures have been taken to reduce bias, and (4) contractors supporting the Licensing function area's evidence-building activities are free from others' undue influence. Among supervisors, 66 percent indicated that Licensing frequently works independently in these four areas, compared to 56 percent of staff. Most comments came from staff in NRR and NMSS, with very few comments from staff in the four regions. Staff brought up three main concerns specific to working with licensees: a need for more effective communication (e.g., clearly communicating NRC expectations to applicants), the ability to hold licensees more accountable (e.g., requiring that licensees submit necessary information in a timely manner), and a general need to avoid the perception of a lack of independence from industry (e.g., limiting communications between managers and licensees, for example, through drop-in meetings).

## Differences in Perspectives

### *Supervisory Licensing Staff*

Although supervisors and staff from Licensing expressed similar perspectives on the attributes of quality and effectiveness, ratings of items focused on methods and independence did differ demonstrably. These differences are summarized as follows:

- Nonsupervisory staff tended to rate items within the methods attribute somewhat higher, or happening more often, than did supervisory staff, but the differences were still relatively small. For example, one item asked whether staff were able to determine when to apply simple versus complex methods. A total of 74 percent of nonsupervisory staff reported that staff in Licensing do this frequently, compared to 80 percent of supervisory staff.
- With respect to independence, supervisors tended to more often perceive that the Licensing function area was operating independently than did nonsupervisory staff. For example, 69 percent of supervisors felt Licensing is frequently supported in performing work free from external influence, compared to 62 percent of nonsupervisory staff. A greater proportion of supervisory staff also felt that Licensing performs work free from internal influence (64 percent of supervisors versus 58 percent of staff).

### *Offices*

- Staff from the four regions tended to rate the attributes of quality, methods, effectiveness, and independence of evidence-building activities most positively of any Licensing staff, on average. For example, when asked to consider the extent to which Licensing staff time had been appropriately allocated based on mission significance, 76 percent of staff within the regions said this happens frequently, compared to 63 percent of staff working in other offices within Licensing.
- In comparison to NMSS, staff from NRR routinely rated the quality, methods, effectiveness, and independence of evidence-building activities as happening more often. For example, only 51 percent of staff from NMSS said they are frequently supported in being able to work free from external influence, compared to 71 percent in NRR.

## Customers of Licensing

Survey data were also collected from customers of Licensing (i.e., NRC staff who rely on work products from Licensing but do not themselves work within Licensing). A total of 87 customers of the Licensing function area provided survey responses.

**Quality.** When considering all quality-related items, 72 percent of customers said that Licensing work is frequently of high quality. More specifically, 80 percent of customers reported that the Licensing function area frequently uses appropriately high-quality data and information. Customers commented that losing experienced staff places time pressure on managers to train new hires while still getting their work done, which, in some cases, leads to inadequate oversight and quality issues.

**Methods.** Among all customers, 64 percent reported that Licensing frequently uses strong methods. In terms of job-specific knowledge, just over 70 percent of customers reported that

staff in Licensing frequently have the knowledge and skills to use software and computational tools needed. Customers shared the need for a single location where all guidance can be stored and kept updated. They also noted that the Licensing staff needs proper software to run confirmatory calculations, again concurring with opinions shared by those within Licensing.

**Effectiveness.** Overall, 59 percent of customers said that Licensing is frequently highly effective. An important item measuring effectiveness of evidence-building activities relates to expending resources efficiently; 67 percent of customers felt that Licensing frequently expends resources efficiently. Comments from customers aligned with those from Licensing staff. For example, customers noted that better documentation and data analytics within Licensing would improve effectiveness and that better attention to the timeliness of work products is needed.

**Independence.** Combined scores of all four independence-related items (discussed previously) revealed that, overall, 58 percent of customers felt that Licensing is frequently highly independent. However, individual customer perspectives about independence within Licensing were mixed. Some noted the need for greater consideration of external stakeholder input, while others indicated a need for more independence from external influence. With respect to external influence, 68 percent of customers felt that Licensing is frequently supported in performing work in a manner that is free from undue external influence.

***Licensing-Specific Findings and Mitigating Strategies***

Progress has been recorded for FY 2022 findings and associated mitigating strategies established to improve the NRC’s capacity to support evidence-building activities within the Licensing function. Data collected for the current (FY 2023) capacity assessment emphasized the continued need for building efficiency through better knowledge management practices, allocation of staff time, and training in the latest technology and software used by licensees. Appendix C summarizes these findings and their statuses.

<p>FY 2022 Finding 1 Licensing actions vary in their complexity (e.g., some licensing actions will take more review hours than others because of the specifics of the action requested). For this reason, it is difficult to ascertain whether NRC licensing actions of a similar scope are becoming more or less efficient while maintaining the agency’s internal expectations of high-quality technical analyses performed by the NRC staff.</p>	<p><b>FY 2022 Mitigating Strategy:</b> As discussed in Priority Question 4 of the NRC’s Evidence-Building Plan, “To what extent are licensing actions performed by the NRC becoming more or less resource intensive over time and have there been any changes in work product quality,” the NRC intends to perform an evaluation of the licensing program. The evaluation will (1) determine if similar licensing actions have become more or less resource intensive over time, (2) identify resource variances between similar licensing actions, (3) identify the factors contributing to the increase, decrease, and variance of resources for each type of licensing action, and (4) determine if there were any changes to the quality of the work products. The NRC will engage internal and external stakeholders to conduct this assessment.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC is in the process of developing an Alignment Agreement for an evaluation to address Priority Question 4 of the NRC’s Evidence-Building Plan. The agreement will identify the planned evaluation’s scope, methods, data, and resources. Once an agreement is established, the NRC will work with an established evaluation contractor to initiate and carry out the evaluation.</p>

**FY 2023 Data:** Data collected for the current (FY 2023) capacity assessment showed continued emphasis on the importance of maintaining and gaining efficiency within the Licensing function area. Staff called for better alignment of tasks with skillsets, as well as for increased training in advanced software and technologies used by applicants to increase efficiency. Staff across offices shared opportunities for more efficient use of resources.

**FY 2022 Finding 2**  
The SWP results indicate that the largest expected staffing gaps are in the following licensing positions: project managers, risk analysts, and engineers (i.e., reactor, nuclear, mechanical, and materials). This information was verified by confirming that these positions have been identified as future staffing gaps by the Licensing business lines and that strategies have been developed to fill those positions.

**Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):** Staffing gaps have been identified as a crosscutting finding in the current (FY 2023) capacity assessment. The discussion of staffing gaps in Section 5 of this report presents this finding.

## OVERSIGHT

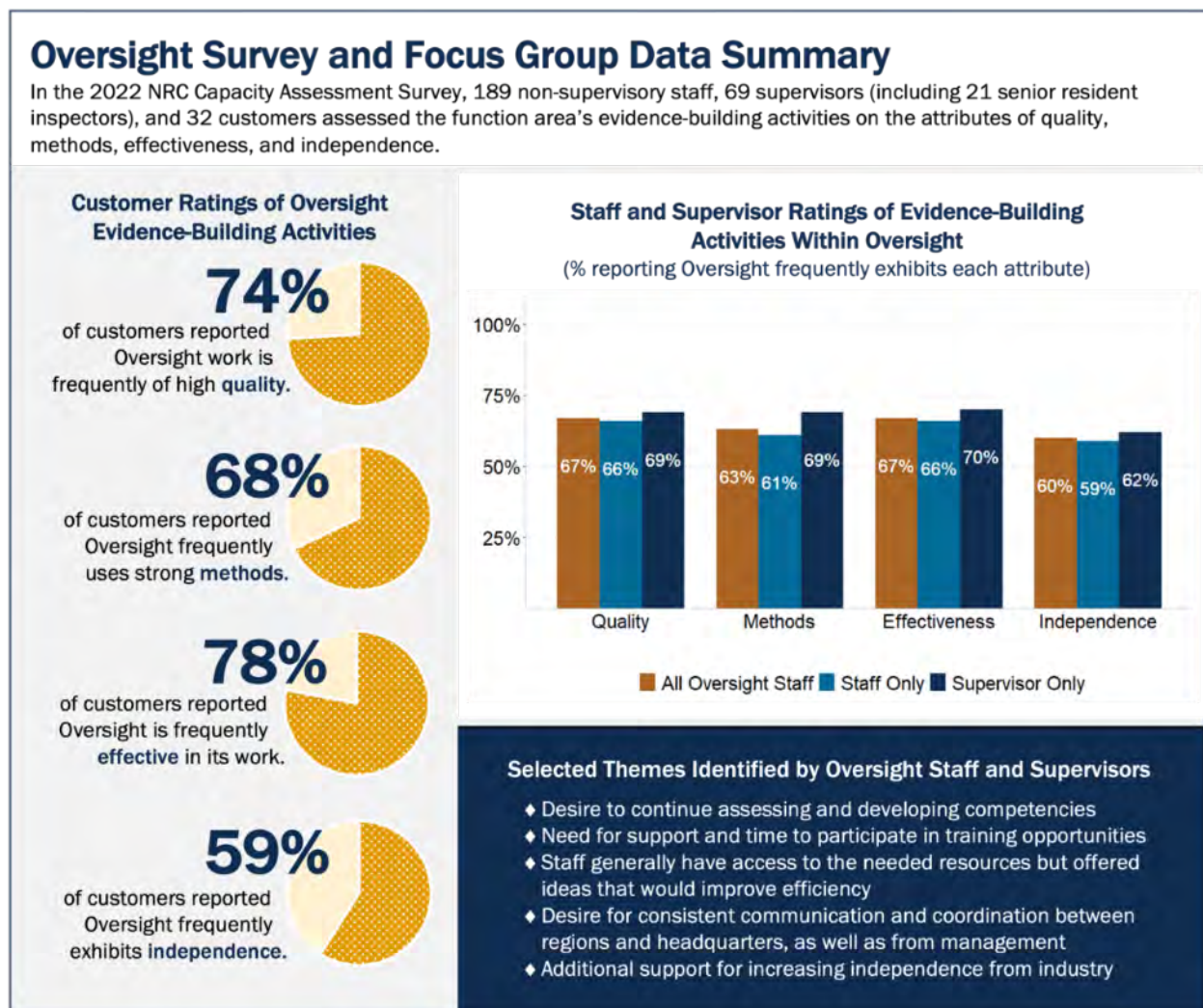
The NRC's Oversight function is designed to verify that U.S. licensees of nuclear power plants, research and test reactors, fuel cycle facilities, and materials users are operating in accordance with NRC rules, regulations, and license requirements. Inspectors follow guidance in the NRC's inspection manuals, which contain objectives and procedures to use for each type of inspection for each type of nuclear facility. Analysis is used to identify samples for inspection and then to interpret the results of those inspections. Analysis is also used to observe and gain insights from operating experience data from the entire fleet of licensed facilities.

The Reactor Oversight Process (ROP) is the NRC's program to inspect, measure, and assess the safety and security of the performance of operating commercial nuclear power plants and to respond to any decline in their performance. The ROP focuses inspections on areas of greatest risk and increases regulatory attention to nuclear power plants if performance declines. The ROP uses objective measurements of performance and gives the public timely and understandable assessments of plant performance. The ROP is designed to allow the NRC to respond to violations in a predictable and consistent manner that corresponds to the safety significance of identified problems.

Staff have developed a variety of dashboards and data tools to support its analysis of operating reactor performance, and various efforts are underway to increase the use of operating experience and Reactor Program System data to improve oversight analysis. There are parallel efforts in the Nuclear Materials and Waste Safety Program to leverage the use of licensing and inspection data within the NRC’s Web-Based Licensing system and other agency databases to develop dashboards to improve technical and financial decision-making.

**Quality, Methods, Independence, and Effectiveness**

Data collection for the FY 2023 Capacity Assessment included survey responses from 258 participants who identified that they most directly supported the Oversight function area over the past year. Of the 258 respondents, 189 were nonsupervisory staff, 31 were branch chiefs or team leaders, 21 were senior resident inspectors, and 17 were senior managers. In addition to the survey, five branch chiefs and team leaders from the Oversight function area participated in a focus group. Figure 14 presents a summary of aggregated survey and focus group results specific to the Oversight function area.



**Figure 14 Oversight Data Summary**

Oversight staff rated the extent to which they are using the following four attributes to conduct evidence-building activities: quality, methods, effectiveness, and independence. Figure 14 displays the percentage of respondents who indicated that Oversight staff are integrating these attributes into evidence-building activities between 70 and 100 percent of the time, which is defined by the term “frequently” throughout this section.

Qualitative and quantitative data revealed six key themes related to the Oversight function area: competencies, training, tools, knowledge management, communication with management, and independence. Figure 15 summarizes key themes specific to the Oversight function area.

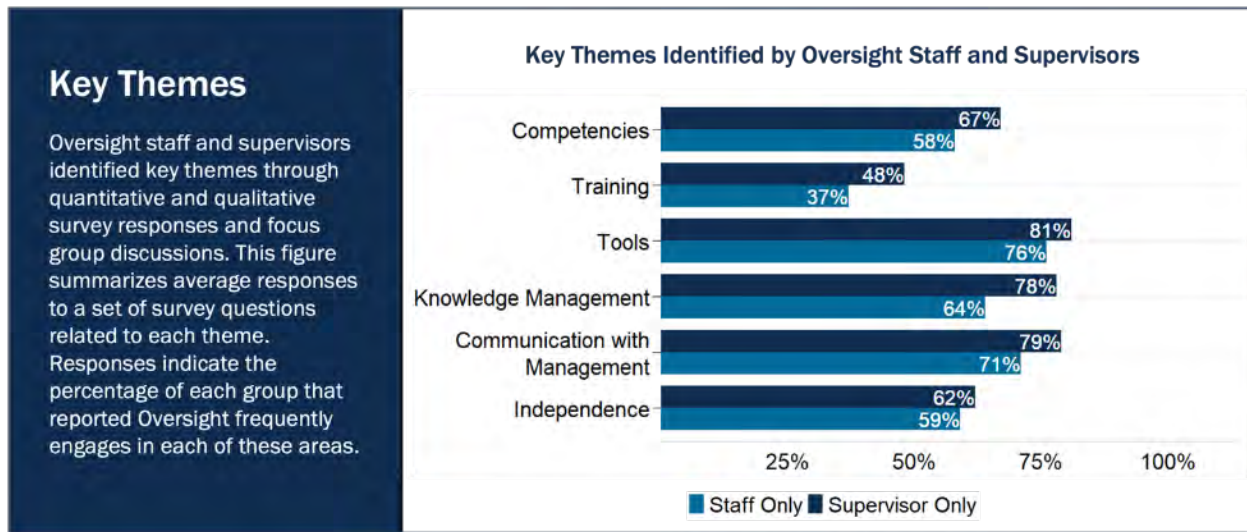


Figure 15 Oversight Key Themes

**Competencies** emerged as the first theme and relates to the need to continue to build skills among existing staff, focusing primarily on critical competencies needed in the field. Two survey items are associated with this theme, including whether staff have (1) the needed knowledge, skills, and abilities to handle the workload, and (2) the knowledge and skills to use relevant software and computational tools. Results indicate that supervisors are more likely than staff to report that these competencies are frequently met within Oversight (67 percent of supervisors compared to 58 percent of staff). Staff and supervisors in both surveys and focus groups suggested conducting a thorough analysis of gaps in competencies in order to develop more pinpointed material, including technical trainings with hands-on components.

**Training** is the second theme, and it refers to access to training and skill development opportunities. This theme was associated with two survey items that inquired about the extent to which staff engage in available internal and external training and development opportunities. Only 37 percent of Oversight staff reported frequently taking advantage of these training opportunities, compared to 48 percent of supervisors. Survey respondents shared that easier access to resources for training and development opportunities (e.g., funding to attend courses), as well as dedicated time to participate in trainings, would allow for better staff participation. Other survey respondents added that coordinating trainings to allow staff to participate with members from other regions would help build relationships and create a more unified approach to work throughout the agency. Staff also noted they were more easily able to take advantage of internal as opposed to external trainings.

**Tools** emerged as the third theme, and it focuses on the importance of consistently having access to needed software. One survey item about access to software and computational tools is relevant to this theme. Of note, this theme was rated the highest out of the six themes discussed here, meaning that more supervisors and staff perceive that this activity is frequently occurring compared to the other themes (81 percent of supervisors and 76 percent of staff). However, staff still provided suggestions for improving tools related to their work. For example, some shared that more mobile options would make working from different locations easier and boost productivity. Other suggestions from the survey and focus group included more ubiquitous use of IT for communication purposes (e.g., using Teams to network between inspectors from different program offices), as well as avenues for streamlining authorizations and approvals.

**Knowledge management** is the fourth theme that emerged from the data, relating to the need for enhanced knowledge sharing and knowledge transfer practices. Two survey items address the extent to which staff from Oversight (1) can rely on established procedures, guides, and standards and (2) capture best practices and lessons learned. Supervisors rated these factors substantially higher, with 78 percent indicating that these resources are made available frequently, compared to 64 percent of staff. Staff and focus group participants suggested that the agency create a more robust central repository to store and easily access topical information, procedures, and historical knowledge, which would, in turn, increase the efficiency and quality of evidence-building activities.

**Communication with management** emerged as the fifth theme and focuses on a general desire among staff for clear communication and coordination between regions and Headquarters to ensure alignment. This theme is associated with three survey items on effectiveness. The first item is about having transparent and clearly defined objectives. The second item relates to meeting agreed-upon objectives. The third item focuses on communicating approach and results clearly. Supervisor and staff responses were similar for these items, with approximately three-quarters of each group indicating that, on average, these activities are happening frequently (79 percent of supervisors and 71 percent of staff). Staff noted that clear and consistent communication from management to define project approaches and intended outcomes would boost productivity by decreasing ambiguities and identifying potential roadblocks. Although more clearly communicating strategic objectives would be helpful, staff also shared that too much micromanagement by division managers, who are more removed from specific tasks, impedes the work and progress that branch chiefs are able to make.

**Independence** is the last theme that emerged, and it refers to the desire for greater independence from industry. Data from four survey items aligned with this theme; these survey items measured staff perception of the extent to which (1) staff are supported in performing work in a manner that is free from undue external influences, (2) staff are supported in performing work in a manner that is free from undue internal agency influences, (3) reasonable measures have been taken to reduce bias, and (4) contractors supporting the Oversight function area's evidence-building activities are free from others' undue influence. Staff and supervisors both indicated that the Oversight function area was more supported in performing work free from undue external influence, compared to internal influence. Supervisors were slightly more likely (62 percent) than staff (59 percent) to report that the Oversight function area was frequently supported in working independently. To maintain greater independence, staff shared that more support from senior leadership would have a beneficial impact. Some staff expressed a perception that feedback from industry is given more weight than feedback from staff.

## Differences in Perspectives

### *Supervisory Oversight Staff*

Within Oversight, results largely aligned between supervisory and nonsupervisory staff, with a few small differences—particularly related to the attributes of independence and quality. For example, within the independence attribute, 68 percent of nonsupervisory staff reported feeling that Oversight took steps to reduce bias and undue influence frequently, as compared to 76 percent of supervisors. With respect to quality, 81 percent of supervisors reported that robust and reliable results are frequently produced, as compared to 74 percent of staff. Otherwise, ratings for quality-related items were similar.

Ratings related to methods and effectiveness were highly similar across supervisor and staff perspectives. For example, regarding the methods attribute, 78 percent of supervisors indicated that, as a function area, Oversight knows when to apply complex versus simple methods frequently, compared to 75 percent of nonsupervisory staff. Regarding effectiveness, 81 percent of supervisors and 82 percent of nonsupervisory staff indicated that Oversight frequently produces clear and concise results that facilitate decision-making.

### *Offices*

Although there were variations in response patterns and no office consistently reported the highest or lowest average scores, some trends can still be noted when comparing ratings among offices and regions. Examples include the following:

- Staff in Region I and Region IV tended to rate items relating to methods, effectiveness, and independence the highest, meaning that, on average, they perceive that evidence-building activities are more often high in quality, effectiveness, and independence and use strong methods than Oversight staff from the other regions and offices. For example, 89 percent of respondents in Region I and 87 percent of respondents in Region IV indicated that the Oversight function area frequently has transparent and clearly defined objectives, compared to 70 percent of Oversight staff from other regions and offices.
- With respect to quality, effectiveness, and methods, staff from NRR tended to provide the lowest ratings. Using the same example question as above, only 62 percent of respondents in NRR working in Oversight felt that they frequently have transparent and clearly defined objectives.
- Oversight staff in NRR and Region III tended to rate independence items lower than the other offices. A clear example of this is seen in responses to an item inquiring about working free from internal influence. When asked about feeling supported in performing their work free from internal influence, 47 percent of respondents in Region III and 48 percent of respondents from NRR responded that they frequently felt supported, compared to 62 percent in Region II, 74 percent in Region IV, and 77 percent in Region I.

### *Customers of Oversight*

Survey data were also collected from customers of Oversight (i.e., NRC staff who rely on work products from Oversight but do not themselves work within Oversight). A total of 29 customers of the Oversight function area provided survey responses.



**Quality.** Ratings of all quality-related survey items revealed that, on average, 74 percent of customers felt that Oversight frequently produces work that is of high quality. An important item specific to the quality of evidence-building activities focuses on the extent to which Oversight uses high-quality data and information. Among customers, 84 percent reported that Oversight frequently uses high-quality data and information. Customers also shared that there is a need to reconcile the clash between traditional and newer approaches to Oversight, including the need to modernize the NRC's use of data to better focus efforts and make risk-informed decisions.

**Methods.** A total of 68 percent of customers responded that Oversight frequently uses strong methods. With respect to job-specific skills, 83 percent of customers reported that staff within the Oversight function area frequently possess the knowledge and skills to use relevant software and computational tools. Customer comments expressed sentiments similar to those provided by Oversight staff, with both noting that a need exists for additional training on certain software, as well as a need to better leverage advanced knowledge of some staff members by better aligning tasks with skillsets. Customers also suggested that more direct experience at plants for headquarters staff who are involved with Oversight could be beneficial.

**Effectiveness.** Overall, 78 percent of customers reported that Oversight is frequently highly effective. Looking at one item in particular, 85 percent of customers indicated that Oversight frequently produces clear and concise results that facilitate decision-making. This is a slightly higher proportion than supervisors and staff within Oversight who felt the same way (81 percent of supervisors and 82 percent of staff).

**Independence.** Average aggregate scores of the four independence-related items showed that 59 percent of customers felt Oversight frequently exhibits high independence. More specifically, 73 percent of customers said that Oversight staff are frequently supported in working free from external influence. A total of 64 percent of customers felt that Oversight staff are frequently supported in being able to work free from internal influence. Some customers suggested that managers should do more to deflect industry influence, which resonated with sentiments shared by nonsupervisory staff from Oversight.

### ***Oversight-Specific Findings and Mitigating Strategies***

Progress has been recorded for FY 2022 findings and the associated mitigating strategies established to improve the NRC's capacity to support evidence-building activities within the Oversight function. Data collected for the current (FY 2023) capacity assessment emphasized the need for technical training and competency building, as well as a need for further processes and procedures to facilitate communication and knowledge transfer. Appendix C summarizes these findings and their statuses.

<p><b>FY 2022 Finding 1</b> The NRC has observed that the number of reactor inspection findings has been consistently and significantly decreasing year after year since 2015. This trend is observed for reactors across all four NRC regions. In 2015, there were 811 total findings (about 8 per reactor), while in 2020 and 2021, there were only 251 and 177 total findings, respectively (about 2–3 per reactor). The NRC has been making efforts to identify the relationship between the declining trend and its causes.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should continue to monitor and fully assess the causes of the observed trend, as well as the potential effects.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC staff provided feedback to inspectors and managers on factors influencing the number of inspection findings. The NRC staff noted that the number of findings appears to have stabilized in FY 2022 (362 findings), increasing to a level similar to that in FY 2019 (361 findings). The NRC continues to track the number of inspection findings, including providing access to data with real-time updates as findings are finalized, to provide broader awareness of any developing trends. Evaluation of the available data, including potential impacts from the public health emergency, indicates that the ROP inspection program remains effective in identifying and addressing issues commensurate with their risk and safety significance.</p>
	<p><b>FY 2023 Data:</b> Data collected for the FY 2023 Capacity Assessment contained limited information related to this finding. A few comments suggested that the number of written violations is decreasing due to industry influence and not necessarily as the result of better licensee performance. Results suggest there is value in additional training to increase consistency in the enforcement of standards across all regions.</p>
<p><b>FY 2022 Finding 2</b> The NRC anticipates challenges associated with the Resident Inspector Program regarding recruitment and retention and would benefit from a data-driven approach for monitoring and assessing the program’s health. NRC senior leadership have reported challenges in attracting and retaining high-quality senior resident inspectors and resident inspectors to staff the Resident Inspector Program. The program needs to offer sufficient incentives to ensure that resident inspector vacancies can be promptly filled.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should continue to assess specific options using a data-driven and evidence-based approach to address the anticipated resident inspector recruitment and retention challenges.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> NRR endorsed recommendations and results of the resident inspector recruitment and retention working actions and has proposed an implementation plan. The proposed plan delineates potential next steps and prioritizes key actions and activities for each of the recommendations. A dashboard that enhances internal monitoring of Resident Inspector Program health by collecting more comprehensive data and improving data visualization was released in July 2022. The NRC will continue its ongoing efforts.</p>
	<p><b>FY 2023 Data:</b> Data collected for the current (FY 2023) capacity assessment included comments from staff indicating the need to hire additional resident inspectors. These data emphasized the importance of attracting and retaining employees, particularly those with advanced skillsets. Staff comments noted that a slow hiring process and limited incentives (e.g., limited telework options compared to office-based roles) may hinder hiring efforts, but that meaningful rewards focused on mission performance may be one avenue to retain highly skilled midcareer resident inspectors. Staff also identified a degree of success in utilizing direct-hire options to onboard new staff into positions within the Resident Inspector Development Program.</p>

FY 2022 Finding 3  
The SWP results indicate that the largest expected staffing gaps are in the following Oversight evidence-building positions: project engineer (RIDP), resident inspector, health physicist (materials inspector/license reviewer), and reactor inspector. In addition, filling the senior reactor analyst position has presented challenges because there is no clear pipeline for developing and preparing staff for this position.

**Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):** Staffing gaps have been identified as a crosscutting finding in the current (FY 2023) capacity assessment. The discussion of staffing gaps in section 5 of this report presents this finding.

## EMERGENCY PREPAREDNESS & INCIDENT RESPONSE

A key component of the NRC's public health and safety mission is ensuring that U.S. nuclear facility operators (licensees) are capable of implementing adequate measures to protect public health and safety in the event of a radiological emergency. The emergency preparedness (EP) program provides this capability and carries out this part of the NRC's mission by setting policy through rulemaking and guidance, managing the oversight program through the EP cornerstone of the Reactor Oversight Process, providing EP expertise to licensing actions, and coordinating EP activities with Federal, State, Tribal, and international partners. For nuclear power plants and certain other licensees, the NRC's EP oversight includes inspection of EP exercises that demonstrate the licensee's ability to adequately implement its emergency plans to protect the public. These exercises help licensees to maintain emergency responder skills and to identify and correct weaknesses in their EP programs. For nuclear power plants, these exercises include full-scale exercises, conducted at least once every 2 years, that include response from offsite response organizations. During full-scale exercises, evaluators from the Federal Emergency Management Agency examine offsite performance.

The NRC's Incident Response program works closely with the EP program and provides the agency's incident response capability, ensuring that the agency has a complete and well-coordinated ability to respond to both licensee and non-licensee emergencies, including acts of terrorism and natural disasters. This response capacity includes oversight and assessment of licensee response, response coordination with Federal, State, Tribal, and international partners, and provision of public information on the NRC's response activities. Under the National Response Framework, the NRC will coordinate with other Federal, State, and local emergency organizations in response to various types of domestic events. Additionally, the NRC maintains the readiness of Operations Centers both at Headquarters and in the regions. In the Headquarters Operations Center, readiness includes watch standers who are available to respond and communicate with licensees 24 hours a day, 7 days per week. This supports the agency's continuity of operations and primary mission-essential functions.

## **Key Themes**

Data collected for the FY 2023 Capacity Assessment included survey responses from 12 participants who identified that they most directly supported the Emergency Preparedness & Incident Response function area over the past year. Data was also collected from branch chiefs and team leaders from Emergency Preparedness and from Event/Incident Response who participated in a combined focus group.

Qualitative and quantitative data revealed four key themes related to the Emergency Preparedness & Incident Response function area: (1) retirement and staffing, (2) knowledge transfer and training, (3) clearly defined project goals, and (4) consistency and clarity in procedures.

**Retirement and staffing** emerged as the first theme, with survey participants noting the importance of workforce planning and hiring to ensure that the NRC has adequate staff with sufficient skillsets moving into the future. Staff communicated limitations in the staffing pipeline to backfill for the soon-to-depart senior EP specialists, with a significant amount of time elapsing between the departure of senior staff and the onboarding of replacements. Nonsupervisory staff also indicated that they want better knowledge management and knowledge transfer practices to ensure smooth transitions following retirements and other departures. To that end, staff also recommended the use of double incumbency as a possible means to facilitate opportunities for knowledge transfer and capture before senior staff or subject matter experts retire or leave. Branch chiefs and team leaders expressed similar sentiments, pointing out the need to ensure that the NRC has staff with proficient knowledge to support carrying out high-quality work.

**Knowledge transfer** and training emerged as the second theme, with respondents communicating a trend of less experienced staff replacing more experienced senior staff as they leave the NRC. Staff comments indicated that a continued focus on training new staff and helping them finish their qualifications in a timely manner is important to support Emergency Preparedness & Incident Response going forward. Some staff also expressed the desire to see more work assigned to newer and less experienced staff, with experienced technical staff coaching and overseeing their work, as opposed to the current tendency for senior staff to complete the work independently, with less experienced staff only conducting reviews. During focus group discussions, branch chiefs and team leaders also emphasized a need for training on how to use new tools that can help improve incident response, including more streamlined training on job-relevant aspects of new tools (such as data analytics tools relevant to EP activities).

**Alignment on project goals** emerged as the third theme. Respondents emphasized the importance of a shared understanding between managers and staff regarding clearly defined project goals and roles. Respondents communicated that such an understanding is important towards working together effectively and transparently. Some staff also expressed a need to focus on effective communications, rather than frequent communications. Branch chiefs and team leaders shared similar perspectives during the focus group, with multiple participants expressing the need for more communication between NRC Headquarters and groups in the regional offices.

**Consistency and clarity in procedures** emerged as the fourth theme, with staff stating that more streamlined procedures and clear communication would aid in alignment and increase efficiency within the function area.

## Customers of Emergency Preparedness & Incident Response

Nine customers of Emergency Preparedness & Incident Response responded to survey questions about that function area. These questions asked customers to respond, from their perspective, about evidence-building activities within Emergency Preparedness & Incident Response over the past year. The questions mirrored those asked of Emergency Preparedness & Incident Response staff about their own function area. Of the customer respondents, most reported working in Oversight.

With only nine responses, the sample size was insufficient to draw quantitative results from the customer data, but analysis of qualitative responses provided additional insights into the themes discussed above. Like Emergency Preparedness & Incident Response staff, customers recognized the need to preserve as much expertise as possible, given recent retirements, and suggested focusing on building the skills of newer employees. Aligning with the second theme from responses within Emergency Preparedness & Incident Response, customers also expressed the sentiment that better communication between NRC Headquarters and Emergency Preparedness & Incident Response personnel in the NRC regional offices would improve project outcomes.

## RESEARCH

The NRC's Research program supports the agency's mission by providing technical advice, tools, and information to NRC program offices to identify potential safety and security issues and resolve them as appropriate. The Research staff assesses risk, as well as other nuclear safety and security issues, and develops and coordinates regulatory guidance. This includes conducting experiments and analyses, developing technical bases to inform the NRC's safety decisions, and preparing the agency for the future by evaluating the safety aspects of new technologies and designs for nuclear reactors, materials, waste, and security. The Research staff collaborates with Licensing, Oversight, Rulemaking, and other staff at the NRC, as well as external organizations, including commercial entities, national laboratories, other Federal agencies, universities, and international organizations. Research staff members also administer the Future-Focused Research Program, wherein all agency staff can propose topics for investigation. This program is designed to supply needed resources to important projects with longer term horizons in support of agency transformation and the agency's vision of becoming a more modern, risk-informed regulator. In addition, through the University Nuclear Leadership Program, the NRC's Research function funds research and development grants related to the agency's mission, as well as scholarships and fellowships to support education in nuclear science and engineering.

According to the Office of Nuclear Regulatory Research (RES) FY 2021–23 Planned Research Activities, the Research function area involves the following strategic objectives: (1) provide independent data and analyses to support ongoing licensing and regulatory oversight activities and prepare for new and emerging technical approaches, (2) maintain core research tools and capabilities to promptly and effectively respond to requests for research from the Commission and regulatory program offices, (3) maintain cognizance of the state-of-the-art developments in nuclear safety and security technologies by engaging with the domestic and international research community, and (4) identify the need for, and provide project management of, research that is contracted to external organizations.

## Quality, Methods, Independence, and Effectiveness

Data collection for the FY 2023 Capacity Assessment included survey responses from 75 participants who identified that they most directly supported the Research function area over the past year. Of the 75 respondents, 63 were nonsupervisory staff and 12 were in supervisory roles, including 8 branch chiefs or team leaders and 4 directors or deputy directors. Data was also collected from five branch chiefs and team leaders in the Research function area who participated in a focus group. Figure 16 presents a summary of aggregated survey and focus group results specific to the Research function area.

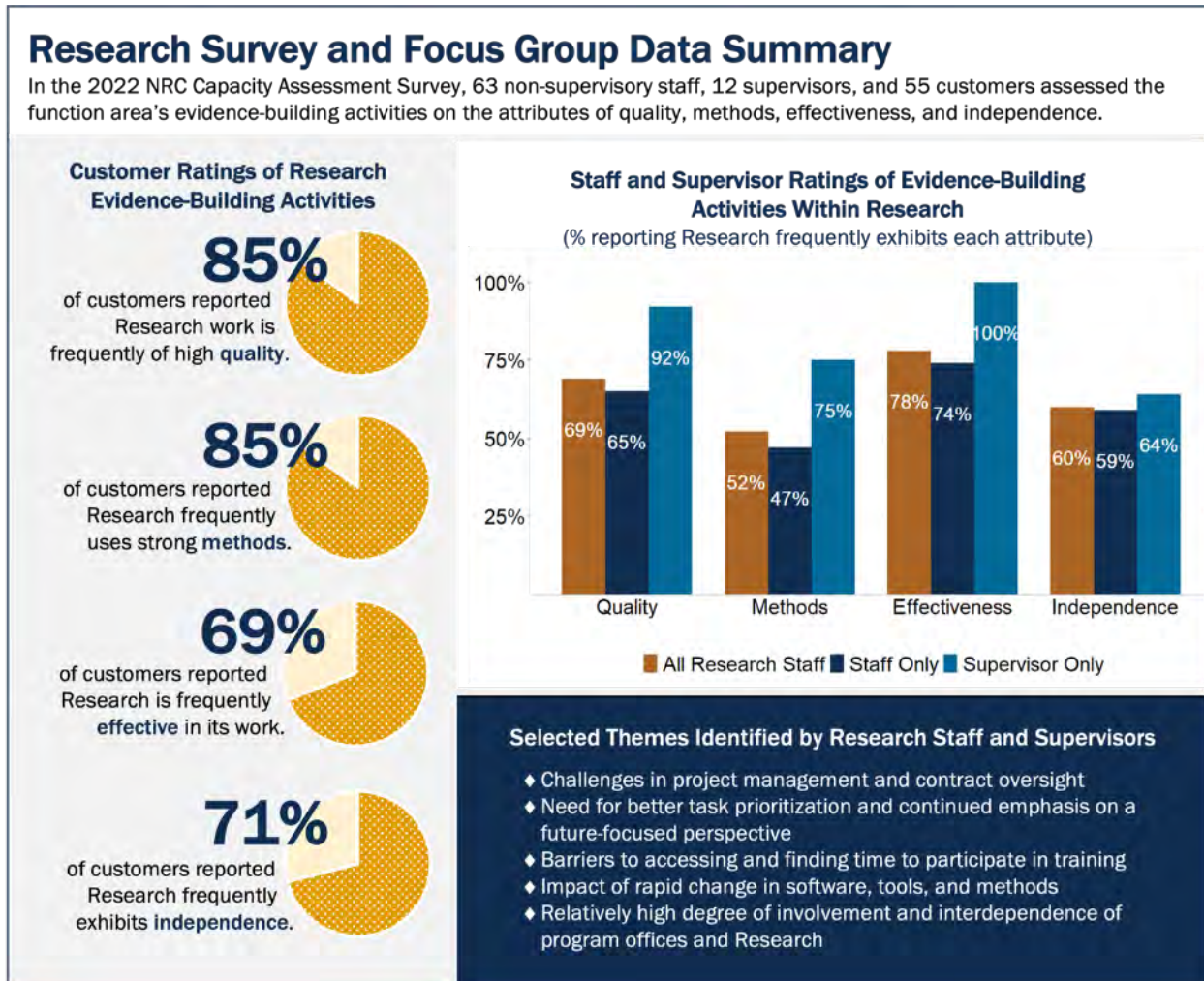


Figure 16 Research Data Summary

Research staff rated the extent to which they are using the following four attributes to conduct evidence-building activities: quality, methods, effectiveness, and independence. Figure 16 displays the percentage of respondents who indicated that the Research staff are integrating these attributes into evidence-building activities between 70 and 100 percent of the time (which is defined by the term “frequently” throughout this section).

Qualitative and quantitative data revealed five key themes related to Research, including (1) project management and contract oversight, (2) support for training, (3) task prioritization, (4) computer codes, software, and tools, and (5) independence. Figure 17 presents a summary of key themes specific to the Research function area.

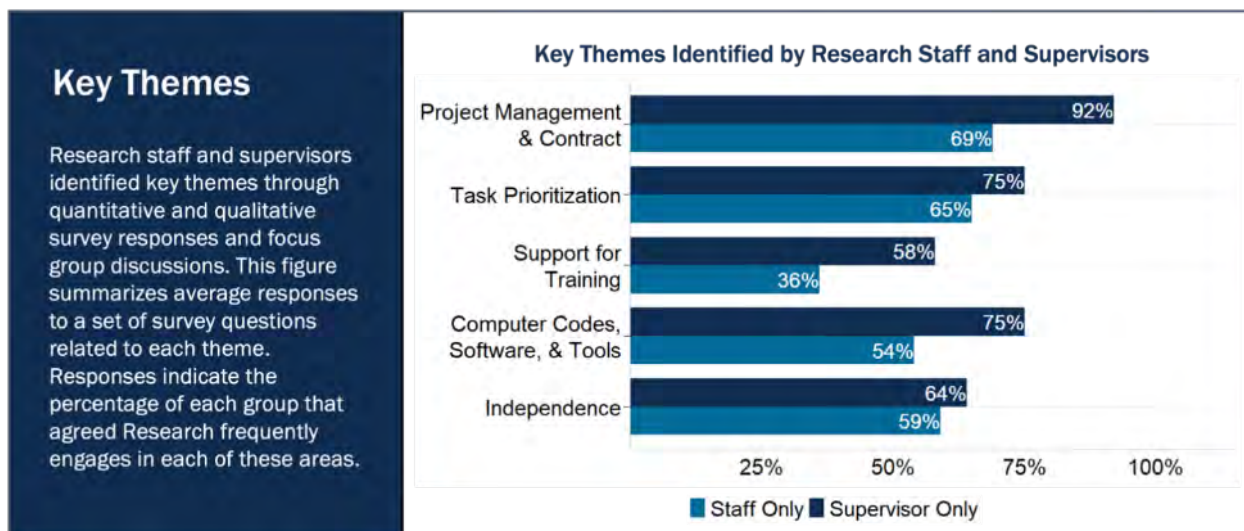


Figure 17 Research Key Themes

**Project management and contract oversight** emerged as the first theme and relates to challenges in efficiently managing projects, as well as an increasing responsibility for technical staff to handle contracts. This theme is associated with two survey items on effectiveness. The first item concerns getting work done in a timely manner and the second item relates to having transparent and clearly defined objectives. Nearly all (92 percent) of Research supervisors (including branch chiefs, team leaders, directors, and deputy directors), compared to 69 percent of Research staff, feel that these two activities happen frequently. Supplemental data from the 2022 Federal Employee Viewpoint Survey (FEVS) specific to RES provide additional insights relevant to this theme. Across RES, 67 percent of FEVS participants agreed their workload is reasonable. However, when asked the extent to which employees in their work unit are typically under too much pressure to meet work goals, 30 percent provided neutral responses and 18 percent agreed; just over half of RES participants disagreed.

Staff from the Research function area shared suggestions for improving project management and contract oversight, including the need to maintain timelines, increase lead time for milestones, better align workloads with staff skills, and consider offering more trainings related to best practices for effectively managing meetings and projects. Staff noted increasingly having to focus on managing contracts over the last year, which takes time away from focusing on core job tasks related to evidence-building activities.

Supplemental data about obligated funds in RES contracts from FY 2018 to FY 2022 provides additional insight to support staff perspectives. Total obligated funds increased approximately \$3.3 million from FY 2021 to FY 2022, from \$46.5 million to \$49.8 million, and the number of contracting officer's representatives (CORs) overseeing contracts with obligated funds increased by just 6, from 72 to 78. By comparison, in FY 2020, 90 total CORs oversaw \$39.1 million in obligated funds—a substantially lower dollar amount and higher number of CORs. Increases in obligated funds were most substantial in the areas of Advanced Non-Light

Water Reactor Regulatory Preparation (from \$4.4 million in FY 2021 to \$6.8 million in FY 2022), Waste Research (\$3.0 million to \$4.0 million), Risk Analysis Research (\$11.4 million to \$12.3 million), and Mission IT/Mission IT Infrastructure (\$2.1 million to \$3.0 million). The only decrease of a similar size from FY 2021 to FY 2022 was in Systems Analysis Research (\$8.4 million to \$7.5 million). These trends in obligated funds align with staff perceptions of an increase in contract management workload in the past year.

**Task prioritization** is associated with the continued need for the Research function area to effectively set priorities to stay innovative and future focused. Two survey items are relevant to this theme; the first focuses on expending resources efficiently, while the second asks whether staff time and effort are being allocated appropriately based on mission significance. Staff members rated both items as occurring less frequently than supervisors, with 68 percent of staff indicating that these outcomes were frequently achieved, compared to 88 percent of supervisors. When RES staff were asked on the 2022 FEVS about the extent to which continually changing work priorities made it hard to produce high-quality work, just 34 percent disagreed. In comparison, 29 percent provided neutral responses, and 36 percent agreed that changing priorities make it hard to produce high-quality work.

Staff and supervisors both talked about the impact of task prioritization on effectiveness (e.g., the value of setting a future-focused research agenda, expending resources efficiently, and communicating effectively to set priorities), and staff further noted the impacts on quality (e.g., allocating staff time and effort appropriately). The need to continue prioritizing a future-focused research agenda was also identified as a finding in the FY 2022 Capacity Assessment; the “Research-Specific Findings” section below provides additional details.

**Support for training** emerged as another theme from both the quantitative and qualitative data and relates to the need for easier access to training, including dedicated time and funding. Two survey items address internal and external training, with 58 percent of supervisors and 36 percent of staff agreeing that these trainings are frequently utilized. Both staff and supervisors noted in qualitative comments that trainings could be more frequently attended. When RES staff were asked on the 2022 FEVS about the extent to which they receive the training they need to do their jobs well, 77 percent agreed that they received adequate training, whereas 16 percent provided neutral responses and 7 percent disagreed.

Looking at each question individually, Research staff and supervisors noted that external trainings are taken advantage of substantially less frequently than internal trainings (38 percent of staff and 42 percent of supervisors agree that external trainings are taken advantage of frequently, whereas 55 percent of staff and 83 percent of supervisors agree that internal trainings are taken advantage of frequently). In general, staff in the Research function area reported difficulty finding sufficient time to participate in training opportunities. Qualitative comments also suggested that additional technical trainings should be offered, including those aimed at quickly developing the skills of more junior staff. Participants expressed a desire for more consistent training offerings, especially technical training, as well as for financial support to attend conferences. The primary barrier noted to accessing external training is the difficulty in getting funding approval.

**Computer codes, software, and tools** emerged as a theme specific to the challenges associated with rapidly changing technology (e.g., access to and knowledge of the latest technology). This theme is associated with two survey items. The first focuses on access to software and computational tools, and the second focuses on knowledge and skills to use the software and computational tools. Results indicate that more supervisors (75 percent) perceive



that the Research function area frequently accomplishes both tasks as compared to nonsupervisory staff (54 percent). On the FEVS, a total of 83 percent of RES staff agreed that their work unit has the job-relevant knowledge and skills necessary to accomplish organizational goals. Additionally, 68 percent agreed that employees in their work unit consistently look for new ways to improve how they do their work.

Supervisors expressed appreciation for the rate of change in technology advancement for the Research function (e.g., cloud-based computing, Amazon Web Services, access to supercomputers through national laboratories). However, staff in both supervisory and nonsupervisory roles expressed that they experience challenges related to the rapid pace of change in computer science and the software, tools, and methods available. Staff described challenges in getting access to software and computational tools, training specific to tools and the latest methods or best practices, and computing power and bandwidth needed to run complex codes and analyses. Branch chiefs and team leaders described a need to modernize computer codes to keep up with rapid advances, but noted limited resources for modernization. This theme is also closely related to an FY 2022 Capacity Assessment finding; the “Research-Specific Findings” section below provides additional detail.

**Independence** emerged as the final theme related to evidence-building activities within the Research function area. Data from four survey items aligned with this theme; these survey items measured staff perception of the extent to which (1) staff are supported in performing work in a manner that is free from undue external influences, (2) staff are supported in performing work in a manner that is free from undue internal agency influences, (3) reasonable measures have been taken to reduce bias, and (4) contractors supporting the Research function area’s evidence-building activities are free from others’ undue influence. Considering all four items together, 64 percent of supervisors and 59 percent of staff said Research frequently works independently. However, staff and supervisors both indicated that the Research function area was more frequently supported in performing work free from undue external influence compared to internal influence. Specifically, close to three-quarters of both staff and supervisors reported that Research was able to frequently work free from external influence, whereas only about half of staff and supervisors said this was the case when it came to internal influence. The largest discrepancy in terms of staff and supervisor ratings emerged in ratings of the extent to which contractor activities are free from undue influence—90 percent of supervisors rated this as happening frequently, whereas only 67 percent of staff felt this way.

### Differences in Perception by Role

Differences in perception by role (i.e., supervisory versus nonsupervisory roles) were noted when assessing capacity to carry out evidence-building activities in Research. These differences are described where relevant throughout the themes presented above but are synthesized and summarized below.

- Research staff members in supervisory roles (i.e., branch chiefs, team leaders, deputy directors, and directors) rated the overall quality, effectiveness, methods, and independence of evidence-building activities in Research more highly frequently than did staff in nonsupervisory roles.
- Staff and supervisors shared the desire to have the freedom to explore more creative and innovative research. Some comments also emphasized the importance of maintaining an external awareness of research being done in other organizations and adapting to changing technical disciplines.

- Research staff described challenges related to review processes and the processes' involvement of senior leadership. Some staff described the time-consuming nature of the NUREG publication process. Branch chiefs and team leaders shared that the complexity and lengthiness of review processes is at least in part driven by the number of managers and senior leaders required to review documents, which can sometimes appear to staff to reflect a lack of managers' and senior leaders' trust in their work. They also shared a desire to reduce the complexity of budget formulation processes and the justifications required.

## Customers of Research

Survey data were also collected from customers of Research (i.e., NRC staff who rely on work products from Research but do not themselves work within Research). A total of 55 customers of the Research function area responded to the survey.

**Quality.** Eighty-five percent of customers said that, on average, Research frequently produces high-quality work. One key item specific to the quality of evidence-building activities in Research focuses on the extent to which Research appropriately allocates staff time based on mission significance. A total of 80 percent of customers reported that Research frequently allocates staff time appropriately. Only a few qualitative comments from customers addressed the quality of work products from Research, with most agreeing that Research does good work, but quality occasionally suffers from staff being overburdened with too many projects.

**Methods.** In response to the methods-related items, 85 percent of customers reported that Research frequently uses strong methods. Additionally, just over 90 percent of customers responded that the Research function area frequently has access to necessary software and computational tools and possesses skills needed to use said technology—two key aspects of methods. There were minimal differences in the ratings of methods-related items between NMSS-based and NRR-based customers. Despite the high rating, a few customers expressed in their qualitative comments a need for more staff in Research with advanced coding, statistical, and data analysis skills.

**Effectiveness.** Among all customers, 69 percent said that Research's work is frequently highly effective. NRR-based customers rated Research effectiveness and quality somewhat more positively than did NMSS-based customers. For example, a larger percentage of NRR-based customers than NMSS-based customers felt that Research frequently considers input from internal and external stakeholders when appropriate. The theme most commonly shared in customers' qualitative comments related to concerns about budgets and how a lack of funds impacts Research activities, including the ability to tackle complex projects and enlist highly skilled contractors. One customer suggested requiring Research staff to do more rotations to gain more knowledge of program offices, which they suggested would allow for more efficient work going forward.

Supplemental data from a survey conducted by RES provide additional insights into customer perceptions of effectiveness in Research. When a product is completed, Research staff send a survey to sponsoring office staff to help Research identify opportunities for improvement. The FY 2022 Capacity Assessment recommended that results of these surveys be shared more openly and consistently with Research staff and others across the NRC. Data from the 2022 calendar year indicate timeliness (i.e., the extent to which products and services are delivered within agreed-upon schedules) remains an opportunity for slight improvement. Across 4 years of data, timeliness has been consistently rated the lowest of any item (average of 4.39 to 4.44 out

of 5). However, it is important to note that customer ratings on the survey are almost entirely positive and variations among ratings were very small, indicating that customers rate Research effectiveness very highly in general. Within the scope of the minimal changes in ratings from year to year, there was a slight but noticeable decrease from 2021 to 2022 in the extent to which customers find Research products and services useful for the agency and an increase in the extent to which customers feel Research products and services address and treat uncertainties.

**Independence.** Overall, 71 percent of customers felt the Research function frequently operates independently. Customers were more likely than either staff or supervisors to indicate that Research was supported in performing work free from undue internal influence, with 69 percent of customers saying this frequently happened over the last year. Additionally, 77 percent of customers reported that contractor activities were free from undue influence. Customers based in NRR and NMSS provided similar ratings when considering the effect of internal influence and whether measures are taken to reduce bias. A larger proportion of customers from NMSS felt that Research and its contractor activities are free from undue influence, compared to customers from NRR.

### ***Research-Specific Findings and Mitigating Strategies***

Progress has been recorded for the FY 2022 findings and associated mitigating strategies established to improve the NRC's capacity to support evidence-building activities within the Research function area. Data collected for the current (FY 2023) capacity assessment emphasized the critical importance of the Future-Focused Research Program and the continued importance of computer codes and analytical tools related to the safety of advanced reactor designs. For FY 2023, one new finding and mitigating strategy were identified in the area of communication for the Research function area. Appendix C summarizes these findings and their statuses.

<p>FY 2022 Finding 1 The NRC’s Future-Focused Research Program is critical to ensure that the NRC is prepared for emerging research topics. Therefore, this program would benefit from an evaluation to ensure that the program is meeting its intended outcomes and the NRC is prepared for technological advancements.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should continue to develop, monitor, and grow the Future-Focused Research Program to identify and fund research that is important to prepare the NRC for the work of the future. As time progresses, the NRC should evaluate the program to determine its effectiveness and develop performance indicators to monitor the program.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC plans to conduct an evaluation of the Future-Focused Research Program in FY 2025, allowing additional time for staff to continue to develop and implement the program and for results to be produced and made available. The evaluation will focus on the effectiveness of the Future-Focused Research Program and on the development of performance indicators to monitor the program over time. In FY 2023, staff will conduct an internal lessons-learned assessment that will help inform the FY 2025 evaluation.</p>
	<p><b>FY 2023 Data:</b> Data collected for the current (FY 2023) capacity assessment showed continued emphasis on the critical importance of the Future-Focused Research Program. Research staff continue to support the value of emphasizing future-focused research alongside ongoing work to support ongoing licensing and regulatory oversight activities, in line with the RES first strategic objective (i.e., provide independent data and analyses to support ongoing licensing and regulatory oversight activities and prepare for new and emerging technical approaches).</p>

<p>FY 2022 Finding 2 The NRC routinely uses scientific computer codes and analytical tools to perform confirmatory, sensitivity, and uncertainty analyses to independently analyze the safety of advanced reactor designs. These codes and tools help examine safety margins inherent in the design, commensurate with the risk and safety significance of the phenomena applicable to specific reactor designs. The NRC staff anticipates challenges associated with collecting information,</p>	<p><b>FY 2022 Mitigating Strategy:</b> As discussed in Priority Question 3 of the NRC’s Evidence-Building Plan (“To what extent are the NRC’s computer codes capable of supporting independent analysis of the safety of advanced reactor designs and operations?”), the NRC intends to (1) address this finding by performing analysis and research to identify the computer codes, analytical tools, information, and data for reactor systems analysis that staff may need to use to analyze the safety of non-LWR designs, (2) assess the existing capability of computer codes, analytical tools, and supporting information, (3) identify gaps in both analytical capabilities and supporting information and data, and (4) interact with both domestic and international organizations working on non-LWR technologies to enhance collaboration and cooperation.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC is coordinating with research program management and staff to support development of a needs assessment plan and subsequent implementation related to the FY 2022 Mitigating Strategy and Priority Question 3 of the NRC’s FY 2022 Evidence-Building Plan.</p>

<p>models, and data needed for computer code modeling of advanced non-LWR safety and operations, particularly for the less mature designs.</p>	<p><b>FY 2023 Data:</b> Data collected for the current (FY 2023) capacity assessment emphasized the continued importance of attention to computer codes and analytical tools related to safety of advanced reactor designs. Supervisors described challenges in providing staff with opportunities to learn about, participate in training about, and run more complex computer codes. They also described the ongoing need to modernize codes, coupled with difficulty finding resources in the research program and staff to support modernization efforts as the field of computer science continues to evolve rapidly.</p>
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<p><b>FY 2022 Finding 3</b> The SWP results indicate that the largest expected staffing gaps are in the following positions: reliability and risk analyst, reactor systems engineer (neutronics), reactor systems engineer (severe accident/source term), and human factors analyst. This finding was validated through discussions with research managers.</p>	<p><b>Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):</b> Staffing gaps have been identified as a crosscutting finding in the current (FY 2023) capacity assessment. The discussion of staffing gaps in section 5 of this report presents this finding.</p>
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## RULEMAKING

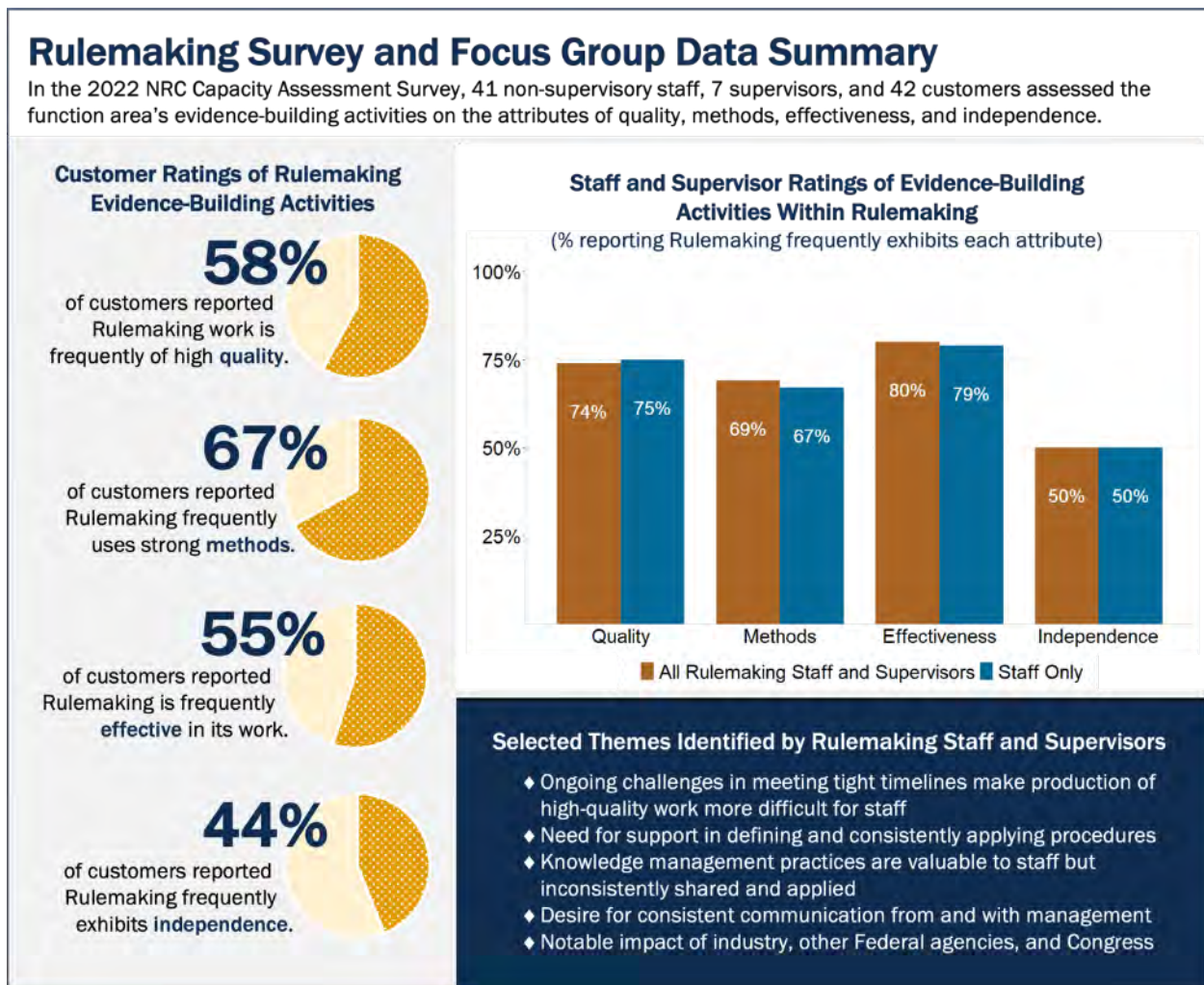
The NRC’s Rulemaking function supports the agency’s mission by developing regulations or “rules.” The NRC may initiate a new rule or a change to an existing rule when necessary to protect public health and safety. In addition, any member of the public may petition the NRC to develop, change, or rescind a rule. The Commission directs the NRC staff to begin work on a new rulemaking activity through approval of a staff rulemaking plan. The NRC’s regulations impose requirements that applicants must meet to acquire an NRC license or certificate. Once a license or certificate is issued, NRC regulations impose requirements applicable to licensees engaging in NRC-regulated activities. NRC regulations govern the possession or use of NRC-regulated materials at nuclear facilities, such as power plants, research and test reactors, uranium mills, fuel facilities, and waste repositories; the use of NRC-regulated materials for medical, industrial, and academic purposes; and the transportation of these materials. Types of rulemaking activities include development of the following: regulatory bases, proposed rules, final rules, direct final rules, and advanced notices of proposed rulemaking. Most NRC rulemaking activities rely on the analysis evidence-building activity, although the function is also supported to a lesser extent by research and statistics.

### *Quality, Methods, Independence, and Effectiveness*

Data collection for the FY 2023 Capacity Assessment included survey responses from 48 participants who reported that they most directly supported the Rulemaking function area over the past year. Of the 48 respondents, 41 were nonsupervisory staff, 5 were branch chiefs, and 2 were senior managers. In addition to the survey, three branch chiefs and team leaders

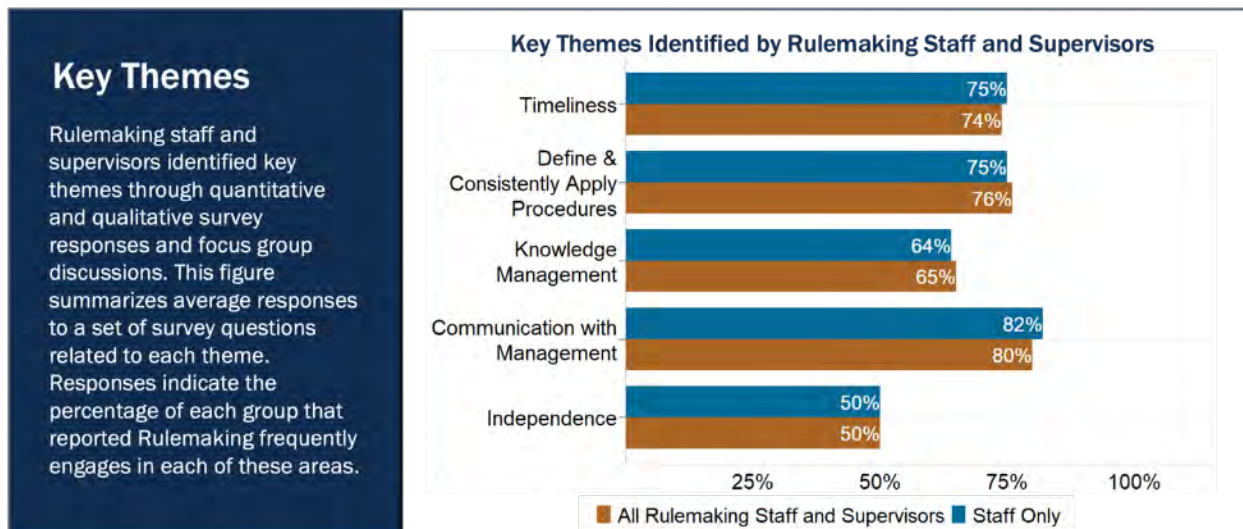
from the Rulemaking function area participated in a focus group. Figure 18 presents a summary of aggregated survey and focus group results specific to the Rulemaking function area.

Rulemaking staff rated the extent to which they are using the following four attributes to conduct evidence-building activities: quality, methods, effectiveness, and independence. Figure 18 displays the percentage of respondents who indicated that Rulemaking staff are integrating these attributes into evidence-building activities between 70 and 100 percent of the time (which is defined by the term “frequently” throughout this section).



**Figure 18 Rulemaking Data Summary**

Qualitative and quantitative data revealed five key themes related to the Rulemaking function area: (1) timeliness, (2) support in defining and consistently applying procedures, (3) knowledge management, (4) communication with management, and (5) independence. Figure 19 presents a summary of key themes specific to the Rulemaking function area.



**Figure 19 Rulemaking Key Themes**

**Timeliness** emerged as the first theme and relates to ongoing challenges created by compressed schedules that make producing high-quality work difficult. Four survey items are related to this theme and measured perceptions regarding how often (1) tasks have been completed in a timely manner, (2) staff time and efforts have been allocated appropriately, (3) resources have been expended efficiently, and (4) robust and reliable results have been produced. Three-quarters (75 percent) of nonsupervisory staff in Rulemaking indicated, on average, that these four activities occur frequently. When supervisory data are included (i.e., when examining all Rulemaking staff), the percentage is very similar (74 percent), indicating that supervisors feel these activities are happening at about the same frequency as do nonsupervisory staff. Staff explained that time pressure could be alleviated by more accurately estimating time requirements of projects based on project complexity. Staff also suggested that better coordination and adoption of tools that could expedite processes might also be helpful in increasing efficiency and meeting tight deadlines.

**Support in defining and consistently applying procedures** emerged as another theme from both the quantitative and qualitative data. This theme relates to the importance of maintaining and consistently applying procedures, both as they apply to rulemaking decisions, as well as general knowledge management practices. Four survey items pertain to this theme and focus on: (1) being able to rely on established procedures, guides, and standards, (2) knowing when to apply simple versus complex methods, (3) using appropriately high-quality data and information, and (4) having access to necessary software and computational tools. Among nonsupervisory staff in Rulemaking, three-quarters (75 percent) felt, on average, that these four items frequently occur. When supervisory data are added to the nonsupervisory staff data (i.e., when examining all Rulemaking staff), the percentage is slightly higher (76 percent), indicating that supervisors feel these activities are happening slightly more often than do nonsupervisory staff. Staff shared that increased guidance and documentation for making determinations, ensuring templates are consistent with NRC’s statutory responsibilities, clearly communicating changes to procedures, and streamlining the concurrence process would help Rulemaking better achieve its mission while pursuing evidence-building activities.

**Knowledge management** is the third theme, and it pertains to the need for better practices relating to knowledge management and knowledge transfer, specifically for the purposes of succession planning, training junior staff, preventing repeated efforts, and sharing relevant regulatory history and lessons learned. Two survey items are relevant to this theme. The first assesses the frequency with which best practices and lessons learned are captured; the second focuses on knowledge management tools and processes to enhance knowledge, skills, and abilities. Similar percentages of nonsupervisory staff (64 percent) and all Rulemaking staff respondents (65 percent) reported that these two activities occur frequently. Qualitative data reveal that, although Rulemaking staff find informal learning and knowledge sharing with each other beneficial, there is a desire among Rulemaking staff for more formal trainings to raise awareness of existing knowledge management tools, particularly for newer staff and management.

**Communication with management** is the fourth theme to emerge, and it relates to the desire for consistent support and guidance from management. Three survey items are relevant to this theme, including how often (1) objectives are transparent and clearly defined, (2) agreed-upon objectives are met, and (3) approach and results are communicated clearly. Although staff from Rulemaking shared their desire for more frequent communication with management—as well as for clearer objectives and expectations to keep projects moving forward—quantitative data show that 82 percent of nonsupervisory staff feel these three survey items are frequently happening. When supervisory data are added to the nonsupervisory staff data (i.e., when examining all Rulemaking staff), the percentage is slightly lower (80 percent), indicating that supervisors feel these activities are happening slightly less often than do nonsupervisory staff.

**Independence** is the last theme to emerge, and it focuses on the shared perception among Rulemaking staff that external influences, such as from industry or other Federal agencies, can have too much influence on their function area. Data from four survey items aligned with this theme; these survey items measured staff perception of the extent to which (1) staff are supported in performing work in a manner that is free from undue external influences, (2) staff are supported in performing work in a manner that is free from undue internal agency influences, (3) reasonable measures have been taken to reduce bias, and (4) contractors supporting the Rulemaking function area's evidence-building activities are free from others' undue influence. Half (50 percent) of nonsupervisory staff in Rulemaking, as well as half (50 percent) of all Rulemaking staff, feel that these four attributes are frequently observed. Although in focus groups the branch chiefs and team leaders did not share that they experienced the same challenges relating to independence, both leaders and staff noted the importance of finding the right balance between maintaining independence with the need to respond to stakeholder comments. Staff struggling with maintaining this balance noted that increased supervisor support to shield them from undue external influences would be helpful.

### Differences in Perspectives

Differences in perception by role (i.e., supervisory versus nonsupervisory roles) were noted when assessing the capacity to carry out evidence-building activities in Rulemaking. These differences are described where relevant throughout the themes presented above but are synthesized and summarized below.

#### *Supervisory Rulemaking Staff*

Quantitative comparisons between supervisory and nonsupervisory staff in Rulemaking cannot be made because of insufficient supervisor sample sizes. However, qualitative comments from



both written survey responses and focus groups held with branch chiefs and team leaders largely indicate alignment in perceptions of both groups as they pertain to the themes discussed above, particularly with respect to knowledge management and the need to define and apply procedures more consistently. Supervisors did not specifically address or share the concerns of staff that related to the desire for more management support. The largest discrepancy in perceptions emerged around the theme of independence. Namely, supervisors generally noted their feeling that Rulemaking was remaining sufficiently independent, whereas nonsupervisory staff shared more concerns about the undue influence industry has on their work.

### *Offices*

Because of sample size constraints, only quantitative comparisons between NMSS and NRR could be examined. Overall, NRR rated items relating to quality, methods, and effectiveness lower or happening less frequently; however, they rated items relating to independence higher, or happening more frequently, compared to NMSS. Two of the largest disparities were found in items relating to knowledge management. Specifically, only 25 percent of Rulemaking staff from NRR indicated that the function area frequently captures best practices and lessons learned, compared to 70 percent of Rulemaking staff from NMSS. The second item with a large disparity focuses on being able to rely on established procedures, guides, and/or standards—56 percent of Rulemaking staff from NRR said this happens frequently, compared to 91 percent of Rulemaking staff in NMSS. In contrast, in terms of independence, a larger proportion of staff from NRR reported frequently being supported in performing work free from both undue internal influence (50 percent of staff from NMSS versus 56 percent of staff from NRR) and external influence (48 percent of staff from NMSS versus 67 percent of staff from NRR).

### Customers of Rulemaking

Survey data were also collected from customers of Rulemaking (i.e., NRC staff who rely on work products from Rulemaking but do not themselves work within Rulemaking). A total of 42 customers of the Rulemaking function area provided survey responses.

**Quality.** Among all customers, 58 percent reported that Rulemaking frequently produces high-quality work. Customers commented that a stronger emphasis on prioritizing tasks and assigning staff appropriately would help increase efficiency and quality within Rulemaking. With respect to one aspect of quality, just over 60 percent of customers responded that the Rulemaking function area frequently allocates staff time appropriately based on mission significance.

**Methods.** When considering all methods-related items, 67 percent of customers felt that Rulemaking frequently uses strong methods. A key item specific to the effectiveness of evidence-building activities in Rulemaking focuses on how often staff possess the necessary knowledge and skills to use software and computational tools. Nearly three-quarters (73 percent) of customers reported that Rulemaking staff frequently possess these skills.

**Effectiveness.** Of Rulemaking customers, 55 percent said that the function area is frequently highly effective. Additionally, 58 percent of customers reported that Rulemaking frequently completes work on time. Qualitative comments aligned with staff experiences in Rulemaking, with customers noting that projects from Rulemaking often take a long time to complete and that they are cognizant of the time pressures felt by Rulemaking staff.

**Independence.** In terms of independence, 44 percent of customers indicated that Rulemaking is frequently highly independent. Customers were slightly less likely than staff to indicate that Rulemaking was frequently supported in performing work free from undue internal and external influence: 44 percent of customers said Rulemaking is frequently supported in working free from undue internal influence, and 45 percent had this same perception about undue external influence. Customers shared the perspective that there should be an appropriate balance between internal and external input.

***Rulemaking-Specific Findings and Mitigating Strategies***

Progress has been recorded for the FY 2022 findings and the associated mitigating strategies established to improve the NRC’s capacity to support evidence-building activities within the Rulemaking function area. Data collected for the current (FY 2023) capacity assessment emphasized challenges related to producing high-quality work given tight timelines, in addition to the importance of robust knowledge management and knowledge transfer practices to ensure that knowledge and best practices are not lost over time. Appendix C summarizes these findings and their statuses.

<p>FY 2022 Finding 1 Survey results indicate that the quality attribute has the most potential for improvement. The lowest scores within the quality attribute were on the use of the appropriate level of effort for analysis activities and on the availability of data to perform independent analyses.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should obtain and assess information related to (1) resource expenditures on rulemaking activities to ensure that the appropriate level of effort is used and (2) the availability of data used to support independent analyses.</p>
	<p><b>Updates to FY 2022 Mitigating Strategy:</b> The NRC collected additional data for the FY 2023 Capacity Assessment through surveys and focus groups. The data indicate that the quality attribute is most affected by pressure to complete tasks on time. The NRC should assess (1) task prioritization, (2) assignments based on skill level, (3) adoption of knowledge management tools to streamline processes, and (4) qualification process for new hires. The NRC should continue to assess information related to resource expenditures on Rulemaking activities to ensure that the appropriate level of effort is being used and to ensure the availability of data used to support independent analyses.</p>
	<p><b>FY 2023 Data:</b> In alignment with the FY 2022 Mitigating Strategy, data from the FY 2023 Capacity Assessment indicate that staff, supervisors, and customers of Rulemaking also perceive time pressure to be a hurdle impacting quality. Staff suggestions to mitigate the impact of quick timelines include more appropriately assigning staff to tasks based on skill level, better task prioritization, and a faster qualification process for new hires so that they can begin meaningfully contributing to projects more quickly. Other suggestions include more consistent adoption of knowledge management tools to streamline processes and to prevent repeated work,</p>

thus allowing staff to spend more time focusing on the quality of their work.

**FY 2022 Finding 2**  
The NRC’s technical staff can be challenged when applying their technical knowledge to the Rulemaking process. The NRC technical staff who routinely perform analyses to support agency functions such as Licensing and Oversight are infrequently needed to support analysis activities for rulemakings. While procedures for performing regulatory analyses are well established, staff who infrequently conduct analyses to support rulemakings could benefit from training before participating in the Rulemaking process. In addition, some technical analyses (e.g., radiation safety, geologic) used to support rulemakings are unique to the specific regulations being developed or amended. These analyses require staff to make decisions such as which analytical techniques are appropriate, what level of rigor should be applied, and the amount of data required to support a statistically significant result.

**FY 2022 Mitigating Strategy:** The following should be incorporated into the process when establishing working groups for new rulemakings: (1) identify key points of contact and clearly define their roles and responsibilities, (2) establish data needs and appropriate analytical techniques early in the process, and (3) provide a high-level overview of the rulemaking process and expectations.

**Progress Toward FY 2022 Mitigating Strategy:** The NRC is coordinating to determine if enhancements can be incorporated into the planned training for new rulemaking working groups and is considering the incorporation of such enhancements into associated guidance as part of a future planned guidance update.

**FY 2023 Data:** Data collected during the FY 2023 Capacity Assessment show that well-maintained knowledge management and knowledge transfer programs are important steps in preserving lessons learned and training new staff on best practices. Additionally, staff suggested focusing on increased guidance and documentation for making analytical determinations, ensuring that templates are consistent with the NRC’s statutory responsibilities, and clearly communicating changes to procedures.

**FY 2022 Finding 3**

The NRC needs to determine if the process for regulatory analysis development can be enhanced with a retrospective review of past rulemakings. Interviews with NRC management indicate that it is unclear if the agency's process for regulatory analysis development can be enhanced to be made more effective (e.g., accuracy of the estimates). Determining the effectiveness of the NRC's regulatory analysis development process would increase stakeholder confidence in the agency's Rulemaking process.

**FY 2022 Mitigating Strategy:** The NRC should conduct an assessment to determine if a retrospective review of past rulemakings would provide useful data to improve future regulatory analyses. If this assessment indicates that the benefits of such a retrospective review would outweigh the resource costs, then an appropriately scoped review should be conducted. Such a historical review would focus on whether the regulatory analyses development process appropriately estimates the activities of the NRC and affected entities to support agency decision-making.

**Progress Toward FY 2022 Mitigating Strategy:** The NRC included as part of the FY 2024 Evaluation Plan<sup>17</sup> a formative evaluation that will inform decision-making about the use of retrospective reviews of past rulemaking implementation to improve the effectiveness of the NRC's regulatory analysis process. The evaluation will determine the extent to which retrospective reviews of past rulemakings and their implementation could enhance the NRC's regulatory analysis process.

**FY 2023 Data:** Data collected for the FY 2023 Capacity Assessment contained limited information related to this finding. However, staff did express feeling time pressure on projects and a desire for adequate time to be built into the schedule for all aspects of a project. Staff also called for more consistency in procedures. Therefore, allocating sufficient time and ensuring that a retrospective review process is implemented consistently will be important considerations during the evaluation process.

**FY 2022 Finding 4**

The SWP results indicate that the largest expected staffing gaps are in the following Rulemaking positions: project managers, regulations specialists, and cost analysts. This information was verified by confirming that these positions have been identified as future staffing gaps and that strategies have been developed to fill these positions. Discussions with NRC management in the Rulemaking area further reinforced this finding.

**Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):** Staffing gaps have been identified as a crosscutting finding in the current (FY 2023) capacity assessment. The discussion of staffing gaps in section 5 of this report presents this finding.

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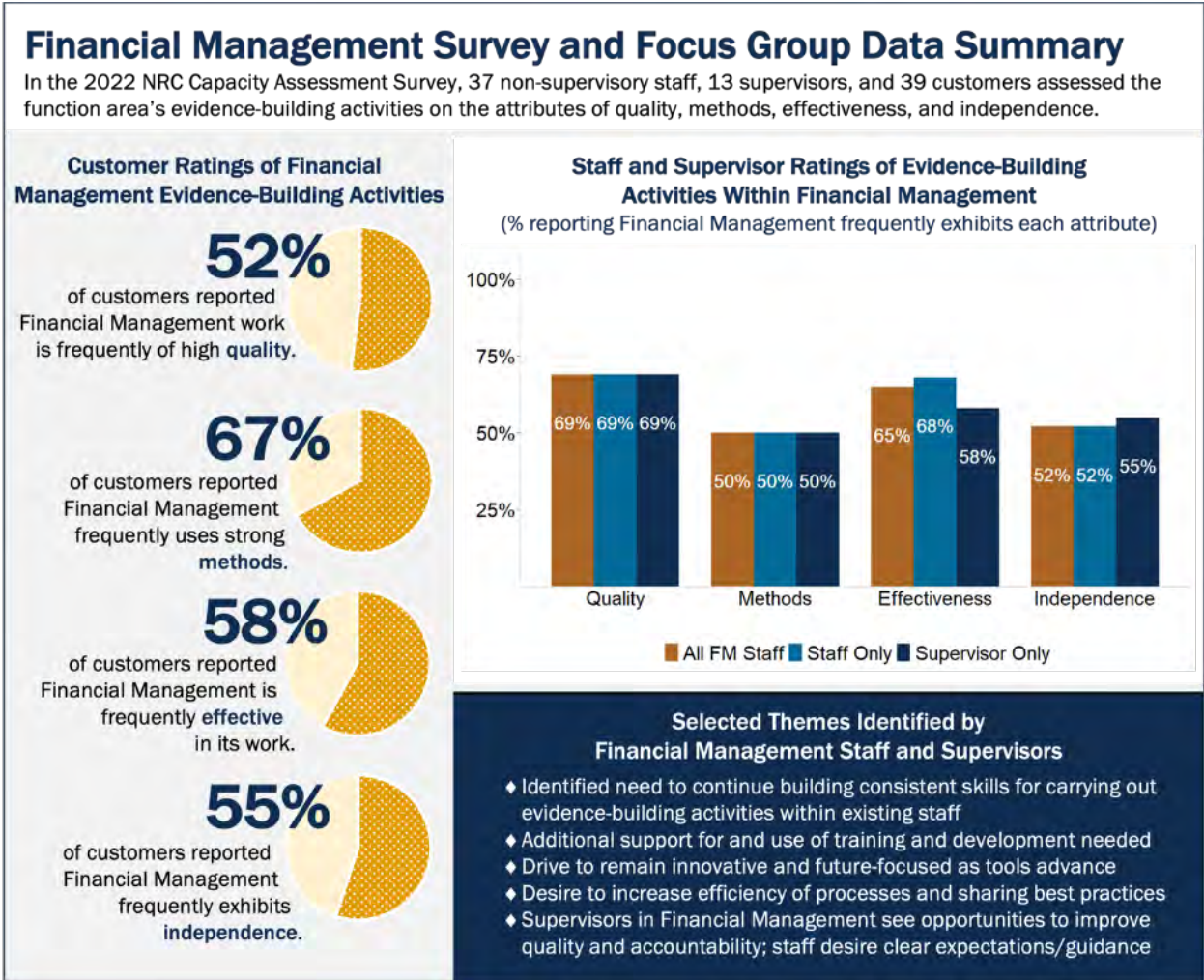
## FINANCIAL MANAGEMENT

The Chief Financial Officer (CFO) is responsible for the NRC's financial management activities, as well as agencywide internal controls. The CFO establishes budgeting and financial management policy for the agency and advises the Chairman and the Commission on these matters. The CFO develops and maintains an integrated agency accounting and financial management system; establishes policy and directs oversight of agency financial management personnel, activities, and operations; and prepares and transmits an annual report that includes the agency's audited financial statement to the Chairman and to the Director of the Office of Management and Budget (OMB). Other responsibilities include monitoring the financial execution of the NRC's budget in relation to actual expenditures; controlling the use of agency funds to ensure that they are expended in accordance with applicable laws and standards; preparing and submitting timely cost and performance reports to the Chairman; reviewing, on a periodic basis, fees and other charges imposed by the NRC for services provided; and recommending revisions of those charges as appropriate. The CFO provides an agencywide management control program for financial and program managers to comply with the Federal Managers' Financial Integrity Act and is responsible for implementing the Chief Financial Officers Act at the NRC. The CFO also oversees the management of the agency's Programmatic Internal Control Program.

### ***Quality, Methods, Independence, and Effectiveness***

Data collection for the FY 2023 Capacity Assessment included survey responses from 50 participants who identified that they most directly supported the Financial Management function area over the past year. Of the 50 respondents, 37 were nonsupervisory staff, 10 were branch chiefs or team leaders, and 3 were senior managers. Data was also collected from five branch chiefs and team leaders in the Financial Management function area who participated in a focus group. Figure 20 presents a summary of aggregated survey and focus group results specific to the Financial Management function area.

Financial Management staff rated the extent to which they are using the following four attributes to conduct evidence-building activities: quality, methods, effectiveness, and independence. Figure 20 displays the percentage of respondents who indicated that Financial Management staff are integrating these attributes into evidence-building activities between 70 and 100 percent of the time (which is defined by the term "frequently" throughout this section). Supplemental data from the 2022 Federal Employee Viewpoint Survey (FEVS) specific to the Office of the Chief Financial Officer (OCFO), where many Financial Management staff work, are included where available.

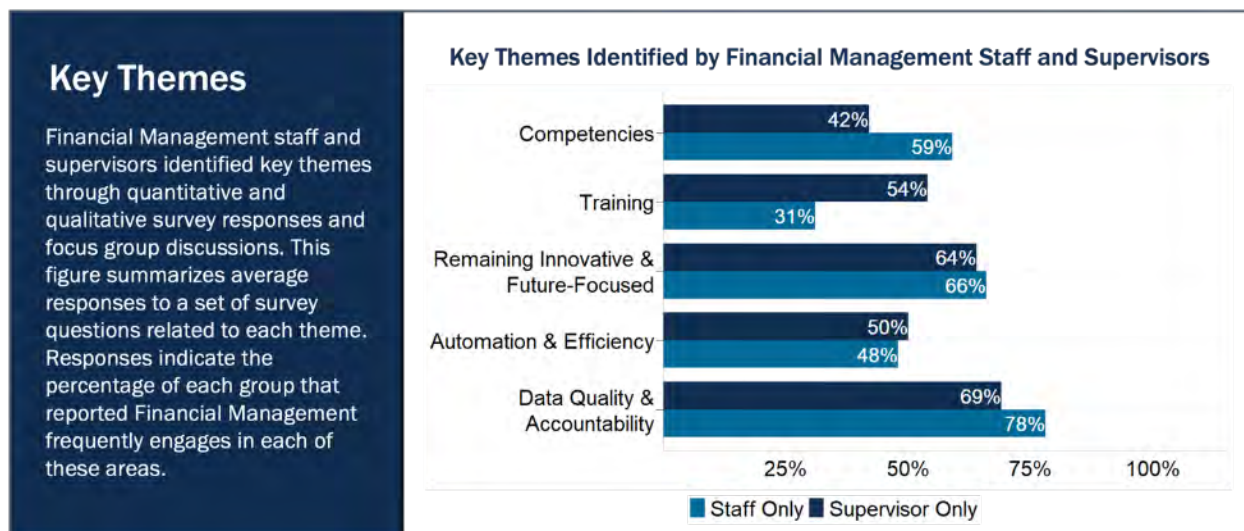


**Figure 20 Financial Management Data Summary**

Qualitative and quantitative data revealed five key themes most relevant to the Financial Management function area: (1) competencies, (2) training, (3) remaining innovative and future focused, (4) automation and efficiency, and (5) data quality and accountability. Figure 21 presents a summary of key themes specific to the Financial Management function area.

**Competencies** emerged as the first theme. This theme identified the need to continue to build skills within existing staff, focusing primarily on methods used in evidence-building activities. Two survey items are associated with this theme, with the first focusing on knowing when to use simple versus complex methods, and the second relating to whether staff have the necessary knowledge and skills to use needed software and computational tools. Supervisors rated both items as occurring less frequently than did staff, with 42 percent of supervisors reporting these happen frequently, compared to 59 percent of staff. Supplemental data from the 2022 FEVS provide additional insights relevant to this theme. When OCFO staff were asked whether their work unit has the job-relevant knowledge and skills necessary to accomplish organizational goals, 25 percent disagreed, while just 61 percent agreed, and 14 percent provided neutral responses. Financial Management staff shared that when some staff do not have sufficient skills to conduct evidence-building activities—such as analysis and evaluation—that work is shifted to those staff who do have the required knowledge, skills, and abilities, thus overburdening more

highly skilled staff. Comments included suggestions for specific competencies to target, as well as suggestions to better utilize knowledge management tools, such as video guides and rotations, to increase knowledge and skills within Financial Management.



**Figure 21 Financial Management Key Themes**

**Training** is the second theme and refers to the availability and ease of access to training materials. This theme is associated with two survey items measuring perceptions of engagement with (1) internal and (2) external training and development opportunities. Compared to staff, supervisors were substantially more likely to indicate that trainings are frequently taken advantage of (54 percent of supervisors compared to 31 percent of staff). Staff and supervisors noted the need for more trainings focused on building analytical thinking skills. Other participants commented that trainings could be better incentivized to encourage participation. In the FEVS, 58 percent of OCFO participants agreed they receive the training they need to do their job well. Another 17 percent provided neutral responses, and 25 percent disagreed that they receive the training they need. These data provide additional evidence that further training may be needed for a substantial portion of Financial Management staff.

**Remaining innovative and future focused** emerged as the third theme, which addresses the importance of continual innovation and the need for staff to stay current with technologies and methods that are becoming critical for the future of the NRC's work. One survey item assessing access to software and computational tools is related to this theme. Supervisors and staff expressed similar sentiments about this item, with 64 percent of supervisors and 66 percent of staff reporting that Financial Management frequently has access to needed software and computational tools. FEVS data also provide information relevant to innovation. When OCFO respondents were asked about the extent to which they agree that employees in their work unit consistently look for new ways to improve how they do their work, 69 percent agreed, 18 percent provided neutral responses, and 14 percent disagreed. To remain future focused, participants suggested focusing on artificial intelligence, machine learning, and the development, maintenance, and use of dashboards. In their focus group, branch chiefs and team leaders emphasized their concerns that some processes are becoming outdated and could be made substantially more efficient with innovation.

**Automation and efficiency** are highlighted in the fourth theme, pertaining to the desire for more efficient processes. This theme is associated with three survey items, including how often (1) resources are expended efficiently, (2) staff has been able to rely on established procedures, guides, and standards, and (3) best practices and lessons learned have been captured. Again, supervisors and staff rated these items similarly, with 50 percent of supervisors and 48 percent of staff reporting that these activities happen frequently. Key issues raised by staff include the need for updated and centralized documentation of standard operating procedures, more consistent sharing of best practices and knowledge management tools and resources, increased automation of processes when possible (e.g., for aspects of reporting), and adoption of tools to increase efficiency.

**Data quality and accountability** is the last theme that emerged, and it relates to the quality of work products. Two survey items are related to this theme, and they focus on the extent to which (1) high-quality data and information are used and (2) how often results are robust and reliable. Although 78 percent of staff reported feeling that Financial Management uses high-quality data and produces robust and reliable results frequently, only 69 percent of supervisors feel the same way. To encourage accountability, supervisors shared the need for measurable targets for staff understanding of subject material and capability with the tools and systems needed. Staff also indicated that more general quality assurance issues could be addressed with performance management practices and by providing clear expectations and guidance. Supplemental data from the FEVS indicate the quality and accountability concerns shared by a portion of Financial Management staff and supervisors may be specific to evidence-building activities in particular. FEVS data show that 94 percent of OCFO respondents agreed that they themselves are held accountable for the quality of work they produce, and 81 percent of OCFO respondents agreed that employees in their work unit produce high-quality work.

## Differences in Perspectives

### *Supervisory Oversight Staff*

Survey data showed several differences between the perceptions of nonsupervisory staff and supervisors, although differences were not as substantial within Financial Management as in some other focal function areas presented in this report. When asked about the quality of evidence-building activities in Financial Management, for example, fewer nonsupervisory staff (53 percent) rated appropriate allocation of staff time and effort based on mission significance as happening frequently, compared to supervisors (67 percent). However, more nonsupervisory staff (75 percent) felt that Financial Management frequently produces robust and reliable results, compared to supervisory staff (70 percent). On average, supervisors rated all methods items as happening less often than staff, but they rated all independence items as happening more often.

## Customers of Financial Management

Survey data were also collected from customers of Financial Management (i.e., NRC staff who rely on work products from Financial Management but do not themselves work within Financial Management). A total of 39 customers of the Financial Management function area provided survey responses.

**Quality.** Considering overall quality, 52 percent of customers reported that Financial Management frequently produces high-quality work. A key item assessing quality of



evidence-building activities includes perceptions of producing robust and reliable results. Customers rated this item lower, or happening less often, than staff and supervisors within Financial Management, with only 46 percent of customers indicating that this outcome happens frequently. Customers requested additional knowledge management and training efforts to reduce errors, increase efficiency, and improve knowledge of key aspects of the NRC’s budget, such as appropriation, fee structures, and no year funds.

**Methods.** Just over two-thirds (67 percent) of customers indicated that Financial Management frequently uses strong methods. More specifically, 68 percent of customers reported that staff frequently know when to apply simple versus complex methods—a higher rating than was given by staff or supervisors within Financial Management.

**Effectiveness.** Of its customers, 58 percent responded that Financial Management is frequently highly effective. To enhance effectiveness, customers requested that Financial Management engage end-users earlier in their processes and clearly define roles and responsibilities of staff providing input. Slightly over half (56 percent) of customers felt that Financial Management frequently communicates approach and results clearly.

**Independence.** Unlike most other function areas, the desire for greater independence from internal and external influence did not emerge as a theme for the Financial Management function area. From the customer perspective, 55 percent indicated that Financial Management frequently operates independently. When considering external influence specifically, 71 percent of customers felt Financial Management was frequently supported in working free from undue external influence.

***Financial Management-Specific Findings and Mitigating Strategies***

Progress has been recorded for the FY 2022 findings and the associated mitigating strategies established to improve the NRC’s capacity to support evidence-building activities within the Financial Management function. Data collected for the current (FY 2023) capacity assessment continued to emphasize a need for more resources and development of skills specific to evidence-building activities within Financial Management. Appendix C summarizes these findings and their statuses.

<p><b>FY 2022 Finding 1</b> The information collected indicated a need for more resources and development of skills in data analytics and analysis based on the continuing transition to new technology and systems.</p>	<p><b>Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):</b> The NRC should use the Enterprise Data Strategy implementation to identify the specific data analytics roles and responsibilities needed, provide role-based training, and develop the analysis skills of the Financial Management staff.</p>
	<p><b>Updates to FY 2022 Mitigating Strategy:</b> The NRC is participating in the CFO Council’s Workforce Modernization Initiative. One aspect of the initiative is a continuing effort to develop a web-based training program on data analysis and data science for the Governmentwide financial workforce.</p>
	<p><b>FY 2023 Data:</b> Data collected for the FY 2023 Capacity Assessment identified this finding across multiple key agency functions. Additional resources and development of skills in analysis, tools, and technology are needed across multiple NRC functions. Results suggest value in training to increase consistency of skills and/or establish a higher base skill level</p>

across all staff. Section 5 of this report identifies a new crosscutting finding for this issue.

**FY 2022 Finding 2**  
The SWP results indicated that the budget analyst position experiences attrition because of retirement. The position also has a consistently high turnover rate due to staff transfers to other roles within the agency or to other agencies.

**Closed FY 2022 Mitigating Strategy (moved to crosscutting findings for FY 2023):** Staffing gaps have been identified as a crosscutting finding in the current (FY 2023) capacity assessment. The discussion of staffing gaps in section 5 of this report presents this finding.

## EVALUATION

Since its inception, the Evidence Act has supported the NRC’s efforts to elevate evaluation to a key agency function. Evaluations are necessary to accomplish the NRC’s mission and are increasingly becoming integral to the NRC’s day-to-day work, as well as the agency’s ability to carry out other types of evidence-building activities. The Annual Evaluation Plan documents evaluations of significance to the NRC, including evaluations associated with priority questions in the NRC’s Evidence-Building Plan,<sup>18</sup> evaluations required by statute, and evaluations of high value to the agency. Evaluations are intended to improve the effectiveness and efficiency of a program, policy, regulation, or organization. In addition, evaluation can identify process improvements to enhance programs and can identify cause and effect to aid in the development and monitoring of performance measures. Performing evaluations requires specialized skills and expertise to apply the standards outlined in OMB Memorandum M-20-12, Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices,<sup>19</sup> dated March 10, 2020.<sup>19</sup> As described below, the NRC is working to build its internal capacity for evaluation, as well as to carry out multiple third-party evaluations each fiscal year.

The following evaluations are identified in the NRC’s FY 2023 and FY 2024 Annual Evaluation Plans<sup>20</sup> and are in progress or undergoing planning:

- Evaluation of the NRC’s **Strategic Workforce Planning (SWP) Process** kicked off in October 2022. The evaluation aims to assess the effectiveness and efficiency of current processes and compare estimated workloads and staffing projections from SWP data against actual results.
- Evaluation of the NRC’s **Knowledge Management Program** kicked off in October 2022. The evaluation seeks to determine the extent to which the NRC’s approach to capturing and transferring knowledge is effectively meeting its intended goals and being implemented efficiently.

<sup>18</sup> NUREG-2252, “Evidence-Building Plan Fiscal Year 2022,” Volume 1, issued April 2022 ([ML22066B056](#)).

<sup>19</sup> <https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-12.pdf>

<sup>20</sup> NUREG-2250, Volume 1, “Annual Evaluation Plan Fiscal Year 2023,” issued April 2022 ([ML21173A247](#)), and Volume 2, “Annual Evaluation Plan Fiscal Year 2024,” issued March 2023 ([ML23073A062](#)).

- The NRC plans to conduct an evaluation of its **Licensing Actions** to ensure that the agency's licensing review and certification process is data driven, evidence based, applies a risk-informed approach, and reflects an appropriate and reasonable expenditure of resources.
- The NRC also plans to conduct an evaluation of its **University Nuclear Leadership Program** to identify opportunities to leverage university grants to support agency research needs, as well as the capabilities of the nuclear workforce and the nuclear industry.
- The NRC will conduct an evaluation related to its **Regulatory Analysis Process for Rulemaking**. This evaluation will determine the extent to which retrospective reviews of past rulemakings and their implementation could enhance the agency's regulatory analysis process.

### ***Personnel***

In support of Title I of the Evidence Act, the NRC is building organizational capacity to perform evidence-building activities and evaluations by establishing a dedicated team in the Office of the Executive Director for Operations (OEDO). This dedicated team will provide a sustainable capacity to implement the requirements of the Evidence Act and will be an agencywide resource for evidence-building activities, including evaluation, as well as strategic planning, innovation and continuous learning, business analytics and solutions, and collaboration and communications on activities across the agency to avoid silos and duplication of efforts. To that end, OEDO has been engaged in the process of hiring four staff in program evaluator positions. Program evaluators are responsible for developing, carrying out, and overseeing evidence-building activities to further the mission of the NRC from project inception through field work to completion of final reports. The management and program analyst functions as a technical expert and authoritative resource in using data-driven and evidence-based methods for analyses with both qualitative and quantitative data associated with agency programs, policies, operations, and functions of critical importance to the achievement of strategic goals and mission requirements.

Third-party evaluations offer advantages of heightened objectivity, technical expertise, and credibility, among others. As such, in addition to building its internal capacity for evaluation, the NRC has contracted with Pacific Research and Evaluation, LLC (PRE), an external expert in evaluation, to conduct evidence-building, evaluation, and relevant change management work over at least a 5-year period. PRE is currently leading external evaluations of the NRC's SWP and Knowledge Management programs, described in greater detail below. NRC contract representatives oversee this evaluation work, with collaborative input from leaders and other key stakeholders across the NRC. PRE will also begin conducting additional evaluations before the end of FY 2023 and into FY 2024, with priorities identified based on the key findings of the FY 2022 and FY 2023 Capacity Assessment documents, as well as the FY 2023 and FY 2024 Evaluation Plan documents.

### ***Updates to Ongoing Evaluations***

In October 2022, the NRC initiated four-phase evaluations of the SWP process and the Knowledge Management Program. Phase one of these evaluations, which included informational interviews and background documentation to inform the development of logic models specific to each evaluation, was completed in December 2022. Phase two began in January 2023 and led to the development of individualized evaluation plans rooted in systematic

knowledge-gathering efforts and evaluation best practices. Phase three focuses on implementing high-quality, practical, and methodologically sound evaluations to produce data-informed change management and continuous improvement efforts, to be carried out in phase four. In addition to these ongoing evaluations, by quarter 4 of FY 2023, the planned Licensing Actions evaluation will be initiated.

**Evaluation-Specific Findings and Mitigating Strategies**

Progress has been recorded for the FY 2022 findings and the associated mitigating strategies established to improve the NRC’s capacity for performing evaluations and other evidence-building activities. The three evaluation-related findings presented in the FY 2022 Capacity Assessment include the following. Appendix C summarizes these findings and their statuses.

<p><b>FY 2022 Finding 1</b> The NRC would benefit from institutionalizing program evaluation into agency activities similar to the implementation of enterprise risk management and performance management. Evaluation is a scientific discipline and, as such, credible evaluations must be managed by qualified evaluators with relevant education, skills, and experience for the methods undertaken.<sup>21</sup> An individual or external firm qualified in designing and performing program evaluations should be hired to enhance the effectiveness and efficiency of the NRC’s programs, policies, operations, and organizations. The program evaluator would serve as an agencywide resource for designing evaluations consistent with the standards in the NRC’s “Evidence-Building and Evaluation Policy Statement” and applicable guidance from OMB.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should hire an individual or external firm qualified in designing and performing program evaluations to lead and support agencywide evaluation efforts, consistent with the evaluation standards in the NRC’s Evidence-Building and Evaluation Policy Statement.</p> <p><b>Progress Towards FY 2022 Mitigating Strategy:</b> The NRC has contracted with PRE to conduct evidence-building and evaluation activities. PRE is currently conducting two of the five evaluations identified in the NRC’s FY 2023 and FY 2024 Evaluation Plan documents.</p> <p><b>FY 2023 Data:</b> This finding is considered complete and closed.</p>
<p><b>FY 2022 Finding 2</b> The NRC staff needs to ensure that its future evaluations use appropriate methods and are of high quality.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should develop procedures (e.g., methods) to ensure that evaluation activities are performed consistently across the agency.</p>

<sup>21</sup> The Office of Personnel Management (OPM) has established standards for evaluation rigor (<https://www.opm.gov/policy-data-oversight/data-analysis-documentation/evaluation-standards/>).

	<b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC is in the process of developing a management directive to ensure that roles and responsibilities are clear for the performance of future evaluations.
	<b>FY 2023 Data:</b> A four-phase evaluation process has been developed and implemented by the NRC’s contractor, PRE. This four-phase process provides a reproducible template for future evaluations and establishes the basis for standards related to using appropriate methods and producing high-quality findings in NRC evaluations.

<p>FY 2022 Finding 3 The NRC does not have evaluators with training or experience in regularly performing evaluations subject to OMB standards. The NRC will need to build its evaluators’ knowledge, skills, and abilities that are required to address this gap.</p>	<b>FY 2022 Mitigating Strategy:</b> The NRC should develop a competency model for the “evaluator” role to ensure that the agency has the capability to assess staff’s proficiency and capacity to perform evaluation activities. The NRC should define the knowledge, skills, and abilities for the evaluator role to address the workforce gap by training staff or hiring qualified personnel.
	<b>Updated FY 2022 Mitigating Strategy:</b> To build internal capacity, the NRC is in the process of hiring four program evaluators. These new hires will have the expertise needed to formalize procedures for the evidence-building and evaluation program at the NRC.

## 5. CROSSCUTTING FINDINGS

The FY 2022 and FY 2023 capacity assessments identified findings that crossed into multiple key agency function areas. Data collected for the current (FY 2023) capacity assessment identified five new findings regarding the NRC’s capacity to conduct evidence-building activities. The findings focus on the following topics: skill levels and training, workload management, data analytics, communication, and evolving in a hybrid work environment. These five new findings for FY 2023 are discussed below, followed by updates to 10 of the 27 findings that originated from the FY 2022 Capacity Assessment. Previously identified crosscutting findings include staffing gaps, knowledge management,<sup>22</sup> competency modeling, data, artificial intelligence, environmental justice, recent operational experience, workforce planning process, reduction in support staff, and corporate support resource limits. Updates on new data and progress related to these 10 existing findings accompany each. Appendix C shows a summary of all findings and their associated completion statuses.

<sup>22</sup> Because staffing gaps and knowledge management emerged as significant crosscutting items in both FY 2022 and FY 2023, substantial additional data are presented on these topics throughout the previous sections.

## NEW CROSSCUTTING FINDINGS IN FY 2023

### *Skill Levels and Training*

Challenges associated with training to build and maintain knowledge and skills within existing staff emerged as a central theme across function areas in relation to the NRC's capacity to conduct evidence-building activities. Several key considerations arose from the data. First, although data from the 2022 Federal Employee Viewpoint Survey (FEVS) indicate that 74 percent of staff members agree that they receive the training they need to do their jobs well, data collected for the capacity assessment highlight differences in experience between internal and external training. Across all function areas, just 37.1 percent of staff members who regularly engage in evidence-building activities reported that their function area frequently takes advantage of external training and development opportunities. Comparatively, 60.5 percent of the same group reported that their function area frequently takes advantage of internal training and development opportunities.

Staff reported that external training provides an important resource that allows them to fill gaps in their learning and development that would not otherwise be covered or addressed by internal training. They also reported that external trainings help them to stay abreast of the latest developments in their fields, including advances in technology and methodologies. Staff noted that many roles at the NRC require specialized knowledge—especially those roles involving a high degree of evidence-building activities—and that external learning and development opportunities fill important needs in the agency's ability to build and maintain the right knowledge sets and skills within function areas.

Some staff shared that internal trainings are not updated regularly enough or are not detailed enough to meet their needs, leading to the necessity to rely on external training to satisfy their learning and development needs. Staff reported that the largest barrier specific to external trainings is obtaining approval and securing funding. The Office of the Chief Human Capital Officer releases two calls for external training funding each year; the calls are released in July for external training that will take place November through April and in January for external training that will take place May through October. Staff members observed that they often do not learn about external training and development opportunities with enough time to be able to submit timely requests, causing them to either forego trainings or pay for the trainings themselves. Emergent external training requests can be submitted per the current NRC approval process, but such requests generally require a higher priority to justify approval, given there is a smaller amount of reserved funds available to support emergent requests. Budget data showed that only 81 percent of the agency's external training budget was expended, with the remaining 19 percent reprioritized for other training needs. A total of 843 emergent and planned requests were submitted in FY 2022. These data appear to indicate that the challenge staff are experiencing is due to perceived burdens imposed by the funding request process, rather than actual limitations in the availability of funding.

Another commonly reported barrier in staff experiences with training is the difficulty staff have in finding time to dedicate to learning and development opportunities. Findings regarding continued staffing gaps (see Section 4 for discussion of coverage) suggest that it is likely that staff are too overburdened in their workloads to engage in learning and development to the extent desired, or at least to the extent possible in previous years when staffing gaps were not as prominent. The NRC plans to hire many more staff in coming years to fill gaps and more evenly distribute workload among staff. As planned hiring is realized, additional support from senior management and direct supervisors to encourage staff to prioritize learning and

development will likely benefit the NRC's continued capacity to conduct evidence-building activities and, ultimately, to meet its mission.

Finally, staff noted that the trainings offered internally could be better aligned with staff skill levels and job duties. The most common topics and content areas requested include the following:

- Trainings to ensure that staff within a work group or function area meet an agreed-upon basic minimum skill or competency level.
- Trainings that include information relevant to the latest methodologies, software, and tools, as technology and best practices continue to advance rapidly.
- Supervisor and management training to ensure high-quality leadership and smooth, efficient project work. Such trainings could focus on communication strategies to fully understand the complexities involved in each stage of a project or task and to appropriately and fairly allocate employee effort and resources across staff with diverse skillsets and experience.
- Project management-specific training to ensure adequate technical knowledge and alignment around project goals, roles, and timelines, as well as strategies to effectively conduct hybrid meetings (i.e., those meetings involving a mixture of virtual and in-person attendees).

The NRC's division of Human Resources Training and Development (HRTD) within the Office of the Chief Human Capital Officer takes several steps each fiscal year to ensure that the agency is offering a variety of training topics to meet training needs and interests. Steps include reviewing data from the most recently completed call for external training funding, consulting within HRTD and with senior management on external circumstances and agency initiatives that may require training support, reviewing attendance rates and waitlists to identify trends in demand for existing offerings, reviewing Talent Management System reports to identify requests for additional offerings, and consulting the instructional designers for insights on changes and developments in required trainings. Additionally, course evaluation data are reviewed to periodically evaluate training effectiveness.

**FY 2023 Finding 1**

Data indicate that staff are experiencing challenges that prevent them from consistently engaging in and taking advantage of trainings. Staff shared difficulties in prioritizing and finding time for training and development given high workloads. Staff also shared challenges in prioritizing and securing funding for emergent external training requests when requests are submitted after the close of the period during which funds are allocated for initial requests.

**Mitigating Strategy:** The NRC should assess the efficiency of the agency's current process for approving external training and development funding and improve access to opportunities that arise with less notice than is currently required by the biannual calls for employee requests. Additionally, the agency should engage supervisors and leaders in an agencywide strategy to better integrate and prioritize learning and development; the agency should also better communicate existing opportunities for staff to share their training and development needs with HRTD. As staffing gaps are addressed, the agency should direct additional HRTD staff resources to ensure that internal learning and development opportunities are regularly updated, reflect the latest advances in technology and methodology, and align with staff skill levels and job duties.

## ***Workload Management***

The NRC staff in all six focal function areas—as well as additional function areas not described in detail in this report—discussed challenges related to task distribution and workload management. Data from the FEVS provided evidence suggesting that workload has been increasing over time, particularly in the last 2 years. When asked the extent to which they agree their workload is reasonable, 66 percent of staff across the NRC provided a positive response in 2022, and 67 percent did so in 2021. These rates of agreement are lower than those for any previous year of FEVS data, which ranged from 69 to 74 percent agreement for 2011 to 2020. Although the differences are only a few percentage points, the downward trend in staff agreement that their workload is reasonable is clear. High rates of attrition, difficulties in hiring to fill staffing gaps, and corporate support resource limits are all likely contributors to increased staff perceptions of unreasonable workloads.

Staff shared that, along with increased workloads, there is a tendency for tasks to be assigned unevenly, with top performers or more skilled staff carrying the burden of additional work. Additional insights into this topic come from a capacity assessment survey item that asked staff the extent to which they feel that workload is being assigned evenly across staff commensurate with their positions and grade levels. Within the six focal function areas included in this capacity assessment, only 43 percent (Financial Management) to 57 percent (Oversight) of staff reported that their function area's work is frequently assigned evenly across staff commensurate with position and grade level. Because of substantial workforce gaps in many offices/regions and, more broadly, in many function areas, staff reported that tasks have become more urgent and difficult to prioritize. Senior managers shared that this understaffing has led to a need to depend heavily on those staff who are most skilled and consistently able to accomplish the tasks needed. At the same time, staff shared that it is difficult and time consuming to onboard new staff, who often have long periods of training to obtain appropriate qualifications, knowledge, and skills. More skilled or experienced staff may thus be at higher risk of burnout and increased stress.

Staff from several function areas suggested ensuring that tasks are assigned at the appropriate skill level to maximize the effectiveness of all staff and prevent overburdening a select few. More even allocation of tasks may help staff feel better equipped to prioritize competing demands and to determine where to focus their efforts, especially given ongoing staffing gaps. It will likely also benefit supervisors, as some supervisors voiced that supporting overutilized staff members in carrying heavy workloads could impose additional burdens on them, on top of those burdens associated with existing gaps in their teams and with any necessary efforts required to address underutilized or underperforming staff members.

As part of efforts to understand and address workload challenges, the Office of the Executive Director for Operations (OEDO) asked each office and region in November 2022 to share the top two workload burdens experienced by first-line supervisors. Commonly reported workload burdens included those associated with the performance appraisal process, required supervisory trainings, hiring process delays and resulting workload management challenges, information technology (IT) systems (e.g., Federal Personnel and Payroll System), onboarding and qualifications processes, budgeting and funding processes, and fee billing/validation processes.

Both NRC staff and management communicated that managing workload will be particularly important in the near future, as the agency expects to take on a higher volume of work in the



coming years. This is particularly the case in the areas of reactor licensing, reactor inspection, reactor security, and emergency preparedness and incident response—areas where staff are preparing for expected increases in workload related to advanced reactor developments. (Additional information regarding such developments can be found in the Agency Environmental Scan, included as Appendix A to this capacity assessment.)

**FY 2023 Finding 2**

Within and across function areas, staff communicated challenges with handling high workloads. Some staff also communicated a perception that the distribution of tasks tends to be uneven, with the highest performing and/or highest skilled employees often carrying a disproportionately high workload. Task prioritization and distribution challenges impact stress, burnout, and retention of experienced, skilled staff, as well as supervisors' ability to support their teams while ensuring the successful completion of tasks.

**Mitigating Strategy:** The NRC should evaluate, monitor, and improve the distribution of its workload among staff—especially nonsupervisory staff—with particular attention given to not overburdening those staff with the most advanced knowledge, skills, and abilities to conduct evidence-building activities. The NRC should identify a tool that could be implemented to support understanding the level and distribution of workload and should provide training on best practices for those interested in using such a tool. The NRC leadership should actively encourage teams to utilize senior and highly skilled staff to mentor and guide those staff with less experience and lower skill levels, rather than relying on senior and highly skilled staff to handle work unilaterally. Whenever possible, staff recruitment efforts should be targeted at highly skilled, experienced staff to increase the proportion of those staff at the NRC. The NRC should also continue to utilize the process for obtaining support for rehired annuitants, when possible, especially during periods when newly hired staff are in the process of being trained and qualified. Finally, the NRC should provide training opportunities to support supervisors and managers in learning new workload management skills.

**Communication**

When the Evidence Act was first implemented, guidance from the Office of Management and Budget (OMB) shared that successful implementation would require “agency staff and external stakeholders to break down traditional silos and collaborate in new ways.”<sup>23</sup> In a similar vein, staff often discussed communication and collaboration during data collection for the capacity assessment. Staff emphasized the importance of communication across offices, regions, divisions, branches, and individuals, as well as across levels of the agency (e.g., from senior management to nonsupervisory staff and vice versa), to effectively conduct evidence-building activities and produce high-quality work.

Data across function areas revealed opportunities for improved communication among roles, as well as among offices and regions. Specific to communication among roles, staff shared a desire for clear, coordinated, and transparent communication from senior management. Additionally, staff reported seeking more consistency in the communication skills of supervisory staff, which may be achieved with additional training or other efforts coordinated at the agency level.

<sup>23</sup> OMB Memorandum M-21-27, “Evidence-Based Policymaking: Learning Agendas and Annual Evaluation Plans,” June 30, 2021. (<https://www.whitehouse.gov/wp-content/uploads/2021/06/M-21-27.pdf>)

In relation to communication between offices and regions, staff who reported that they are customers of one or more function areas or who belong to a function area that frequently collaborates with other offices/regions or function areas shared the need to continue improving coordination and collaboration processes. Staff requested more standardized approaches for communication among offices/regions, more coordination of tasks to reduce duplication of efforts, and more widespread sharing of lessons learned. It is important to note that the majority of the NRC's function areas bridge multiple offices/regions, further emphasizing the critical importance of communication and coordination. FEVS data from 2022 showed that when staff were asked the extent to which managers promote communication among different work units, 67 percent of staff responded positively, meaning that only about two-thirds of staff feel that managers are promoting communication among work units.

An additional aspect of communication commonly raised by staff was that of relationships with external stakeholders. The NRC's role in providing information to the public is essential. Independence and openness are two of the NRC's five principles of good regulation, and the inclusion of these two principles demonstrates the central importance of communication with stakeholders to the NRC's work. Furthermore, the third goal of the agency's 2022–2026 strategic plan is to inspire stakeholder confidence in the NRC. Staff share the perspective that the public and other external stakeholders play a critical role in the agency. However, some staff shared that they feel the agency is too responsive to licensee influence and feedback, which distracts from work more closely aligned with the NRC's mission. Nonsupervisory staff also shared the perspective that a disproportionate amount of staff time is spent considering industry proposals that are outside the range of acceptable projects. Staff emphasized challenges that accompany trying to appropriately balance meeting the NRC's mission with responding to stakeholder comments. Within the six focal function areas included in this capacity assessment, 47 percent (Rulemaking) to 74 percent (Research) of staff reported their function area is frequently supported in performing work free from undue external influence, indicating there is a relatively wide range of experiences among function areas.

One particular area of staff concern related to the NRC's transparency and independence was that of drop-in meetings with industry. The NRC Office of the Inspector General (OIG) addressed this concern as well in an audit report published in August 2022.<sup>24</sup> Based on its audit, the OIG recommended that the NRC take the following actions:

- Develop and publish a public description of the purposes and benefits of, and the controls on, the drop-in meeting process.
- Develop guidance to systematize practices across the agency for consistently informing technical staff about drop-in meetings, both before and after such meetings occur.
- Develop guidance to systematize practices across the agency for consistently including staff observers in drop-in meetings as part of staff development and training.
- Once new guidance is developed, train all managers on the new guidance and controls for drop-in meetings, as well as on related interactions with external stakeholders.

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<sup>24</sup> Information about the OIG's audit of the NRC's drop-in meeting policies and procedures is available at <https://nrcoig.oversight.gov/reports/audit/audit-nrcs-drop-meeting-policies-and-procedures>.

### FY 2023 Finding 3

Staff expressed a desire for improved and more open communications within and across offices, especially from senior leaders. Staff are strongly aligned with the NRC's values of integrity, service, and openness, among others, and they highly value clarity, consistency, and transparency in communication from leaders, among offices/regions, and with industry. Staff communicated that they seek a better understanding of agency and leadership priorities and more authentic communications from senior management. Staff also seek consistent practices and policies that reflect the NRC's principle of ensuring independence from undue industry influence. To this end, staff also expressed that they seek increased transparency regarding NRC drop-in meetings with industry.

**Mitigating Strategy:** The NRC should continue implementing the recommendations from the OIG report regarding the NRC's drop-in meeting policies and procedures. The NRC should regularly evaluate the effectiveness and utilization of each of its available agencywide communications tools (e.g., network announcements, Microsoft Teams, the Executive Director for Operations (EDO) update emails, newsletters) and strategies to ensure that the most critical and relevant information reaches staff as intended. Ongoing efforts from OEDO and other offices/regions to increase the authenticity, value, and effectiveness of communications from senior management should be built on and increased, augmented with additional resources directed to those efforts on a permanent basis.

### *Evolving Hybrid Work Environment*

Capacity assessment data, along with reports from the Hybrid Environment Assessment and Review Team (HEART) and the Telework Policy and Implementation Working Group (TPIWG), indicate that the hybrid work environment and the NRC's telework policy are critically important to staff. Staff at all levels indicated that they are experiencing higher than usual rates of burnout and stress and that this stress is related to several challenges and organizational factors. One key factor already discussed in this report is understaffing, which has led to increasingly heavy workloads, (See the Workload Management finding above). However, staff also often cited the Coronavirus Disease 2019 (COVID-19) pandemic and its impacts on the agency as additional key stressors, reporting that challenges surrounding the optimization of the hybrid work environment—those that have arisen since the onset of the COVID-19 pandemic and, in particular, since many staff returned to the office after a long period of telework—have contributed substantially to feelings of decreased satisfaction and morale.

Staff widely requested greater flexibility surrounding telework, as well as consistent, transparent communication from senior management about the NRC's hybrid environment and telework policy. Relevant to the agency's ability to conduct evidence-building activities, many technical staff who regularly engage in evidence-building activities noted that they are better able to accomplish their tasks in a hybrid or fully remote work arrangement, sharing that their ability to focus for longer periods of time while working remotely has supported their ability to engage in high-quality evidence-building activities. Staff also emphasized the importance of ensuring that any expectation regarding in-person work periods be intentional and purpose driven, with an aim to foster meaningful in-person experiences. Staff expressed that expectations regarding in-person presence should not be arbitrary in nature.

To support this finding, an initial analysis of questions posed to agency leadership by staff in various forums was conducted. Staff can anonymously submit questions to the EDO in a process called “Ask the EDO.” Additionally, the EDO hosts quarterly EDO Town Hall meetings, in advance of which staff can submit questions using a Microsoft Power App. Once a question is submitted in the Power App, other staff can vote to have the question answered in the EDO Town Hall meeting. Examination of the questions staff have raised clearly identify that telework policy has become a top priority for staff. A systematic search for the terms *telework\**, *telecommute\**, *hybrid*, and *remote* across all Ask the EDO questions showed that in the period leading up to March 19, 2020, which is when the agency entered maximum telework, telework-related topics were raised in just 7 percent of questions received. During the period of maximum telework, telework was mentioned in 21 percent of questions received. Since the agency’s reentry period, beginning November 7, 2021, telework has continued to be frequently raised (17 percent of questions received).<sup>25</sup> An in-depth content analysis of the questions and comments submitted by staff would provide additional insights about trends in staff perspectives, and those insights could inform the management of telework-related changes.

The NRC’s shift to a hybrid work environment has also changed the agency’s physical environment and use of its office space. Because many staff now work remotely several days per week, there has been a reduction in the number of staff physically present in the office on any given workday. The NRC is thus considering modifications to the way the agency utilizes available workspace. While staff expressed differing views on the advantages and disadvantages of changing current use of office space, one potential benefit raised is that a reduction in office space could free up resources for other uses.

**FY 2023 Finding 4**

The evolving shift to a hybrid work environment, in the wake of the COVID-19 pandemic, has been difficult for NRC leaders and staff to navigate. This shift has raised new challenges and complexities that are impacting staff morale, stress, and trust. Staff communicated that they are particularly impacted by changing norms and expectations regarding telework. The NRC has engaged in substantial efforts in the past year to better understand and pursue strategies to help address staff perspectives around the agency’s hybrid work environment, telework policy, and use of physical office space.

**Mitigating Strategy:** The NRC is in the process of considering certain recommendations from the HEART and TPIWG reports, as appropriate in accordance with recently issued OMB guidance.<sup>26</sup> Specifically, the agency is considering (1) delegating authority to first-level supervisors to approve telework schedules requiring no fewer than two in-person days per pay period, and (2) implementing a *Presence with Purpose* framework to enhance the value added from in-person interactions. Once changes are implemented, the agency will monitor and assess the impact of changes on the NRC’s ability to carry out its safety and security mission. The agency will also develop and utilize new survey tools, in conjunction with existing surveys and other available data sources, to monitor the impact on external stakeholder confidence and various organizational health aspects (e.g., recruitment and retention, employee satisfaction, and training and development). Based on those reviews, adjustments will be made, as needed, and the data collected will also be considered in physical space decisions.

<sup>25</sup> It should be noted that, because of the anonymous nature of the “Ask the EDO” platform, it is possible that multiple questions can be submitted by one individual, which could affect the total count.

<sup>26</sup> OMB Memorandum M-23-15, “Measuring, Monitoring, and Improving Organizational Health and Organizational Performance in the Context of Evolving Agency Work Environments,” dated April 13, 2023 (<https://www.whitehouse.gov/wp-content/uploads/2023/04/M-23-15.pdf>).

**Data Analysis and Analytics**

In the previous (FY 2022) capacity assessment, the need for more resources and development of skills in data analysis and analytics was identified as a finding within the Financial Management function area. However, data for the current (FY 2023) capacity assessment supported elevating this finding to a crosscutting finding across the agency. Within most function areas, staff reported the need for additional resources and skills specific to data analysis.

One identified need supported by the data is for the agency to provide additional training in development and appropriate use of dashboards and other data visualizations. For example, staff noted that, although there has been an uptick in the usage of dashboards at the NRC, the dashboards that have been created are not widely advertised or relied on for decision-making. Staff expressed that it is important to provide training to support staff in moving beyond compilation of data and into assessment and interpretation of data. Although staff are glad to have access to software and computational tools, including dashboards, more resources and training for staff to learn what the tools can and cannot provide would be beneficial. Such resources and training could help further build the NRC’s overall capacity to conduct evidence-building activities.

Other resources and improvements staff requested included the following:

- increased focus on interpretation of data and analyses to support data-informed decision-making
- training and/or communications to improve staff knowledge of data quality and governance, including a need to improve understanding of data quality (e.g., the key features of high-quality data, as well as the impact that low-quality data can have on analyses and resulting decisions)
- hiring of statisticians who can advise other staff on their analytic approaches
- increased support for use of the NRC’s data warehouse in shorter term, smaller, and/or lower priority projects

<p><b>FY 2023 Finding 5</b> The information collected for the FY 2022 and FY 2023 capacity assessments indicated a need for more resources and development of skills in data analytics and analysis, based on the NRC’s continuing transition to new technologies and systems.</p>	<p><b>Mitigating Strategy:</b> The NRC should use the Enterprise Data Strategy implementation to identify the specific data analytics roles and responsibilities needed, align on the differences among overlapping job series, provide role-based training, and develop the analysis skills of relevant NRC staff.</p>
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**UPDATES TO CROSSCUTTING FINDINGS FROM FY 2022**

The following crosscutting findings originated in the FY 2022 Capacity Assessment. Where relevant, additional data from the current (FY 2023) capacity assessment are included to update the previously documented crosscutting findings. Additionally, updates to and progress toward the previously identified mitigating strategies are described.

**Staffing Gaps**

The NRC’s workforce is critical to performing evidence-building activities necessary to carry out its mission. As described in the discussion of coverage in Section 4, the NRC’s Strategic Workforce Planning (SWP) process is used to identify projected workforce gaps over a duration of 5 years. The gaps identified by the SWP process were analyzed for each functional area to provide a more holistic understanding of agency workforce gaps and challenges relative to an office-by-office analysis.<sup>27</sup> Results indicated that all function areas will continue to experience substantial hiring needs due to staffing deficits caused by a combination of projected attrition (including retirements) and changes in workload over the next 5 years.

<p><b>FY 2022 Finding 1</b> SWP results indicate that there are key evidence-building positions with large, expected staffing gaps across each agency function analyzed in this capacity assessment including Licensing, Oversight, Research, Rulemaking, and Financial Management. In addition, there are key evidence-building positions that are potentially susceptible to high rates of attrition. Specific core positions within each function area are discussed further in Section 4.</p>	<p><b>FY 2022 Mitigating Strategy:</b> Where appropriate, the NRC should collaborate across organizations and develop an agencywide strategy to hire for positions with large staffing gaps and those susceptible to high attrition. The NRC should proactively use various recruiting, retention, and knowledge management resources to identify ways to ensure that qualified staff can perform agency functions.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC stood up #HIRENRC! as an agencywide collaborative and integrated effort focused on expanding hiring capabilities to meet agency needs. The effort consists of a range of highly capable teams empowered to develop tools and solutions to meet near-term needs, while also identifying opportunities for longer term improvements. The teams proactively developed goals, scope, timelines, and expected deliverables to guide their efforts. The #HIRENRC! teams have made notable progress in modernizing, streamlining, and integrating processes and practices in recruiting, hiring, and onboarding. #HIRENRC! has designed, developed, and deployed a number of innovative tools and resources across a range of functions, including the following:</p> <ul style="list-style-type: none"> <li>• collaborative and coordinated hiring approaches for filling multiple positions across the agency</li> <li>• multiple process improvements, comprehensive knowledge management tools</li> <li>• a robust vacancy data call to inform decision-making,</li> <li>• creative social media campaigns</li> <li>• marketing materials</li> <li>• a first-ever virtual job session</li> <li>• recruiter training and tools</li> <li>• recruiter staffing for in-person events</li> <li>• onboarding improvements</li> </ul> <p>The NRC has also made progress in filling staffing gaps, hosting an in-person hiring event on May 11, 2023, and</p>

<sup>27</sup> The FY 2022 Capacity Assessment analyzed staffing gaps by each key function area, with findings and mitigating strategies developed specifically for each area, in addition to an overarching crosscutting finding. For the current FY 2023 Capacity Assessment, these gaps are identified only as a crosscutting finding.

	using various direct hiring authorities to expeditiously fill vacancies when possible. The NRC has also authorized the allocation of additional resources (including funding and personnel) to support hiring and recruitment.
	<b>FY 2023 Data:</b> Data collected for the current (FY 2023) capacity assessment show that staffing shortages have led to heavy workloads for NRC employees and make it difficult for employees to prioritize tasks (when all work seems to be a priority). Data collected also indicate that staffing shortages within Office of the Chief Human Capital Officer have created a bottlenecking effect, which impacts the timeliness of onboarding selected candidates when filling vacancies and further exacerbates the situation.

***Knowledge Management***

Knowledge management tools and processes are used to capture best practices and lessons learned and to facilitate knowledge transfer within the agency. Capturing best practices and historical knowledge is an important resource for all NRC employees and takes on greater urgency given that a high percentage of the NRC’s workforce will be eligible to retire within the next 5 years (see Appendix A).

One of the intended outcomes of an effective knowledge management system is an efficient means of transferring knowledge, which is important to avoid knowledge loss. A critical time for knowledge transfer occurs as experienced individuals prepare to exit the agency and their replacements need to quickly amass the knowledge and skills needed to effectively perform the job functions. Input from supervisory and nonsupervisory staff in all function areas, as well as customers of each function area, specifically noted knowledge transfer as a growth opportunity for the NRC.

**FY 2022 Finding 2**

Knowledge management tools are not utilized to their fullest extent to ensure successful capture and transfer of knowledge to staff. Survey results for each of the key agency functions show that approximately half<sup>28</sup> of surveyed staff and management usually use knowledge management resources and processes (internal wiki site, videos, publications, etc.) to capture best practices. Knowledge management will influence agency performance over the next 5 years, given that approximately 26 percent<sup>29</sup> of the NRC's workforce is currently eligible to retire and approximately 44 percent will be eligible to retire within the next 5 years. High attrition over the next 5 years could negatively impact some positions identified in this assessment and will leave a critical knowledge gap.

**FY 2022 Mitigating Strategy:** The NRC should evaluate the agency's knowledge management program to better align the efforts with expected outcomes. The evaluation should explore ways to elevate the priority and urgency of capturing critical knowledge and best practices. Attention should be focused on the positions with highest projected attrition as identified through the SWP. The evaluation should consider methods to increase knowledge management engagement with the NRC's senior-level staff. The evaluation should include a cost-effectiveness analysis to better understand the cost compared to the expected outcomes. To measure effectiveness, performance indicators should be established as a result of the evaluation. In addition, usage data for Nuclepedia should be thoroughly tracked and analyzed to find how to maximize the usefulness of this resource for the NRC.

**Progress Toward FY 2022 Mitigating Strategy:** The NRC is actively engaged in a third-party evaluation of the agency's knowledge management program. Results are expected to support the NRC in aligning knowledge management efforts with desired outcomes—and in achieving those outcomes.

**FY 2023 Data:** Data collected for the FY 2023 Capacity Assessment reveal two opportunities for enhancing knowledge management: (1) streamlining processes and procedures for capturing best practices and (2) creating more robust central repositories. Both of these measures will ultimately enable more efficient work and knowledge transfer within the NRC. Illustrating this point, 42 percent of respondents who regularly engage in evidence-building activities reported that they do not regularly use knowledge management tools and processes for sharing and enhancing knowledge, skills, and abilities.

<sup>28</sup> Updated data from the FY 2023 Capacity Assessment show that 60 percent of surveyed staff and management report that their function area frequently uses knowledge management resources and processes.

<sup>29</sup> Updated data show that 29 percent of the NRC's workforce will retire or be eligible to retire within the next 5 years.



**Competency Modeling**

The NRC uses competency models to identify skill gaps across the workforce. Competency models and assessments can improve workforce agility by (1) providing a means of comparing an employee’s current skillset to the skills needed now and in the future and (2) helping to ensure the existence of a workforce with the necessary skills to be successful in a dynamic environment through the identification of training, mentoring, and rotations to address skill gaps.

In FY 2020, the agency started competency model assessments on a voluntary basis; approximately 44 percent of staff opted to take part. Far fewer used them in FY 2021, with at least a partial completion rate of about 25 percent as of August 2021. In addition, manager participation was low in FY 2020 and FY 2021, at about 20 percent and 2 percent, respectively. This low participation rate by staff and managers has made it difficult to identify specific skill gaps. Additionally, data suggest that NRC staff have conflicting views of the purpose and value of competency models.

<p><b>FY 2022 Finding 3</b>          The NRC competency modeling program requires refinement in order to provide insights into agencywide skill gaps. The NRC’s competency modeling program has the potential to be a powerful tool for identifying agencywide skill gaps that, if addressed, would strengthen agency evidence-building capacity. However, the competency model assessment data from FY 2020 and FY 2021 were not sufficient to identify critical skill gaps. Analysis of FY 2020 and FY 2021 competency model assessment results has enabled a better understanding of the ways to improve this tool so that skill gaps may be identified in future capacity assessments. Potential improvements to this tool include (1) increasing participation rates for both staff and managers, (2) establishing a core set of skills for competency models with the same position across offices (e.g., project managers, engineers), (3) adding competency models for staff without a model currently assigned, (4) refining the</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should develop an updated plan to implement competency modeling. The plan should clearly document the program’s overall objectives and quantitative goals that need to be reached to support meeting the overall objectives. An assessment should be performed to fully determine what improvements should be made to ensure the longevity and success of the program. The quantitative goals should include both staff and manager participation rates, as well as consider feedback on the quality and relevance of the competencies assigned to each staff.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC staff developed an updated implementation plan detailing the scope, goals, data/measurements, methods, strategies, and resources for each action. The general actions for the updated competency modeling implementation plan are to (1) increase competency modeling assessment participation rates for staff and managers, (2) establish a core set of skills for competency models with the same position across offices, (3) add competency models for staff without a model currently assigned, (4) refine the existing models to verify that staff members are assessed only for competencies that apply to them, (5) ensure a more consistent approach for establishing target ratings, (6) improve reporting capabilities and the potential to directly link competency model assessment results with individual development plans and/or training courses, and (7) add the capability for staff to conduct optional self-assessments for multiple competency models (current capability is limited to one model). The NRC has also initiated a comprehensive review of the agency’s competency modeling program, which is being conducted by Kaptive, LLC. The review is expected to determine whether additional or alternative recommendations should be adopted. Additionally,</p>

<p>existing models to verify that staff are assessed only for competencies that apply to them, (5) ensuring a more consistent approach for establishing target ratings, and (6) addressing limitations to the current tool to improve reports and the ability to produce individual development plans directly from the system.</p>	<p>because of overlap between competency modeling and the Strategic Workforce Planning (SWP) process, relevant information may also be obtained from the SWP evaluation that is currently underway.</p>
	<p><b>FY 2023 Data:</b> Data suggest that supervisors continue to be concerned that competency models do not provide sufficient value to warrant the substantial time commitment required. Supervisors also expressed confusion about the purpose and role of competency models, supporting ongoing progress toward the mitigating strategies identified in the FY 2022 Capacity Assessment.</p>

## Data

The NRC continues to upgrade systems, consolidate data into data warehouses, and improve desktop technology. These changes have prompted a need to produce higher quality reporting of data and an increased need for data analytics skills. One area in which staff desire enhancement is the capability to perform content searches across NRC systems and platforms. The recently developed Information Technology Roadmap has identified this as an NRC priority. As a result, the agency has been exploring ways to enhance search and discovery and has identified a set of actionable initiatives and associated resource needs to address the issue.

In addition, the NRC has developed an Enterprise Data Strategy with a goal of promoting the continual maturation of agency staff skills and agency processes for data management. The strategy has the following goals:

- Establish roles and responsibilities.
- Provide role-based training.
- Improve data management resources.
- Integrate data into application life-cycle management.

The implementation of this data strategy will enable the NRC’s training and development staff to prepare training plans and curricula to support the agency’s strategic goals. A data management resource pool would ensure that key data roles are staffed in the areas of information and records management, data architecture, data science, and data analytics. The NRC Enterprise Data Strategy, as drafted, provides key steps in determining the data management workforce needs of the agency by establishing roles and responsibilities associated with the management of data throughout its life cycle and by establishing role-based training.

Investing in information technology modernization is key to ensuring that staff have the tools and knowledge to perform evidence-building activities effectively. As a result of budget constraints, the NRC has invested a smaller percentage of its IT budget in development, modernization, and enhancement (DME) compared to the Federal Government as a whole. This limited DME investment has resulted in the slower introduction and more limited use of new data technologies than otherwise desired to support the NRC’s data strategy goals. For example, the use of data analytics has increased at a rate slower than needed. This delayed

growth reflects underfunding of technology projects, such as the development and expansion of the NRC Enterprise Data Warehouse, and of purchasing additional data analytics tool licenses. To fully realize the benefits of increased data use at the NRC, the IT DME budget should be more aligned with the Federal Government DME percentage.

<p><b>FY 2022 Finding 4</b>  A recent agency data literacy survey showed that 75 percent of participants scored a 3 or higher on a 5-point scale on the skills related to analyzing data for decision-making, selecting relevant data sources, and formulating meaningful questions; 36 participants scored lower on skills related to accessing data, organizing data collections, and maintaining data resources to ensure sufficient data quality. Additionally, the NRC has recognized the need to make data more accessible to agency staff. The NRC’s development, modernization, and enhancement (DME) percentage of the overall IT budget is much smaller compared to the Federal Government DME percentage, and this may continue to hamper the introduction of new technologies to NRC staff. For example, the use of data analytics has increased at a rate slower than needed as a result of the underfunding of supporting technology projects, such as the development and expansion of the NRC Enterprise Data Warehouse and purchasing of additional licenses to support increased use of data analytics tools. Additionally, the inability to fund technology</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should develop an implementation plan to ensure that goals and actions within the Enterprise Data Strategy and the Information Technology Roadmap are achieved. Future enhancements to NRC content search capability across agency systems and platforms will help the NRC staff identify and collate data more effectively and efficiently. The NRC should continue to strive to increase the DME percentage of the IT budget so that investments can be made in new technologies.</p> <p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC is developing an implementation plan that would ensure that goals and actions in the Enterprise Data Strategy and the Information Technology Roadmap are achieved. The implementation plan would (1) establish roles and responsibilities, (2) define task/deliverable milestone dates, and (3) estimate budgetary resources.</p> <p>In FY 2022, the Information Technology/Information Management Portfolio Executive Council (IPEC) championed the agency’s efforts to further promote the inclusion of resources to enable DME to meet the priorities of the IT Roadmap during FY 2024 IT budget formulation. As a result, the DME percentage increased by 2 percent, thereby enabling new initiatives pertaining to data architecture, dashboard development, and data analytics.</p> <p>Also, in FY 2022, the Chief Information Officer championed a benchmarking study to compare the NRC's DME budget percentage to that of other Federal agencies. This study further highlighted the gap between the agency’s current DME percentage and its counterparts, while also providing a potential target for future fiscal year budgets. As a result, the Chief Information Officer has engaged the IPEC through the FY 2025 IT budget formulation process to prioritize the identification of DME resources to support the agency’s IT Roadmap priorities, which include initiatives to promote the agency’s data strategy.</p>
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modernization activities has delayed efforts to improve the search capability of the NRC's Enterprise Content Management System.

**FY 2023 Data:** Qualitative and quantitative data collected for the FY 2023 Capacity Assessment indicate the existence of opportunities to continue strengthening data management and analytic skills within the NRC. For example, approximately a quarter of staff (26 percent) across the agency feel that they are not regularly using appropriately high-quality data and information in their function area. The "Data Analysis and Analytics" crosscutting finding described above further describes the need for additional data analytics capabilities.

### ***Artificial Intelligence***

Artificial intelligence (AI) tools can be a powerful and beneficial asset to the NRC. AI can be used to improve operations, processes, and procedures; meet strategic goals; reduce costs; increase efficiency and mission effectiveness; improve quality of services; improve safety; train the workforce; and support decision-making. However, AI tools are highly dependent on the quantity and quality of the data that support them. To maximize the usefulness of AI tools, the NRC needs to identify and develop high-quality datasets spanning the range of technical and corporate support fields within the agency. The NRC plans to conduct an evaluation to address a priority question from the NRC's Evidence-Building Plan: "What data received and maintained would be most beneficial for use in advanced analytical tools (e.g., artificial intelligence) to support NRC decision-making?"

In addition, the nuclear power industry is expected to adopt AI tools more widely. The NRC is studying how the agency may apply use of AI technologies in agency activities. A 2021 scan conducted by NRC staff identified projects that may fall within the technical area of data science and AI (e.g., projects using machine learning). Depending on the application, the use of AI technology may be subject to an NRC safety or security determination or regulatory oversight.

NRC staff currently has limited technical capacity to review and regulate technologies relying on AI. Staff need to be familiar with a range of potential technologies, have adequate training support in place, and have an available knowledge base in data science and AI. In addition, the transformative and rapidly advancing nature of AI requires that the NRC adapt its culture, skills, and approaches. To succeed, the NRC will need an iterative, risk-informed approach to AI implementation.

#### **FY 2022 Finding 5**

The NRC needs a sufficient knowledge base to effectively regulate nuclear facilities that use AI and to leverage software that has integrated AI technologies into NRC processes. AI tools can be a powerful and beneficial asset to the agency. To maximize the usefulness of AI tools, the NRC needs to have (1) sufficient staff knowledge and familiarity with them, (2) access to

**FY 2022 Mitigating Strategy:** The NRC should develop an implementation plan to ensure that

<p>the latest programs, software, and libraries, and (3) high-quality datasets. The NRC is exploring the potential ways that applicants and licensees can use AI and digital twins. However, the NRC staff currently has limited technical capacity to review and regulate technologies relying on AI. Technical knowledge and skills should be enhanced to improve readiness in the future. Staff needs to be familiar with a range of potential technologies, have adequate training support in place, and have a data science and AI knowledge base available. The NRC needs to develop a way to track its progress toward achieving technical and regulatory readiness to review such applications to ensure sufficient licensing and oversight capacity.</p>	<p>goals and actions within the AI Strategic Plan<sup>30</sup> are achieved. The NRC needs to complete the development of its AI Strategic Plan and track its progress toward meeting the goals in the plan including (1) building staff AI expertise through training and qualification programs, (2) acquiring and deploying the necessary software tools to test, evaluate, and develop AI applications, and (3) establishing a data science and AI governance structure to coordinate research and development activities across the agency. Finalizing these strategies and executing their goals will provide a foundation to enhance evidence-building capacity.</p> <p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC is working on the development of an implementation plan that would ensure that goals in the AI Strategic Plan are achieved. The implementation plan would (1) establish roles and responsibilities, (2) provide an outline of tasks and deliverables, (3) define task and deliverable milestone dates, and (4) provide estimates of budgetary resources.</p> <p><b>FY 2023 Data:</b> Qualitative data collected for the FY 2023 Capacity Assessment indicate that staff see a need to stay abreast of evolving technologies, including AI. Staff also noted that evaluating these technologies to determine appropriate application is an important step in remaining a future-focused agency.</p>
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### **Environmental Justice**

Environmental justice involves identifying and addressing, as appropriate, the disproportionately high and adverse human health or environmental effects of an agency’s programs, policies, and activities on minority and low-income populations. The NRC issued its “Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions” in 2004.<sup>31</sup> This policy statement presents a comprehensive statement of the Commission’s policy on the treatment of environmental justice matters in NRC regulatory and licensing actions.

<sup>30</sup> NUREG-2261, “Artificial Intelligence Strategic Plan, Fiscal Years 2023–2027,” issued May 2023 ([ML23132A305](#)) (referred to in the FY 2022 Capacity Assessment as the “Data Science and AI Strategic Plan”).

<sup>31</sup> This is available in the *Federal Register* (FR) at [69 FR 52040](#).

<p>FY 2022 Finding 6 Prior to 2021, the NRC had not systematically and holistically reviewed the effectiveness with which its programs, policies, and activities address environmental justice.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should complete its ongoing systematic review of how the agency’s programs, policies, and activities address environmental justice. This has already been identified as a priority question in the NRC’s Evidence-Building Plan: “To what extent are the NRC’s programs, policies, and activities addressing environmental justice?” The NRC, in its analysis, should take into consideration recent Executive orders like Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad,” dated January 27, 2021.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The Environmental Justice Review Team has completed its systematic review of how the NRC approaches environmental justice in its programs, policies, and activities, including the development of several recommendations for moving forward. The team submitted its work to the Commission in SECY-22-0025, “Systematic Review of How Agency Programs, Policies, and Activities Address Environmental Justice,” dated April 12, 2022.<sup>32</sup> With these actions, this mitigating strategy is completed, and the finding is considered to be closed. Moving forward, the NRC may take action, as deemed appropriate in accordance with the Commission’s decision on the provided recommendations. The NRC will continue to monitor the effectiveness with which its programs, policies, and activities address environmental justice, and this topic may be revisited in future iterations of the agency’s capacity assessment.</p>

***Recent Operational Experience***

In response to the challenges of the COVID-19 pandemic, the NRC quickly identified temporary alternative and risk-informed methods for conducting licensing and oversight analyses while continuing to provide reasonable assurance of adequate protection of public health and safety. Building on the Office of Nuclear Reactor Regulation “COVID-19 Coordination Team Lessons Learned Report,” issued October 2021,<sup>33</sup> the NRC would benefit from identifying any further lessons learned in the COVID-19 pandemic. To enhance the methods used by the NRC staff, these lessons learned should be further analyzed to determine any potential benefits and improvements to the agency’s licensing and oversight processes.

<sup>32</sup> The Environmental Justice Assessment can be found at <https://www.nrc.gov/about-nrc/regulatory/licensing/nepa/environmental-justice/assessment.html>.

<sup>33</sup> [ML21252A070](#)

<p>FY 2022 Finding 7 The NRC’s licensing and oversight analyses may be enhanced by lessons learned from the COVID-19 pandemic and other recent operating experience.</p>	<p><b>FY 2022 Mitigating Strategy:</b> In the NRC’s Evidence-Building Plan, Priority Question 1 asks, “How can the NRC improve Licensing and Oversight, based on recent operational experience (including lessons learned from the COVID-19 pandemic)?” Responses to the priority question will identify lessons learned and collectively document temporary changes made to NRC Licensing and Oversight processes in response to the COVID-19 pandemic. The NRC will further analyze these and other lessons learned to determine potential benefits and improvements to the agency’s licensing and oversight processes.</p>
	<p><b>Progress Toward FY 2022 Mitigating Strategy:</b> The NRC has implemented multiple lessons-learned projects following the COVID-19 pandemic, including additions to inspection guidance and procedures. The NRC COVID-19 Coordination Team also issued a lessons-learned report in March 2023,<sup>34</sup> which provided a status update on recommendations addressed in an initial report published in October 2021. The NRC is also in the process of developing an alignment agreement for an evaluation to address Priority Question 1 of the NRC’s Evidence-Building Plan. The agreement will identify the planned evaluation’s scope, methods, data, and resources. Once an agreement is established, the NRC will work with an established evaluation contractor to initiate and carry out the evaluation.</p>
	<p><b>FY 2023 Data:</b> The NRC has returned to pre-COVID postures in most licensing and inspection areas, while also continuing to implement technology advances and other improvements introduced in response to needs associated with the pandemic. Further evaluation of available data over time will be necessary to more thoroughly assess the effectiveness of the NRC’s implementation of lessons learned.</p>

### **Workforce Planning Process**

From 2017 to 2020, the NRC performed a phased rollout of the SWP process on an annual basis to analyze critical or “core” positions. A gap analysis—part of the process to compare the current workforce against projected future workforce needs in 5 years—identifies positions with the highest rates of attrition (e.g., retirements), which may cause a critical loss of knowledge, skills, and abilities. Short- and long-term strategies and action plans are developed to enable the NRC to recruit, retain, and develop a skilled and diverse workforce with the competencies and agility to address emerging needs and workload fluctuations. Action plans to address critical skill gaps and projected future vacancies include recruiting, hiring, potentially cross-training, or enhancing the skills of the current staff. The NRC also has a program to develop college graduates through targeted hiring by using the Nuclear Regulator Apprenticeship Network program and other hiring programs.

<sup>34</sup> “Final NRR COVID-19 Coordination Team Lessons-Learned Report,” dated March 31, 2023 ([ML22264A309](#)).

The FY 2022 and FY 2023 Capacity Assessments took a holistic approach to analyzing the results of the SWP process by key agency functions, as opposed to by office or region. This perspective challenges some of the existing SWP strategies to address the gaps for positions that exist across the agency. For each key agency function, staff identified the largest projected gaps by core position, as well as those positions that are projected to show an attrition rate of approximately 40 percent or higher over the next 5 years. The discussion of coverage in Section 4 of this report presents the results.

<p><b>FY 2022 Finding 8</b> At the end of each phase or year, the NRC's SWP process is reviewed and improved based on lessons learned from participants. Now that the entire agency has participated, it is an appropriate time to conduct a comprehensive evaluation of the effectiveness and efficiency of the processes, procedures, and technology used to support the SWP process.</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC's FY 2023 Annual Evaluation Plan includes a priority question from the NRC's Evidence-Building Plan that is designed to evaluate whether the agency's approach to workforce planning is effective in meeting its intended goals and whether it is being implemented efficiently. The results of this evaluation should improve the process and give the NRC the ability to effectively and efficiently build and maintain a workforce of appropriate size and makeup, with the flexibility necessary to adjust for various factors as needed.</p>
	<p><b>Progress Towards FY 2022 Mitigating Strategy:</b> In FY 2022, the NRC initiated an evaluation of the SWP process. The NRC has contracted with Pacific Research and Evaluation, LLC (PRE), to conduct evidence-building and evaluation work.</p>
	<p><b>FY 2023 Data:</b> PRE uses a four-phased approach to conduct evaluations. Phase one, now complete, has resulted in the development of a logic model that is being used to inform the design of the evaluation. Phase two, also complete, led to development of individualized evaluation plans rooted in systematic knowledge-gathering efforts and evaluation best practices. Phase three, currently ongoing, focuses on implementing high-quality, practical, and methodologically sound evaluations to inform the data-informed change management and continuous improvement efforts, which are carried out in phase four. Preliminary evaluation data, along with data collected for the FY 2023 Capacity Assessment, suggest that better use of SWP data will help the NRC to remain future focused and to address substantial staffing gaps in the agency.</p>

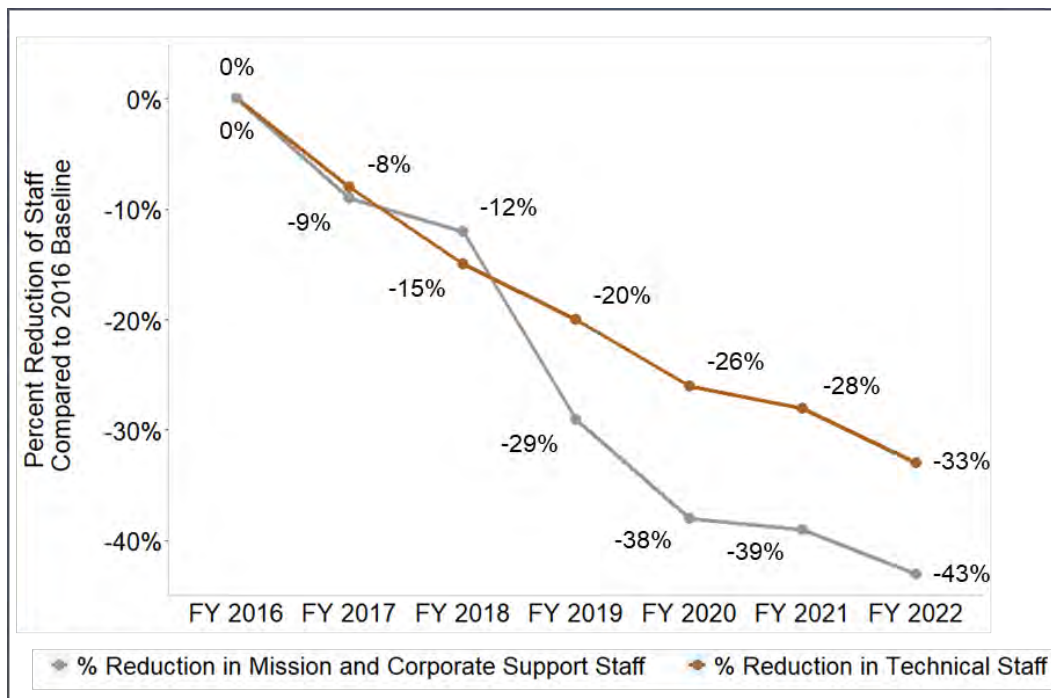
### ***Reduction in Support Staff***

The NRC has conducted several agencywide efforts to gain effectiveness and efficiency for its mission and corporate support functions over the past several years. A main goal of these efforts has been to centralize mission and corporate support functions to reduce potential duplication of effort. The centralization of these functions resulted in an overall reduction in mission and corporate support staff (e.g., licensing assistants, budget analysts). However, while the number of mission and corporate support staff was reduced, many of their responsibilities were shifted to other mission and corporate support staff in addition to the centralized staff (e.g., budget analyst activities shifted to technical assistants and licensing assistant activities shifted to project managers). In addition, corporate support reductions have continued to achieve compliance with the requirements in the Nuclear Energy Innovation and Modernization Act (NEIMA). As shown in Figure 22, in 2022, the number of mission and corporate support staff



has decreased by 43 percent relative to 2016 staffing.<sup>35</sup> This decrease outpaces the reduction in technical staff and managers that perform licensing analyses during the same period, which declined by 33 percent.

Figure 22 provides a snapshot indicating that the NRC is working to ensure that its mission and corporate support functions represent a smaller portion of the budget. Other sections of this report—such as Section 4, which discusses coverage—examine some of the impacts of those reductions.



**Figure 22 Technical and Support Staff Reductions**

<p><b>FY 2022 Finding 9</b> The NRC should assess the extent to which past reductions in mission and corporate support staff (including NEIMA reductions) have led to efficiency gains in program functions. An assessment should be performed to determine if the reduction in support staff has led to NRC technical staff</p>	<p><b>FY 2022 Mitigating Strategy:</b> In the FY 2023 Evaluation Plan, the NRC has a priority question planned to evaluate whether the agency's approach to workforce planning, including associated processes and procedures, is effective in meeting its intended goals and whether it is being implemented efficiently. The results of this evaluation should include an examination as to whether additional work has shifted to NRC technical staff because of reductions in support staff.</p>
	<p><b>Progress Towards FY 2022 Mitigating Strategy:</b> The NRC is engaged in an evaluation of its SWP process to determine the extent to which the SWP process is effective in meeting its intended goals and is being implemented efficiently. The results of this evaluation will include an examination of whether</p>

<sup>35</sup> Figure 22 compares the number of licensing assistants and mission and corporate support staff (e.g., Division of Resource Management and Administration staff and Division of Program Management, Policy Development, and Analysis staff) for the lead offices of the Reactor Safety and Nuclear Materials and Waste Programs to the number of technical staff and managers in those lead offices.

<p>performing more nontechnical business support work. This crosscutting issue may affect the capacity of NRC staff to perform licensing, oversight, research, and rulemaking analyses.</p>	<p>additional work has shifted to the NRC technical staff because of reductions in support staff.</p>
	<p><b>FY 2023 Data:</b> Results from the FY 2023 Capacity Assessment survey indicate that staff are experiencing additional workload burdens as a result of the reduction in support staff over the last few years. Some technical staff described taking on additional work that is outside of their main job function (e.g., managing contracts or handling administrative duties) and, in general, having more work to do with fewer resources at their disposal. Only 54 percent of staff across the agency reported that work in their function area is assigned evenly across staff commensurate with position and grade level. As described in the discussion of coverage in Section 4 of this report, FEVS data showed that the rate of staff agreement that their workload is reasonable is at its lowest point since the FEVS was implemented in 2011, with approximately two-thirds of staff agreeing that their workload is reasonable.</p>

### **Corporate Support Resource Limit**

Section 102(a) of NEIMA places a cap on the NRC’s corporate support costs with respect to its annual budget justification, to the maximum extent practicable, beginning at 30 percent of the annual budget justification in FY 2021 and FY 2022 and stepping down to 28 percent in FY 2025 and beyond. On October 4, 2021, the NRC submitted a report to Congress, as required by Section 102(e) of NEIMA, which discussed the reductions to comply with NEIMA, as well as the impacts of the corporate support resource limit. The report noted that “the continuation of a reduction to the corporate support cap is expected to negatively impact the agency’s ability to directly support its safety and security mission.”<sup>36</sup>

<p><b>FY 2022 Finding 10</b> Attempts to meet the NEIMA cap on corporate support costs have caused the NRC to reduce or postpone critical investments and services. Continued postponements of critical investments and services will negatively impact the NRC’s capacity to perform evidence-building activities to support the agency mission. These reductions and postponements have slowed the rate at which modern</p>	<p><b>FY 2022 Mitigating Strategy:</b> The NRC should continue to closely monitor the impacts of NEIMA’s cap on corporate support costs in its annual budget justification. The NRC should continue efforts to assess the constraints on corporate support and allow the agency to address needed capacity. The NRC will continue to make efforts agencywide to meet the cap.</p>
	<p><b>Progress Towards FY 2022 Mitigating Strategy:</b> The NRC has applied reprogramming as a mitigating strategy. As approved by the Commission for FY 2022 Shortfalls and Excess Funds, the NRC notified Congress that the agency intended to reprogram \$3.325 million in prior-year funding (fee-based carryover) from the Nuclear Reactor Safety control point to the corporate support control point to support compliance with cybersecurity mandates.<sup>37</sup> Congress approved the request in September 2022. As monitored in the</p>

<sup>36</sup> Letter to the Honorable Thomas R. Carper, Chairman, Committee on Environment and Public Works, dated October 4, 2021 ([ML21238A132](#) and [ML21237A033](#)).

<sup>37</sup> [ML22194A010](#)

<p>data analytics tools may be used across the agency to support evidence-building activities. The NRC identified major efficiencies and areas for cost savings within corporate support just prior to, and within the initial implementation of NEIMA, and has prioritized spending that is integral to the success of the agency’s mission. Continued reductions to meet the corporate support cap are not sustainable, are already negatively impacting the agency, and will have an even greater impact as the corporate support cap declines in future years.</p>	<p>FY 2023 Congressional Budget Justification,<sup>38</sup> corporate support constitutes approximately 31 percent of the agency’s total budget in FY 2023 and reflects the agency’s efforts to comply with the corporate support cap of NEIMA, to the maximum extent practicable. Resources requested for corporate support increase by \$19.0 million or approximately 7.1 percent, when compared to FY 2022. The increase is primarily due to increases in IT investments including cybersecurity, as well as salaries and benefits, consistent with OMB guidance. This increase is partially offset by a reduction in rent costs associated with the release of two floors within NRC Headquarters, as well as the anticipated move of a regional office to a new location with less space. The agency continues to use its Enterprise Risk Management process for decision-making around this finding.</p> <p><b>FY 2023 Data:</b> Qualitative data collected for the FY 2023 Capacity Assessment suggest that reductions in corporate support staff have exacerbated difficulties stemming from the slow hiring process and challenges meeting hiring demands. For example, two of the largest staffing gaps identified by the SWP process fall into the category of support staff: IT specialists and administrative assistants. Staffing gaps in these two job functions shift additional work onto other staff, thereby limiting the ability of those encumbered staff to fully engage in evidence-building activities to support the mission of the agency.</p>
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## 6. LIST OF EVIDENCE-BUILDING ACTIVITIES

The NRC’s evidence-building activities span key agency functions including licensing, oversight, rulemaking, research, evaluation, and corporate support (e.g., financial management). Information on the agency’s evidence-building activities is available to the public on the NRC’s Agencywide Evidence-Building Activities webpage.<sup>39</sup>

<sup>38</sup> [ML22089A188](#)

<sup>39</sup> The NRC’s Agencywide Evidence Building Activities webpage is available at <https://www.nrc.gov/about-nrc/plans-performance/evidence-building-and-evaluation/agencywide-evidence-building-activities.html>.



# APPENDIX A AGENCY ENVIRONMENTAL SCAN

## Agency Environmental Scan for Fiscal Years 2023 through 2028 Strategic Workforce Planning

### Introduction

The agency environmental scan provides information on internal and external drivers that may influence the workload and workforce of the U.S. Nuclear Regulatory Commission (NRC). Environmental scanning is the ongoing tracking of trends and occurrences to shape an organization's strategies and goals. The agency environmental scan serves as the foundation for the strategic workforce planning (SWP). Under this process, offices and regions use the agency environmental scan and other related data sources (e.g., trend and forecast reports, information from licensees) to identify impacts on expected workload. The workload forecast information is then be used to determine the workforce needed to perform agencies functions.

The agency environmental scan is an internal agency report that is updated throughout the year to ensure that changes to the NRC's dynamic environment are captured. Information included in this environmental scan that can be made publicly available is included and finalized in the NRC's Capacity Assessment on an annual basis.

**DISCLAIMER: The information contained in this *Agency Environmental Scan for Fiscal Years 2023 through 2028 Strategic Workforce Planning* is accurate as of the end of Fiscal Year 2022 (September 30, 2022). Some of the information contained herein may not be up to date as a result of changing circumstances or subsequent events. The NRC will provide relevant updates in future iterations of this document.**

### Executive Summary

The environment in which the NRC will operate through FY 2028 is influenced by external factors that include industry operating experience, national priorities, a significant incident at a domestic or non-U.S. nuclear facility, the security and threat environment, legislation, Federal court litigation, market forces, new technologies, and resource availability. These external factors were considered in the development of the agency environmental scan through FY 2028 and are anticipated to result in workload impacts that are discussed in greater detail throughout this report. Several key factors within this report have been summarized as follows:

- The number of large light-water reactor (LWR) operating reactors is expected to increase by two over the next 5 years. In addition, there is a potential for two advanced (non-LWR) reactors to start operations by 2028.
- The NRC anticipates initial license renewal work will continue with two new applications expected through FY 2028. Subsequent license renewal (SLR) work is expected to increase through 2028 due to the continued reviews of 4 SLR applications and 13 new SLR applications for up to 23 units through FY 2028.
- The NRC anticipates an increase in license applications for advanced reactors with at least five nonpower reactor new applications submitted by the end of FY 2025 and several more through FY 2028.
- Stakeholders currently support the motivation to modernize the licensing of new small modular reactors (SMRs), and the NRC expects to receive up to five new applications

for combined licenses, design certifications, construction permits, operating licenses, and early site permits through FY 2028.

- The NRC anticipates an increase in licensing and oversight for one medical radioisotope facility operating license application, one construction permit application, and one licensing application under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70, “Domestic Licensing of Special Nuclear Material,” for a medical radioisotope facility.
- The NRC anticipates an increase in licensing and oversight workload for fuel facilities. The work will include reviewing the license applications and amendments, developing inspection programs for construction and operations, and inspecting new fuel fabrication and medical isotope production facilities.
- Work on new fresh fuel and spent fuel transportation packages is expected to increase for advanced reactor fuel designs through FY 2028 (assuming an increase of about 10 cases per FY).
- The NRC received a letter of intent to become an Agreement State from Connecticut, and it anticipates that an agreement will be signed in calendar year (CY) 2024. In addition, the NRC received a letter of intent from the State of Indiana and anticipates that an agreement will be signed in CY 2025.
- The NRC anticipates the submission of additional license applications through 2028 for new technologies, such as for digital upgrades at operating reactors and to support the deployment of accident tolerant fuel.

## Current and Future Environment

In February 2019, the NRC published “The Dynamic Futures for NRC Mission Areas,”<sup>40</sup> also known as the “Futures Assessment.” The Futures Assessment evaluated potential futures for nuclear power and materials activities domestically and worldwide that could impact the NRC’s work. The Futures Assessment identified more than 100 indicators to anticipate potential futures that may be influenced by the external environment. The Futures Assessment report identifies four possible scenarios, defined by the U.S. nuclear power demand and the global reactor innovation, that could impact the nuclear industry in the coming years and thus affect the NRC’s workload. The four futures have titles that are selected to reflect the thrust of their narratives and make each scenario easy to remember—the scenario titles are not intended to connote “good” or “bad” futures, only to stimulate discussion. Table A-1 identifies the four scenarios.

**Table A-1 Four Futures Scenarios**

What’s Old is New Again	Increased nuclear power demand, but low innovation for new technologies
Nuclear Takes Off	Increased nuclear power demand and increased innovation in nuclear reactors globally
Gone with the Wind	Decrease in nuclear power demand; energy portfolio switches to other sources
Great Idea, But Not for U.S.	Decreased nuclear energy demand domestically; increased global nuclear innovation

<sup>40</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. [ML19022A178](#)

Figure A-1 represents the projected scenarios as they relate to the level of U.S. nuclear power demands and global nuclear reactor innovation



**Figure A-1 Summary of Projected Futures**

An additional source of data that provides insights into the current and future environment is the U.S. Energy Information Administration (EIA) “Annual Energy Outlook 2022” (AEO 2022). The “Annual Energy Outlook” presents an assessment by the EIA of the outlook for energy markets through 2050.

According to the U.S. Department of Energy,<sup>41</sup> the Inflation Reduction Act of 2022 keeps momentum building for nuclear power. On August 16, 2022, the Inflation Reduction Act became law, providing tax credits for existing reactors that would help preserve the existing fleet of nuclear plants. The NRC expects this to increase the potential for future license renewals and power uprates. In addition, it incentivizes advanced nuclear deployment by including several tax incentives for clean energy technologies, including advanced reactors. The Inflation Reduction Act also provides \$700 million to support the development of a domestic supply chain for high-assay low-enriched uranium (HALEU) needed to support deployment of advanced reactors. The NRC expects the development of a domestic supply chain for HALEU to increase the potential for additional advanced reactor license and design applications.

The Foundations for Evidence Based Policymaking Act of 2018 (Evidence Act) is having a substantial impact on how the NRC performs evidence-building activities (e.g., foundational fact finding, performance measurement, policy analysis, and evaluations) and how the agency uses data to make informed decisions. The Evidence Act created a new paradigm by calling on

<sup>41</sup> <https://www.energy.gov/ne/articles/inflation-reduction-act-keeps-momentum-building-nuclear-power>

agencies to significantly rethink how they currently plan and organize evidence-building activities, data management, and data access functions to ensure that each agency has an integrated and direct connection to its data and evidence needs. The Evidence Act also requires agencies to assess their ability and infrastructure to carry out evidence-building activities. The NRC envisions that implementation of the Evidence Act will strengthen the agency’s oversight of existing uses of nuclear technology, enhance the agency’s readiness to license and regulate new and novel nuclear technologies, and further the NRC’s ongoing efforts to improve its internal processes. Implementation of the Evidence Act—including the evidence-building activities documented in the NRC’s Evidence-Building Plan, Capacity Assessment, Annual Evaluation Plan, and Open Data Plan—is an ongoing effort across the agency.

The NRC’s budget authority decreased by 11 percent between FY 2014 and FY 2023 (Figure A-2). The agency also reduced full-time equivalents (FTE) by 25 percent during this period.



Notes: In FY 2020, the NRC received a \$3.3 million supplemental appropriation under the Coronavirus Aid, Relief, and Economic Security Act on March 27, 2020. In FY 2021, the explanatory statement for the 2021 Consolidated Appropriations Act directed that \$16 million of unobligated carryover be used to fund the University Nuclear Leadership Program.

**Figure A-2 Fiscal Year 2014–2023 Budget (Includes the Office of the Inspector General)**

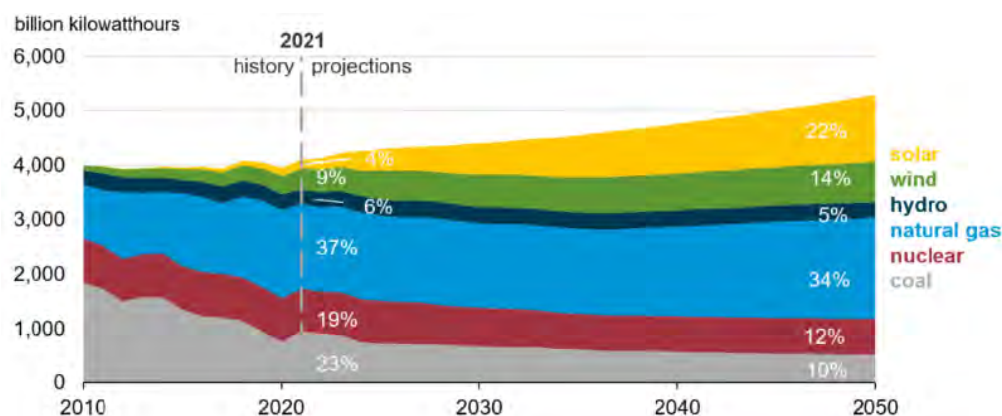
## Nuclear Reactor Programs

### Operating Reactors

While global energy demand continues to rise, factors such as the high cost of building and operating nuclear power plants and the increase in electricity generation from renewables have led to a decline in the use of nuclear energy in the United States in recent years. Figure A-3 presents a steady pattern with a slight increase for additional operating reactors in the next 5 years, as predicted in the AEO 2022 report. The slight increase for operating reactors is due to the addition of a limited number of new reactors that will help offset the number of shutdown reactors, and several existing nuclear power plants have been or are expected to be granted license renewals to continue operations for an additional 20 years or more.



The EIA projects that the electricity generation mix will continue to experience a rapid rate of change, with renewables remaining the fastest-growing source of electricity generation through 2050 (Figure A-3) because of continuing declines in the capital costs for solar and wind, which are supported, in part, by Federal tax credits and higher State-level renewables targets. With slow load growth and increasing electricity production from renewables, U.S. coal-fired and nuclear electricity generation is expected to decline, with most of the decline occurring by the mid-2020s.



**Figure A-3 U.S. Electricity Generation from Selected Fuels (AEO 2022 Reference Case)<sup>42</sup>**

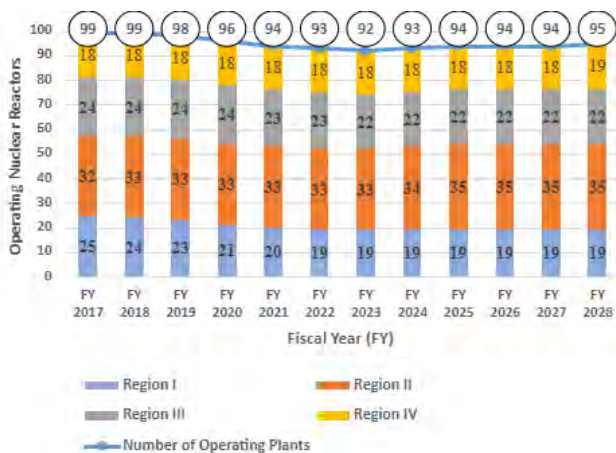
As of September 30, 2022, 93 commercial nuclear power reactors were operating in the United States. Eight commercial nuclear power reactors shut down between FY 2017 and September 2022 (Figure A-4). In addition, the total number of large LWR operating reactors is expected to increase by two and two advanced reactors could become operational over the next 5 years. The number of shutdown nuclear power reactors is expected to be offset in FY 2023 and FY 2024 with the addition of Vogtle Electric Generating Plant Units 3 and 4,<sup>43</sup> respectively. Additionally, Pacific Gas and Electric requested to resume its previous license renewal application for Diablo Canyon Power Plant, Units 1 and 2,<sup>44</sup> or receive a timely renewal exemption. Oversight activities are expected to slightly increase over the next few years with the startup of Vogtle Units 3 and 4 and potentially two advanced power reactors (X-energy XE-100 and Terrapower Natrium) starting up by FY 2027 and FY 2028.

As Vogtle Units 3 and 4 transition to operations, the workload for the NRC's Construction Inspection Program will decrease through FY 2024 and be adjusted to support future work for advanced reactors. Vendor inspections are expected to continue at a steady pace through FY 2028, with focus shifting from vendors supporting Vogtle Unit 3 and 4 construction to vendors supplying operating reactors and advanced reactor applicants.

<sup>42</sup> Figure by the EIA in AEO 2022, page 17 ([https://www.eia.gov/outlooks/aeo/pdf/AEO2022\\_Narrative.pdf](https://www.eia.gov/outlooks/aeo/pdf/AEO2022_Narrative.pdf))

<sup>43</sup> <https://www.world-nuclear-news.org/Articles/Further-delay-in-startup-of-Vogtle-AP1000s>

<sup>44</sup> On October 31, 2022, Pacific Gas and Electric (PG&E) submitted a letter (<ML22304A691>) requesting either a resumption of its previous license renewal application for Diablo Canyon Units 1 and 2 or a timely renewal exemption. The current licenses expire on November 2, 2024, and August 26, 2025. The NRC is reviewing PG&E's requests and will determine a path forward. Based on PG&E's October 31 letter and the staff's response to PG&E's requests, staff are making a budgetary assumption that the licensee may choose to continue operation, and staff would need to review an application to extend the current plants' operating licenses. Although the timing is unclear, for planning purposes, staff estimate that the application review would start at the beginning of FY 2024 and extend into FY 2025.



Plant Name	Fiscal Year	Shutdown or Startup
Fort Calhoun	2017	Shutdown
Watts Bar Unit 2	2017	Startup
Oyster Creek	2018	Shutdown
Pilgrim	2019	Shutdown
Three Mile Island Unit 1	2019	Shutdown
Indian Point Unit 2	2020	Shutdown
Duane Arnold	2020	Shutdown
Indian Point Unit 3	2021	Shutdown
Palisades	2022	Shutdown
Vogtle Unit 3	2023	Startup
Vogtle Unit 4	2024	Startup
X-energy XE-100 <sup>45</sup>	2027	Startup
Terrapower Sodium	2028	Startup

**Figure A-4 Number of Operating U.S. Commercial Nuclear Power Plants from FY 2017–2028**

Operating reactor licensees are adopting new technologies to improve safety and to operate more economically. These technologies include (1) expanded use of digital (versus analog) and wireless technologies, (2) accident tolerant fuel (ATF),<sup>46</sup> and (3) additive manufacturing technology (e.g., three-dimensional printing). The NRC needs to ensure that it has the technical skills to develop appropriate regulatory frameworks for these technologies, as well as adequate resources to perform any associated licensing and oversight activities as licensees move to adopt these technologies. In addition, the NRC needs to assess the likelihood of future technology adoptions and to take appropriate action to be ready to effectively license and inspect such technologies.

On December 20, 2021, staff submitted SECY-21-0109, “Rulemaking Plan on Use of Increased Enrichment of Conventional and Accident Tolerant Fuel Designs for Light-Water Reactors,”<sup>47</sup> requesting Commission approval to initiate rulemaking to amend NRC regulations to facilitate the use of LWR fuel containing uranium enriched to greater than 5.0 weight percent uranium-235. As part of the rulemaking plan, staff evaluated the current regulatory framework in 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” and 10 CFR Part 71, “Packaging and Transportation of Radioactive Material,” to determine whether rulemaking would support a more efficient review of licensing actions related to ATF and the use of fuels enriched to greater than 5.0 weight percent uranium-235. Currently, NRC regulations state that uranium-235 enrichment levels in power reactor fuel may be no more than 5.0 percent by weight, unless significant additional restrictions, plant systems, or analyses are implemented. In March 2022, the Commission approved staff’s proposal to initiate a rulemaking to amend requirements for the use of LWR fuel containing uranium enriched to greater than 5.0 weight percent uranium-235. The Increased Enrichment final rule is expected to be published in 2026.

<sup>45</sup> In 2021, Energy Northwest, and the Grant County (Washington) Public Utility District entered into a memorandum of understanding with X-energy to coordinate on the deployment of an Xe-100 reactor on the Hanford Site in the State of Washington.

<sup>46</sup> ATFs are a set of new technologies that have the potential to enhance safety at U.S. nuclear power plants by offering better performance during normal operation, transient conditions, and accident scenarios.

<sup>47</sup> [ML21232A237](#)

The nuclear power industry continues to evolve into new areas, especially business-driven and information-driven innovation. In addition to more traditional improvements in areas such as ATF, higher enriched fuels, higher burnup fuels, and digital instrumentation and controls, the NRC will need to be ready for new areas of innovation such as additive manufacturing, flexible plant operation, digital twinning, and other information-driven applications of artificial intelligence (AI).

The nuclear power industry is a mature industry (i.e., many personnel have extensive experience and facilities have systems with technology enhancements) and has developed efficient operation and maintenance practices for the existing technology. However, additional operation and maintenance costs can occur as equipment ages. Parts may become more expensive or difficult to find, necessitating full replacement and potential design changes. The NRC continues to consider these unique challenges and potential ways in which its programs may be adapted to continue supporting efficient regulatory oversight of plant operations.

Over a plant's life, safety is ensured through maintenance and the plant's unique licensing basis. Improved understanding of the risk profiles of the plants may lead to adjustments in oversight and licensing activities while maintaining a graded regulatory approach. However, the NRC may explore enhancements to oversight and licensing activities to verify continued acceptability of the licensee's probabilistic risk assessment models and to maintain the NRC's Standardized Plant Analysis Risk models.

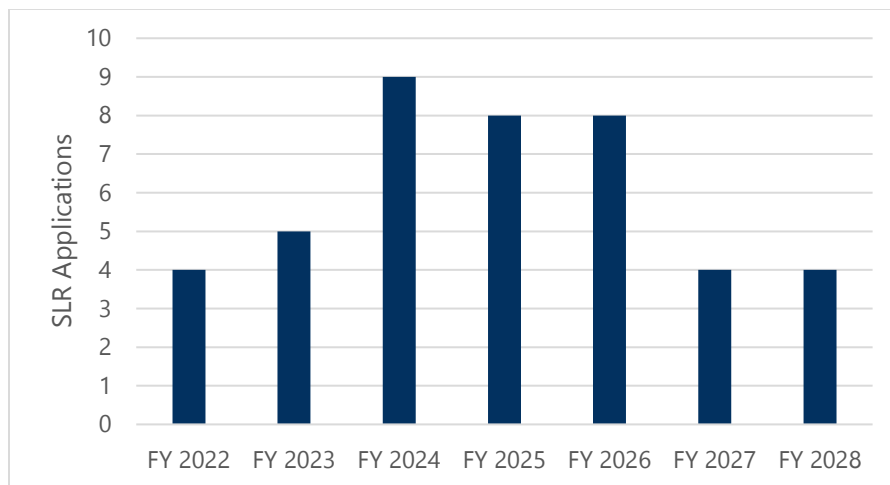
#### License Renewal and Subsequent License Renewal

The NRC has established a timely power reactor license renewal process and clear requirements that are needed to ensure safe operation for an extended period. The decision to continue operations beyond 40 years to 60 years is strictly an economic decision to be made by power reactor owners. License renewal and SLR for an additional 20 years (total 80 years) allow licensees to continue to service the electricity demands in various geographic regions at an already existing power reactor rather than assuming construction costs of a new electricity source concurrent with decommissioning.

The NRC anticipates that license renewal work will continue through FY 2028, but a few operating plants have not yet applied to extend their operating license to 60 years. Perry Nuclear Power Plant, Unit 1, and Clinton Power Station, Unit 1, have filed letters of intent to submit applications in FY 2023 and FY 2024, respectively. The licensee for Diablo Canyon Units 1 and 2 has requested either a resumption of the review of its previous application or an exemption from the timely renewal requirements. Either way, the bulk of the information to review will be submitted in FY 2024. Ongoing safety and environmental noncomplex reviews (i.e., no hearings or technical issues) will continue for Comanche Peak Nuclear Power Plant, Units 1 and 2, during FY 2023 and FY 2024.

SLR work is expected to increase through 2028 because of the continued reviews of SLR applications for North Anna Power Station, Units 1 and 2; Point Beach Nuclear Plant, Units 1 and 2; Oconee Nuclear Station, Units 1, 2, and 3; Saint Lucie Plant, Units 1 and 2; and Monticello Nuclear Generating Plant, Unit 1. Additionally, there is a potential for up to 11 new applications through 2028 based on results of a 2022 Nuclear Energy Institute (NEI) survey,

letters of intent that the NRC has received, and Duke Energy’s public announcement<sup>48</sup> that it intends to seek SLR for its entire fleet. Figure A-5 shows the number of projected SLR applications that could be in-house for review through FY 2028.



**Figure A-5 Projected SLR Applications**

The Subsequent License Environmental Directorate (SLED) was established to implement the Commission’s direction to ensure that the NRC’s environmental regulations, supporting analyses, and guidance fully support the subsequent renewal of nuclear power plant operating licenses. SLED is responsible for the leadership and developmental activities required to accomplish the following by April 2024: (1) a rulemaking to amend Table B-1, “Summary of Findings on NEPA [National Environmental Policy Act] Issues for License Renewal of Nuclear Power Plants,” in Appendix B, “Environmental Effect of Renewing the Operating License of a Nuclear Power Plant,” to Subpart A, “National Environmental Policy Act—Regulations Implementing Section 102(2),” of 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions,” and (2) an update of NUREG-1437, Revision 1, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants,” issued June 2013 (License Renewal GEIS). To accomplish these objectives, SLED will conduct a thorough analysis of the environmental impacts of SLR to expand the applicability of the License Renewal GEIS to SLR. As part of this update, SLED will also consider changes to applicable laws and regulations, new data, and experience in conducting similar environmental reviews to update the analysis in the License Renewal GEIS for initial license renewals as well. Additionally, SLED will update associated guidance for consistency.

### New Reactors

If the market conditions support the high demand for nuclear energy that the nuclear industry is projecting over the next 25 years, the NRC expects to see an increase in innovation in the area of new reactors. The nuclear industry is expected to grow gradually over the next 5 years and beyond with the addition of new technologies, designs, and new applications outside of the traditional power plants. According to Idaho National Laboratory, the United States will need an additional 162 gigawatts of new nuclear generation by 2050 in order to meet zero-carbon

<sup>48</sup> <https://news.duke-energy.com/releases/duke-energy-seeks-subsequent-license-renewal-for-oconee-nuclear-station>

emissions goals.<sup>49</sup> In addition, NEI reported that with support of the market conditions, more than 300 new SMRs could be planned for deployment over the next 25 years.<sup>50</sup>

### *Light-Water Reactors*

There is increasing support for the light-water SMRs because of their ability to provide stable power that supplements other renewable energy sources. They have the potential to transform the nuclear energy industry by creating increasing demand for new LWRs that is not present for today's large LWR designs. The NRC anticipates receiving several new applications for combined licenses, construction permits, operating licenses, early site permits, design certifications, and standard design approvals for SMRs through FY 2028, resulting in a projected increase of SMR licensing activities from the current level.<sup>51</sup> NRC staff are currently engaged in preapplication reviews for SMR designs by NuScale, General Electric Hitachi, Holtec, Utah Associated Municipal Power System, and Carbon Free Power Project. As such, the licensing of these new SMRs is also evolving. Licensing work associated with five light-water SMR designs is anticipated through FY 2028.

### *Advanced Reactors*

Innovation is changing the way advanced reactor designs are being developed. Advanced non-LWRs will use heat pipes, gas, liquid metal, or molten salt to transfer energy and are expected to provide enhanced margins of safety and to use simplified, inherent, passive, or other means to accomplish their safety and security functions. Some will have a fast neutron spectrum, some will operate at or near atmospheric pressure, and some will be much smaller than current generation reactors. In 2022, Idaho National Laboratory published a report<sup>52</sup> indicating that the United States will need an additional 162 gigawatts of new nuclear generation by 2050 to meet zero-carbon emissions goals. According to an NEI survey of its 19 utility members,<sup>53</sup> more than 300 new SMRs could be planned for deployment over the next 25 years.

Congress has provided funding to the U.S. Department of Energy (DOE) to encourage investment in the design and development of commercial non-LWRs. The DOE's Advanced Reactor Demonstration Program is funding two non-LWR designs with the objective of commercial operation by CY 2027.<sup>54</sup> This DOE program is also funding other designs with the objective of commercial operation in the 2030s. A wide variety of designs are based on different combinations of fuel and coolant, including metallic fuel, tri-structural isotropic (TRISO) fuel, and molten fuel, as well as heat pipe, gas, liquid metal, and molten salt coolants.

The NRC continues to make significant progress on its ongoing activities to support licensing of non-LWRs. Rulemaking efforts supporting this plan include the Alternative Physical Security Requirements for Advanced Reactors and the Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (10 CFR Part 53). Both rulemaking projects are currently developing draft proposed rules. The Alternative Physical Security Requirements for Advanced Reactors rulemaking looks to provide a handful of specific alternatives to specific physical

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<sup>49</sup> <https://www.osti.gov/biblio/1838156>

<sup>50</sup> <https://www.nei.org/news/2023/nei-survey-shows-even-more-interest-in-nuclear>

<sup>51</sup> As discussed in Appendix B to "Regulatory Analysis for the Proposed Rule: Emergency Preparedness for Small Modular Reactors and Other New Technologies," the best estimate of the number of SMRs and non-LWRs is nine. (<https://downloads.regulations.gov/NRC-2015-0225-0321/content.pdf>)

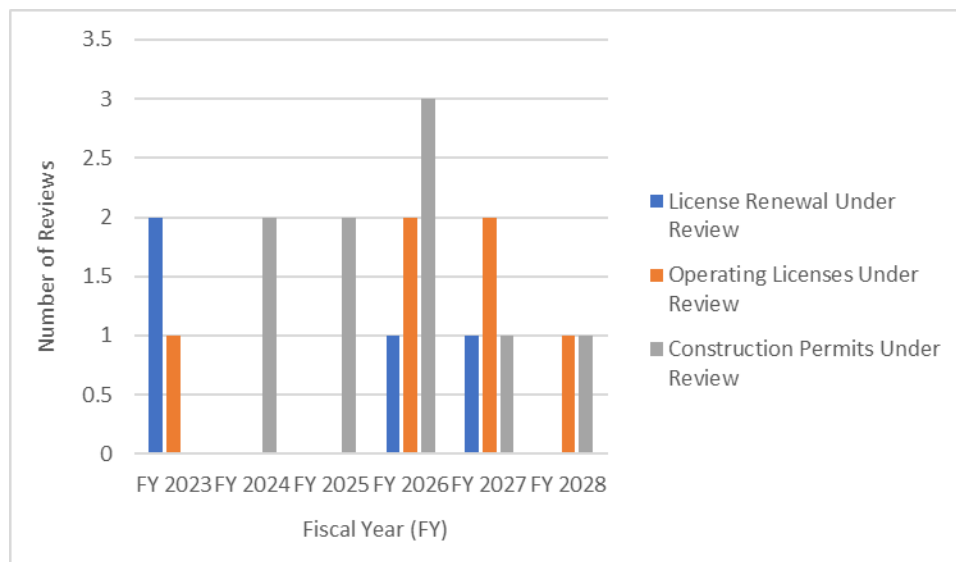
<sup>52</sup> <https://www.osti.gov/servlets/purl/1838156>

<sup>53</sup> <https://www.nei.org/advanced-nuclear-energy/advanced-nuclear-101>

<sup>54</sup> <https://www.energy.gov/ne/advanced-reactor-demonstration-program>

security requirements under 10 CFR 73.55, “Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage,” to those non-LWR or SMR facilities that meet the proposed rule’s performance-based eligibility criteria. The 10 CFR Part 53 rule would modernize the NRC’s regulatory infrastructure to support licensing as required by Section 103 of the Nuclear Energy Innovation and Modernization Act (NEIMA) by establishing a technology-inclusive regulatory framework for optional use by applicants for new commercial advanced reactor license applications. The NRC expects to publish the final 10 CFR Part 53 rule before NEIMA’s deadline of December 31, 2027.

As of early FY 2023, the NRC has received two construction permit applications for advanced research and test reactors (RTRs). Kairos Power submitted an application for the Hermes fluoride salt-cooled high temperature test reactor in 2021, and the safety evaluation is ongoing. Abilene Christian University submitted an application for a molten salt research reactor in 2022. Licensing activities and construction oversight for the Hermes and Abilene Christian University reactors are expected to continue through FY 2026. The University of Illinois has informed the NRC staff that it intends to submit an application for a high-temperature gas-cooled reactor in FY 2024. Licensing activities and construction oversight are expected to continue through FY 2028. Additional universities<sup>55</sup> and vendors<sup>56</sup> have expressed interest in the deployment of advanced RTRs. Figure A-6 shows the anticipated workload for advanced RTRs.



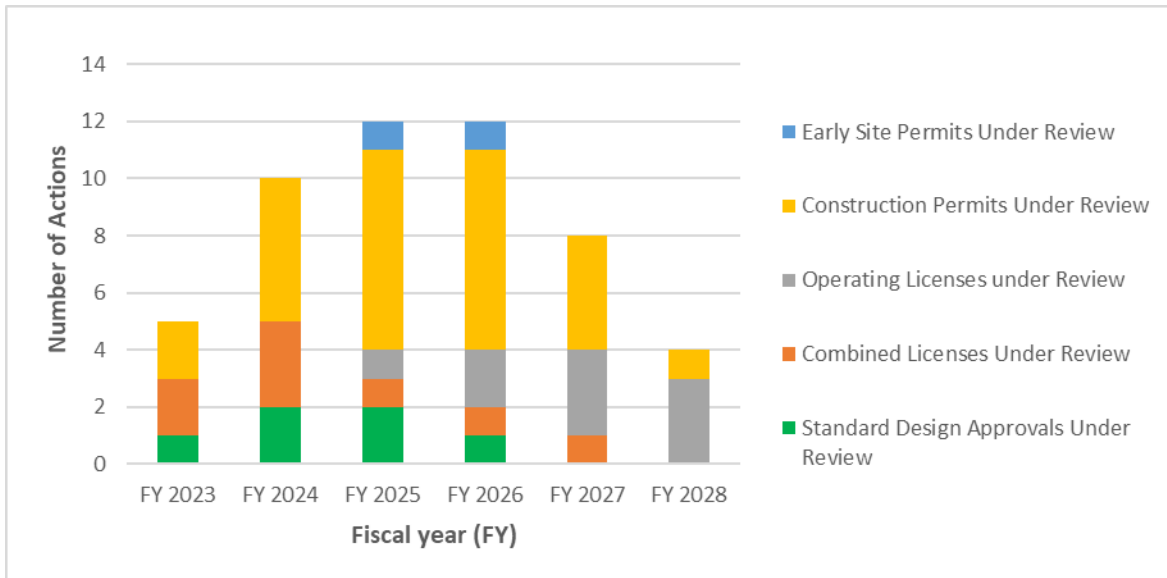
**Figure A-6 Anticipated Nonpower and Production and Utilization Facilities Reviews**

For advanced power reactors, eight vendors have submitted preapplication topical reports (or white papers) or have communicated their intent to do so by FY 2024 (Oklo, Kairos, X-energy, Terrapower, Terrestrial Energy, Westinghouse, General Atomics, ARC Clean Energy). Staff anticipates the receipt of at least five non-LWR power reactor applications by the end of FY 2025 and five more by the end of FY 2028. Beyond this timeframe, there is early interest in

<sup>55</sup> <https://www.purdue.edu/administrative-operations/nuclear/index.php>

<sup>56</sup> <https://www.icds.psu.edu/westinghouse-and-penn-state-to-explore-advancing-sustainable-micro-reactors/>

the use of advanced nuclear technology for industrial applications<sup>57</sup> and to support coal-fired plant transitions.<sup>58</sup> Figure A-7 shows the anticipated workload for non-LWR power reactors.



**Figure A-7 Anticipated Advanced Reactor Licensing Reviews**

### *Medical Radioisotope Facilities*

New medical radioisotope facilities are under development in the United States to support the national initiative to establish a domestic supply of molybdenum-99 (Mo-99). These facilities could use a variety of technologies to produce Mo-99, including accelerator-driven subcritical operating assemblies, nonpower reactors, hot cell structures, and target fabrication facilities. In most cases, these facilities will feature multiple technologies located on a single site to prepare or manufacture targets, irradiate targets, and process targets for Mo-99 extraction. Given this diversity in technology, the licensing process for these facilities could vary based on the chosen production method. The SHINE Medical Technology facility is expected to commence operations in FY 2023. By FY 2024, staff expects the submittal of additional 10 CFR Part 50 applications from Atomic Alchemy and Eden Radioisotopes. Licensing and construction oversight would continue through FY 2028. In FY 2023, staff expects to receive the submittal of a 10 CFR Part 70 licensing application from Niowave for a medical isotope facility.

### *Fusion Technology*

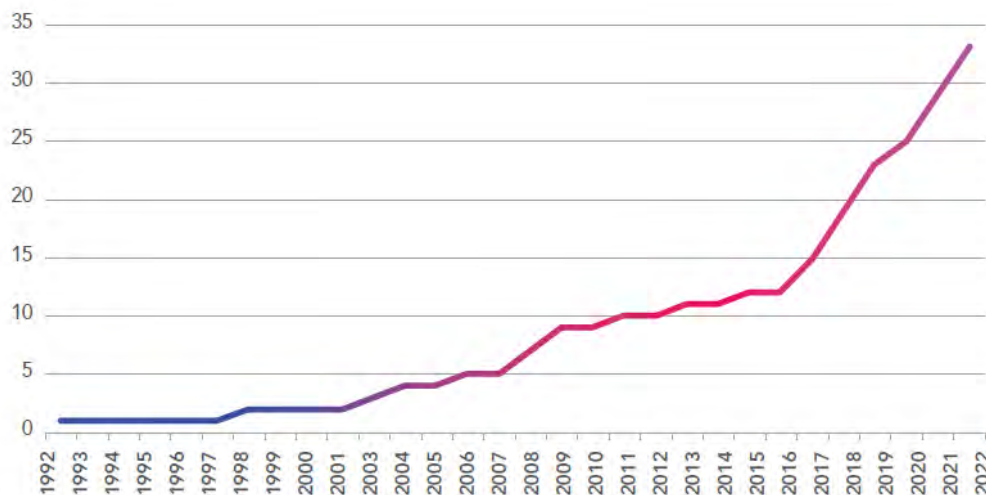
There is growing interest in the public and private sector to explore the potential of commercial fusion energy systems. In 2022, the White House Office of Science and Technology Policy and the DOE co-hosted the first-ever White House summit on Developing a Bold Decadal Vision for Commercial Fusion Energy. Thereafter, the DOE announced up to \$50 million for a milestone-based fusion development program. This program will provide support to for-profit entities, which may team with national laboratories, universities, and others to meet major

<sup>57</sup> <https://x-energy.com/media/news-releases/dow-and-x-energy-to-drive-carbon-emissions-reductions-through-deployment-of-advanced-small-modular-nuclear-power>

<sup>58</sup> <https://www.terrapower.com/terrapower-and-pacificorp-announce-efforts-to-expand-sodium-technology-deployment/>

technical and commercialization milestones toward the successful design of a fusion pilot plant that will help bring fusion toward technical and commercial viability.

According to the “2022 Global Energy Industry Report” from the Fusion Industry Association (FIA),<sup>59</sup> the global number of private fusion companies increased throughout the last 10 years (figure A-8), indicating a growing interest in fusion energy as an option to contribute to the world’s low-carbon energy supply. In addition, the FIA recognizes that private companies are aiming to deliver commercial fusion and are advancing in the science and technology that will lead to a commercial power plant. In its report, FIA indicated that the potential exists for vendors to design and operate prototype fusion power systems by the late 2020s, with the potential for commercial power generation by the 2030s.



**Figure A-8 Total Number of Private Fusion Companies by Year**

Consistent with the direction in SRM-SECY-20-0032,<sup>60</sup> staff are preparing options to support the development of a regulatory framework for fusion energy systems. NEIMA requires the NRC to establish a regulatory framework for fusion energy systems by 2027. Staff have hosted six public meetings on the fusion regulatory framework since 2021 to gather stakeholder feedback. On September 14, 2022, the NRC staff issued a white paper entitled “Licensing and Regulating Fusion Energy Systems,”<sup>61</sup> describing options for licensing and regulation of fusion energy systems. The Commission conducted a public meeting in November 2022 to seek additional information from the NRC staff and the public. On January 4, 2023, staff conveyed their recommended option and alternatives to the Commission for consideration.<sup>62</sup>

<sup>59</sup> <https://www.fusionindustryassociation.org/about-fusion-industry>

<sup>60</sup> “Staff Requirements – SECY-20-0032 – Rulemaking Plan on ‘Risk Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (RIN-3150-AK31; NRC-2019-0062),” dated October 2, 2020 ([ML20276A293](#))

<sup>61</sup> [ML22252A192](#)

<sup>62</sup> SECY-23-0001, “Options for Licensing and Regulating Fusion Energy Systems,” January 4, 2023 ([ML22273A178](#))



## **Nuclear Materials and Waste Safety Programs**

In the coming years, an increase in transport and new package and storage designs is projected to require research, rulemaking, and training, along with outreach. In addition, the licensing and oversight of consolidated interim storage facilities (CISFs) will be ongoing. For fuel facilities and reprocessing, a high demand for fuels will lead to new fuel facility construction requiring additional regulatory rulemaking, oversight, training, outreach, and other related activities, with the potential for Agreement States to play a role. New medical and industrial entrants and nuclear material uses could create a staffing challenge for the NRC, both in terms of the number of available staff and in the availability of necessary skills. As the nuclear industry expands, it will be necessary for the NRC to focus on the relevant State and Tribal stakeholders, particularly with regard to repositories.

### Decommissioning

While no new power reactors are expected to shut down and begin decommissioning by the end of FY 2028, nuclear facilities that may be added will require continued staff support for licensing and oversight of decommissioning activities. Because of the increased number of power reactors entering accelerated decommissioning schedules, staff expect that the number of decommissioned power reactors attempting to transfer their spent fuel to dry cask storage (i.e., transition to independent spent fuel storage installations (ISFSIs)) increases within 3 to 5 years of their final shutdown. The workload is expected to stabilize for licensing reviews, such as license transfers to decommissioning entities; emergency planning, security, and licensing amendments and exemptions associated with permanent reactor shutdown; and reviews to support final site release, including license termination plans and final status survey reports. Inspection activities, such as performing confirmatory surveys, are expected to increase to support oversight of decommissioning activities. Overall, the trend of power reactors entering accelerated decommissioning will result in an increase in decommissioning inspections, ISFSI inspections, licensing actions (i.e., technical and environmental reviews), and interactions with stakeholders (for example, with State officials and nuclear decommissioning citizens advisory panels).

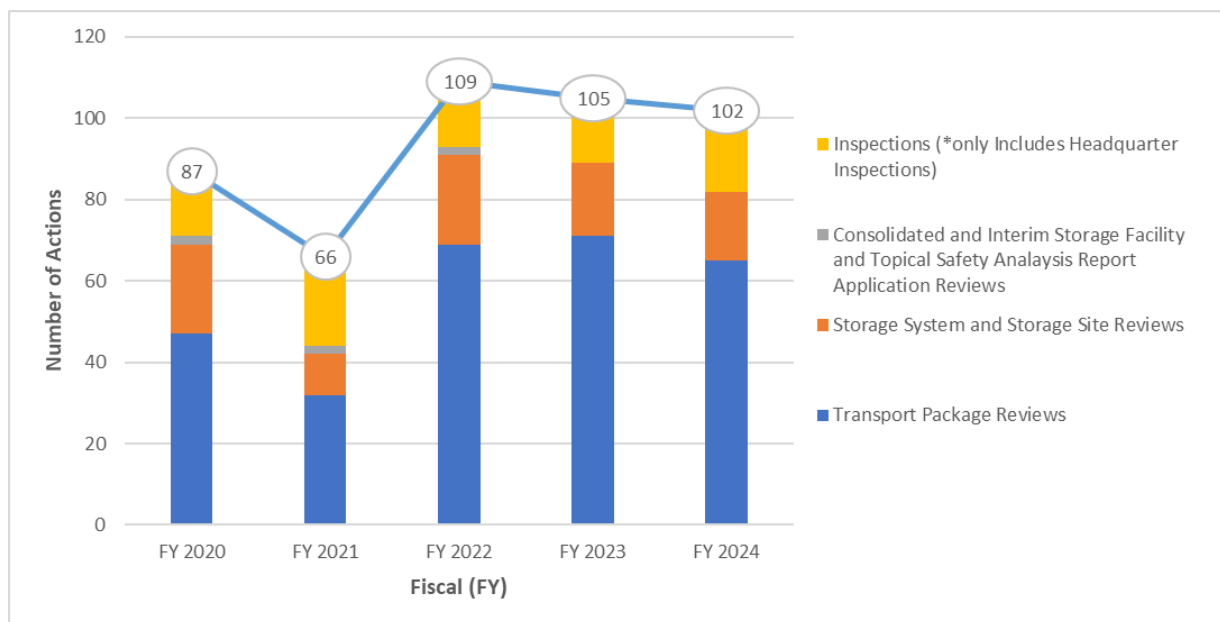
The NRC is engaged in a rulemaking activity to improve the efficiency of the decommissioning process. The Regulatory Improvements for Production and Utilization Facilities Transitioning to Decommissioning rulemaking would implement specific regulatory requirements for different phases of the decommissioning process consistent with the reduced radiological risks associated with those decommissioning phases; this rulemaking is expected to result in savings for the industry and NRC. The estimated publication date of the final rule is 2024.

### Nuclear Materials Transportation and Spent Fuel Storage

Design changes for transportation packages for uranium hexafluoride and for packages that can accommodate both new fresh fuel and spent fuel for ATF and advanced reactors are expected to increase through FY 2028. Fuel vendors will also be seeking approval for transportation and storage of ATF designs with enrichments above 5 percent and increased burnup. Widespread implementation of ATF and higher enriched designs for advanced reactors would require increased certification activity for transportation packages and spent fuel storage casks. In addition, the NRC is expecting three applications for transportable microreactors through 2028. Work on new fresh fuel and spent fuel transportation packages is expected to increase for advanced reactor fuel designs through FY 2028.

The NRC has approved a CISF license for Interim Storage Partners and is currently reviewing one additional CISF application, for which a final licensing decision is anticipated in FY 2023. There is an expected increased interest in commercial (i.e., nongovernment) shipment of spent nuclear fuel to one—or both—of these sites, resulting in an increase in technical reviews anticipated for security transportation plans, approval of security routes prior to transport of spent fuel, and coordination of oversight of shipping campaign activities to CISFs. For shipments to CISFs, the NRC outreach to external stakeholders and associated oversight activities are anticipated to increase as spent fuel is moved from storage to transportation configurations and at receipt of shipments at one, or both, CISFs. Updates and revision of the applicable inspection procedures will be needed in advance of the onset of shipments to a CISF to support the anticipated increase in oversight at shipping and receiving sites. An increase in licensing actions is expected to support new and amended transportation package designs; likewise, there would be an increase in oversight, as well as coordination of shipping campaign activities to interim storage facilities. To support these activities, the NRC would need to develop associated regulatory guidance documents to accommodate the number of designs and amendments being driven by operational needs.

Notwithstanding activities related to CISFs, licensee utilization of onsite ISFSIs is expected to require continued inspection and oversight. In addition, an increase in oversight is expected as more facilities implement aging management programs as their spent fuel storage systems enter the period of extended operation.



**Figure A-9 Anticipated Spent Fuel Storage and Transportation Reviews**

Fuel Facilities

An increase is expected in licensing activities related to new fuel fabrication and enrichment facilities to support the production of fuel for advanced reactors that would operate with higher enrichments and different forms of fuels (e.g., higher enrichments and TRISO fuel for pebble-bed, molten salt, or advanced gas-cooled reactors). NRC staff are reviewing a 10 CFR Part 70 license application for the nation’s first HALEU fuel fabrication facility to

produce fuel for advanced and small modular reactors. Staff are expecting two additional new applications and three amendments to existing licenses by 2028. The licensing and oversight functions for existing fuel facilities are expected to continue with increases to support amendments for higher enrichments above 5 weight percent through FY 2028. The NRC anticipates an increase in oversight workload to develop a construction inspection program and to conduct inspections for new fuel fabrication and medical isotope production facilities.

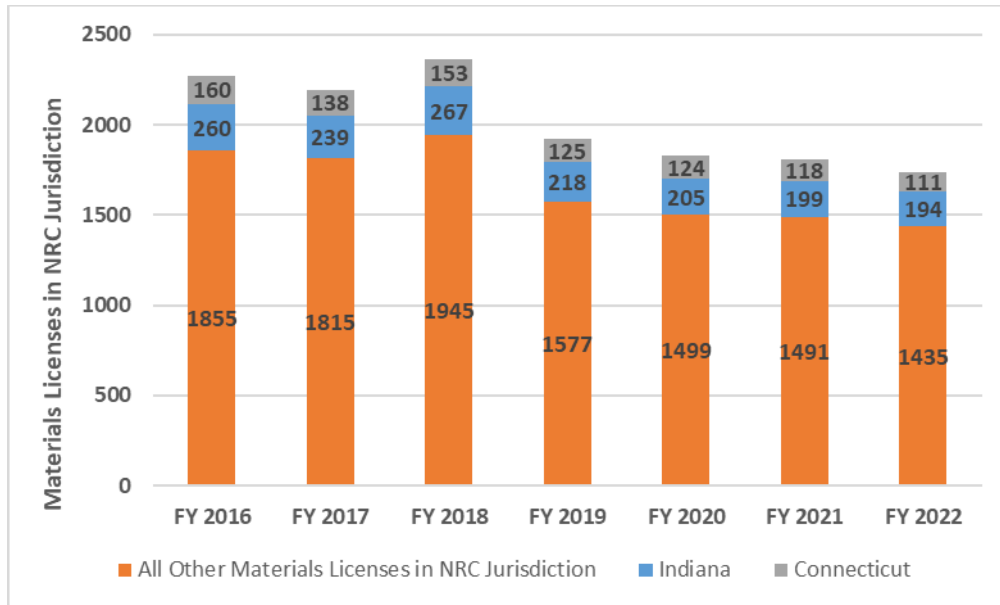
Several fuel vendors, in coordination with DOE, have announced plans to develop and seek approval for various ATF fuel designs. The NRC's role with ATF is to review the new fuel technologies and their associated enrichment, fabrication, transportation, and storage aspects to ensure that licensees maintain public health and safety when implementing ATF. Facility changes and license amendments will be needed to accommodate the enrichment and fabrication of fuel with enrichments above 5 percent. ATF research activities are expected to remain stable through FY 2028 to support the development of agency technical review capabilities.

### Agreement States

The mechanism for the transfer of the NRC's authority to a State is an agreement signed by the Governor of the State and the Chairman of the Commission, in accordance with section 274b of the Atomic Energy Act of 1954, as amended. In the past few years, several states have inquired about becoming Agreement States, which would affect the number of licensees under NRC jurisdiction and thereby the budget needed for direct licensing and inspection activities. The NRC staff received letters of intent from the State of Connecticut on December 10, 2020, and from the State of Indiana on June 11, 2021. Given the number of materials licenses in these States (Figure A-10), there would be a moderate reduction in materials licensing and inspection workload in Region I and Region III if Connecticut and Indiana, respectively, become Agreement States. Connecticut has approximately 5 percent of NRC materials licensees, and Indiana has about 9 percent of these licensees; specific resource changes would depend on the types of licensees and the associated licensing and inspection resources. These changes would not take effect until such agreements are in place. For Connecticut, the current projected date is January 1, 2025; therefore, the impacts would begin to occur in FY 2025. For Indiana, the current projected date is January 1, 2026; therefore, the impacts would begin to occur in FY 2026.

For each additional Agreement State, there would be a modest workload increase for the NRC's Agreement State support for Integrated Materials Performance Evaluation Program reviews and a larger span of work for the Regional State Agreement Officers. West Virginia has had multiple engagements with NRC staff and may submit a letter of intent to become an Agreement State. Wyoming is expected to submit a letter of intent in April 2023 regarding amending their Agreement to include source material processing for rare earth metal extraction.

NRC staff are developing a Commission paper to provide information on the changes to collaboration, coordination, and NRC infrastructure (e.g., fee policy) that would be needed if the number of Agreement States increases significantly over the next 5 years.



**Figure A-10 Materials Licenses in NRC Jurisdiction**

Tribal Engagement

In support of the NRC’s Tribal Policy Statement and realizing the breadth of work of interest to Tribal Nations, the NRC is strengthening its Tribal outreach program for increased engagement with Tribal Nations. Communication, interactions, and transparency are being enhanced to better inform and include Federally and State-recognized Native American Tribal governments in NRC processes and activities. The Commission is considering staff recommendations for environmental justice (SECY-22-0025, “Systematic Review of How Agency Programs, Policies, and Activities Address Environmental Justice,” dated April 12, 2022),<sup>63</sup> which, if implemented, could have significant resource impacts.

Emerging Medical Technologies

The NRC has seen an increase in medical applications of radioisotopes and advances in medical technologies for use in diagnosis, therapy, and medical research. The NRC anticipates an increase in the number of emerging technologies, including new types of cancer therapies licensed by the NRC and Agreement States. The number of reviews, along with the development of new or revised guidance, related to emerging medical technology and radiopharmaceuticals is expected to increase through FY 2028 based on information ascertained through routine engagement with the Advisory Committee on the Medical Uses of Isotopes, as well as interactions with professional societies involved with emerging medical technologies, the manufacturers of emerging medical technologies and radiopharmaceuticals, the U.S. Food and Drug Administration, and the Agreement States. The NRC already projects under the SWP process that additional resources in the area of medical health physics will be needed to address this increased workload. To mitigate the resource impacts of this increase, the NRC formed a standing committee to streamline and refine the process for issuing emerging technology guidance. This approach enables staff to incorporate feedback quickly from the NRC

<sup>63</sup> [ML22031A063](#)

regions, the Advisory Committee on the Medical Uses of Isotopes, and the Agreement States. Staff are developing a regulatory basis that would support a rulemaking to restructure the regulations to better accommodate current and future emerging medical technologies. The NRC is currently developing a regulatory guide that will provide methods acceptable to the NRC staff for release of animals who have been administered unsealed byproduct material or implants that contain radioactive material. In 2023, the NRC will develop a rulemaking plan related to the release of animals treated with byproduct material. If approved, these two rulemakings would represent multiyear staff efforts resulting in an increased workload for rulemaking and medical health physics staff over the next 5 years. After promulgation, these rules would reduce resources for specialized licensing for certain emerging technologies that have already been proven, as well as for vendor-specific veterinary issues.

### Radioactive Source Security

The U.S. Government Accountability Office (GAO) has issued multiple reports with recommendations associated with radioactive materials security. Congressional interest in NRC action in response to these reports is high, and media interest has also been high in the past. A perceived deficiency in source security controls or delay in addressing issues of concern could affect trust in the NRC's ability to protect the public, as well as additional effort to address stakeholder concerns. The NRC is conducting rulemaking on an accelerated schedule to address issues with category 3 quantities of radioactive materials and sent a proposed rule to the Commission in December 2022. The NRC is also engaging with Agreement States, licensees, and vendors to ensure that they understand GAO recommendations and that they understand how to verify the validity of licenses under the current requirements.

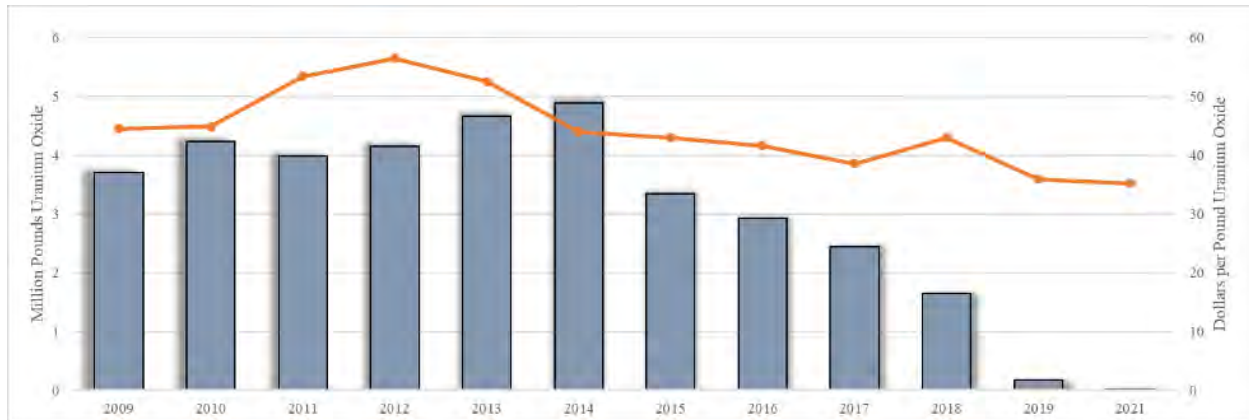
GAO has also recommended Congressional action on alternatives to radioactive materials, including establishing a national strategy for risk reduction, providing additional authority to agencies, and directing the NRC to consider alternative technologies in its licensing process. The NRC does not take a position on the matters for Congressional consideration, but it observes that these authorities, if provided to the NRC, would require additional resources for the NRC to implement. The timeframe for implementing such regulations cannot yet be projected.

### Uranium Recovery

The Uranium Leasing Program (ULP), managed by the DOE's Office of Legacy Management, signed agreements with lessees for the last remaining active ULP tracts (29 in total), opening the door to the exploration, development, and extraction of uranium and associated minerals in the Uravan Mineral Belt of southwest Colorado. Of the 29 lease tracts, 11 are permitted with the Colorado Division of Reclamation, Mining, and Safety. None of the 29 lease tracts had active mining operations in 2021. A timetable for resuming mining operations under the ULP has not yet been established. The signed agreements in Colorado would not influence the NRC's uranium milling workload because of Colorado's status as an Agreement State for uranium milling.

In fall 2021, DOE began soliciting information on various topics related to the establishment of its Uranium Reserve Program. The NRC staff will continue to track into FY 2023 how DOE funding and structuring of its Uranium Reserve Program could impact the NRC's uranium milling workload. U.S. uranium mines produced 21,000 pounds of triuranium octoxide ( $U_3O_8$ ), or uranium concentrate, in 2021. Production data were withheld in 2020, but 2021 production was

down 88 percent from 2019 production levels.<sup>64</sup> The low market demand (Figure A-11) indicates that the future workload for uranium recovery is expected to remain minimal.



**Figure A-11 U.S. Uranium Concentrate Production and Average Price of Domestic Purchases (2010–2021) (production data withheld in 2020 and average price of domestic purchases withheld in 2019)**

## Crosscutting Areas

### Emergency Preparedness and Incident Response

Operators of nuclear facilities are required to develop and maintain effective emergency plans and procedures to protect the public in the unlikely event of emergencies. Emergency plans consider a range of hazards and natural events; these plans address adequate response staffing, the ability of emergency personnel to respond within certain timeframes, evacuation time estimate studies, and any necessary prompt and effective actions within the emergency planning zone to protect the public. The emergency preparedness (EP) program also includes policy development, coordination of oversight between the NRC Headquarters and regional offices, and close coordination with the Federal Emergency Management Agency to ensure integration of licensees' emergency plans with State and local emergency plans.

In the coming years, the NRC expects a substantial increase in EP licensing reviews, policy development, and oversight work to coincide with the anticipated applications for new reactors (i.e., SMR/other new technologies (ONTs), advanced reactors including non-LWRs, microreactors, and fusion technologies), fuel cycle facilities, new licenses and license renewals for research and test reactors, medical isotope facilities, independent fuel storage facilities and future decommissioning reactors.

On January 3, 2022, the NRC staff provided the proposed final rule package for EP for SMR/ONTs to the Commission for its consideration. If approved, a significant increase in the EP-related licensing workload is expected to accompany anticipated new applications for combined licenses, design certifications, and standard design approvals for SMR/ONTs, as well as an increase in design-specific EP topical reports for NRC review and approval. Approval of the final rule will also result in an increase in the workload for guidance development and

<sup>64</sup> <https://www.eia.gov/uranium/production/annual/>

inspections. The NRC staff also anticipates leveraging parts of this technology-neutral rule in its rulemaking for advanced reactors, including for non-LWRs.

Microreactor designs raise technical and regulatory issues that need to be addressed because (1) these reactors may be operated remotely and semiautonomously, (2) accident source terms are under development, and (3) some designs are transportable. Furthermore, fusion technologies present radiological and nonradiological hazards different from those of fission technology, and the NRC staff anticipates work will begin on developing an appropriate EP regulatory framework for fusion energy systems. Therefore, the NRC expects that EP policy development and oversight work will continue to increase through FY 2028 for licensing of SMR/ONTs, advanced reactors including non-LWRs, microreactors, and fusion technologies.

Evaluation of EP regulations is a continual process as NRC staff seek to risk inform and modernize EP requirements for reactors. NRC staff perform operating trend assessments and reviews of inspection findings to initiate regulatory improvements. Additionally, numerous submittals from industry and the public in the form of white papers and petitions for rulemaking are assessed for changes in EP regulations. NRC approval of such petitions would have potentially significant impacts on the NRC's EP workload for regulatory changes and guidance development. FY 2023 through FY 2028 work includes regulatory changes and guidance development to emergency plan change processes, development of protective action strategies, licensee reviews of emergency plans, development of a performance-based EP oversight program, creation of new EP performance indicators, and revision of the risk-informed EP significance determination process.

According to the Nuclear and Radiological Incident Annex,<sup>65</sup> the NRC is the lead Federal agency for nuclear or radiological events involving facilities and/or materials licensed under NRC regulation. The Headquarters Operations Officers provide 24-hour response capabilities for the agency, ensuring that the agency can quickly respond should there be an emergency at a licensed facility. Procedures utilized by the Headquarters Operations Officers to address issues at nuclear reactor sites are not facility specific and, as such, could be applied to any future reactor technologies. The incident response program expects increased resource needs to support continued transition to a hybrid response model and to prepare for future technologies.

The NRC's EP and incident response programs also support interagency and international partnerships through the Convention on the Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, as well as the International Atomic Energy Agency (IAEA) Emergency Preparedness and Response Standards Committee. The NRC expects interagency and international exercises and coordination work to increase through FY 2028 because of increased focus by the international community on advanced reactors and protective measures.

### Security Operations

The security environment is influenced by both internal and external factors, including industry operating experience, national priorities, the potential for a significant incident at a domestic or non-U.S. nuclear facility, the geopolitical environment, the security and threat environment, legislation, and new technologies. Any new design, technology, or facility presents a change in

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<sup>65</sup> [https://www.fema.gov/pdf/emergency/nrf/nrf\\_nuclearradiologicalincidentannex.pdf](https://www.fema.gov/pdf/emergency/nrf/nrf_nuclearradiologicalincidentannex.pdf)

the threat vectors and a potential need for increased protection. Therefore, the NRC must anticipate the need for an increase in a few key areas:

- **Industrial security** (to include Authorizing Officials) will see increased requirements over the next several years as the NRC addresses issues of foreign adversaries conducting long-term research into U.S. technologies.
- **Operational security** is a new element in the industrial security domain that departments and agencies are required to support. This establishes increased vigilance with international partners in the protection of common information (e.g., rewriting classification guidance and participating in security working groups/international outreach).
- **Threat assessments and intelligence analyses** will continue to increase in number, complexity, and scope as new technologies and facilities emerge (e.g., HALEU, laser enrichment, SMRs, advanced reactors). This will require an increase in workforce and competency to ensure that the NRC can assess impacts or changes to the threat environment for licensed facilities, materials, and activities.
- The agency continues to monitor the **threat environment** for any changes that may impact NRC-licensed facilities, materials, or other activities. The NRC has noted changes in the geopolitical environment, domestically and abroad, that could increase terrorist threats or capabilities. Additionally, the international pursuit of new nuclear technologies, such as SMRs and advanced reactors, has resulted in a persistent counterintelligence threat to the NRC and its licensees.
- **Classified information systems** at the NRC will require an increase in the workforce and competency to adequately protect these systems as threats continue to increase and protection levels change. Further, the need to transition away from systems relied upon for secure communications will require additional resources to ensure continued defense in depth in classified communications.
- The **baseline security (physical and cybersecurity) inspection program** will likely require revision as the design-basis threat is updated because of the evaluation of emerging technologies and threat evaluations, as well as the development of a baseline inspection program for the advanced reactor/SMR platforms.
- As plans for new technologies and new facilities materialize, there is an increasing need for **security oversight infrastructure**, which includes the development of a baseline inspection program for the advanced reactor/SMR platforms. Additionally, the demand from advanced reactor design vendors and companies to establish information security programs will continue to increase because of the need to protect sensitive information as safeguards or controlled unclassified information. Reviewing vendor and applicant programs will represent an increasing workload for NRC staff.
- Work related to the **oversight of the decommissioning facility and ISFSI security inspection program** will marginally increase as the number of facilities transitioning to decommissioning continues to grow.
- The move or collocation of space for **special use areas** may represent an increase in costs to establish new special use areas within the White Flint Complex as space consolidation occurs and the future of the Three White Flint North lease is considered.
- **Bilateral and multilateral international engagement on security** by design and novel approaches to security for advanced reactors, including SMRs, will require increased



support to ensure the NRC's ability to lead and influence the development of international standards and guidance. The effort will benefit regulatory agencies, international bodies, and designers by providing necessary guidance on the features or approaches that enhance security and could be incorporated at the initial design stage by designers of novel nuclear technology designs or for development of physical protection strategies. Building security into facility design—rather than retrofitting security features—preserves resources and provides greater assurance for designers, operators, and regulators.

- Future **preapplication and application submittal review** activities associated with non-LWR designers, potential operators, and nonpower RTRs will require an increase in resources, as well as diverse knowledge and skills, as stakeholders submit various white papers and topical reports on proposed physical protection programs and security alternatives.

### Cybersecurity

Cyberspace is the virtual environment created by computers and the Internet. Its underlying infrastructure is vulnerable to a wide range of risks. Sophisticated cyber actors and nation-states continue to develop capabilities to disrupt, destroy, or threaten the delivery of essential services. Cyberspace is particularly difficult to secure due to several factors: the ability of malicious actors to operate from anywhere in the world, the linkages between cyberspace and physical systems, and the difficulty of reducing vulnerabilities (and consequences) in complex information system infrastructures. Of growing concern is the cyberthreat to critical infrastructure, which is increasingly subject to sophisticated cyber intrusions that pose new risks. As information technology (IT) becomes increasingly integrated with physical infrastructure operations, there is increased risk for wide-scale or high-consequence events that could cause harm or disrupt services on which the U.S. economy and the daily lives of millions of people depend. The 2021 Executive Order 14028, "Improving the Nation's Cybersecurity," provided direction to the NRC concerning the protection of its IT infrastructure and is expected to result in additional executive branch requirements and guidance that will affect the NRC.

The Cybersecurity and Infrastructure Security Agency created the National Initiative for Cybersecurity Education<sup>66</sup> cybersecurity workforce framework as an initiative for increasing the size and capability of the U.S. cybersecurity workforce. Meanwhile, the limited number of experienced cyber specialists and the increased complexity of the cybersecurity threat will continue to pose a challenge to Federal agencies, including the NRC, as organizations (both commercial and government) compete for the limited number of experienced cyber specialists.

NRC staff are in the process of developing regulations regarding cybersecurity programs for future licensees, including SMR/ONTs and advanced reactors, as requested by the Commission. NRC staff are working to incorporate consequence-based cybersecurity program requirements into the 10 CFR Part 53 rulemaking. In addition, microreactor designs raise technical and regulatory issues that need to be addressed in the future considering that (1) these reactors may be operated remotely and/or semi-autonomously, and (2) accident source terms are under development. Accordingly, the NRC expects an increase in its licensing, policy development, and oversight activities associated with the forecasted workload due to anticipated new applications for combined licenses, design certifications, and standard design approvals for SMR/ONTs, including non-LWRs and microreactors, in the next 5 years and

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<sup>66</sup> <https://www.cisa.gov/nice-cybersecurity-workforce-framework>

beyond. This would also include a corresponding increase in oversight workload for guidance development and inspections.

### Research

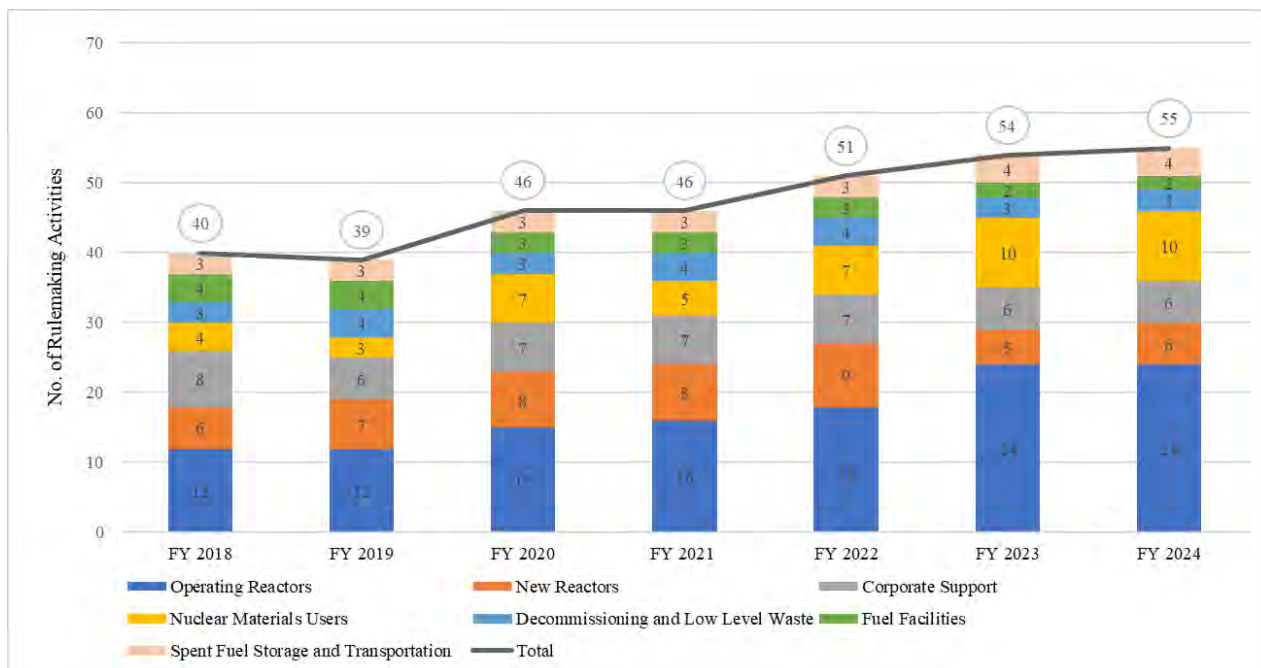
In the coming years, the NRC anticipates that innovation and new practices will call for research and portfolio management across a variety of areas, including new fuels, new construction materials, new reactor designs, uses of AI and robotic process automation, and adoption of digital instrumentation and controls.

The NRC will continue to perform research to provide technical advice, tools, and information for meeting the agency's mission, including resolving safety and security issues, making regulatory decisions, and promulgating regulations and guidance. Research will continue to support agency priorities, including the University Nuclear Leadership Program and preparation for industry-driven innovation. Activities will be performed through FY 2028 to prepare for and support licensing and oversight of the operating fleet, licensing renewal, decommissioning, advanced fuels, digital instrumentation and controls, SMRs, and advanced reactors. Consistent with the Nuclear Energy Innovation Capabilities Act of 2017, research activities will align with other areas of industry-driven innovation, such as those involving additive manufacturing, advanced construction techniques, flexible plant operation, digital twinning, and other applications of AI.

### Rulemaking

The NRC's rulemaking program supports the agency's mission by developing regulations. The NRC initiates a new rule or a change to an existing rule when necessary to protect public health and safety. Additionally, any member of the public may petition the NRC to develop, change, or rescind a rule. The Commission directs the staff to begin work and obtain public input on a new rulemaking activity through the approval of a staff rulemaking plan. The process is informally divided into two phases—pre-rulemaking and rulemaking—with a goal of maximizing public participation. The pre-rulemaking phase enlists public views by issuing an advance notice of proposed rulemaking, preliminary rule text, or a regulatory basis for comment. Pre-rulemaking outreach is considered in the development of proposed and final rules and can influence the agency's decision on whether to continue with a rulemaking. The agency is also undertaking a rulemaking innovation effort to better align the NRC's full rulemaking product development cycle with the agency's vision of being a modern, risk-informed regulator.

The NRC anticipates a slight increase in the rulemaking activities expected for FY 2024. Figure A-12 shows the number of ongoing rulemaking activities for FY 2018 through FY 2024 according to the rulemaking tracking and reporting system. The actual number of rulemaking activities conducted by the staff each fiscal year can be influenced by several factors (e.g., number and complexity of public comments, schedule adjustments, timing of Commission direction).



**Figure A-12 Ongoing Rulemaking Activities**

Compliance with the National Environmental Policy Act and Other Environmental Statutes

The NRC’s Environmental Center of Expertise (ECOE) supports the agency’s mission to protect public health, safety, and the environment by conducting environmental reviews for licensing actions and rulemakings and ensuring compliance with the National Environmental Policy Act (NEPA) and other environmental laws and statutes. The ECOE’s workload is driven by reactor licensing, materials licensing, and rulemaking actions described in the applicable sections above. Supporting a growing need for expertise in environmental reviews cannot be accomplished without additional staff resources, which is made difficult by a highly competitive labor market. The ECOE has been challenged to recruit and maintain sufficient staff resources to meet the NRC’s NEPA-related mission needs. Attrition of experienced staff, coupled with the noted demand by industry—along with other government agencies—for critical NEPA practitioners (due to the Infrastructure Investment and Jobs Act and legislation mandating improvement in Federal licensing actions) has exacerbated the ECOE staffing challenge. In addition, the ECOE is competing for skilled practices with private sector companies (and other agencies) able to offer more favorable flexibilities, compensation, and benefits. This summarily results in the need to focus and align the appropriate resource levels and expertise with the forecasted licensing and rulemaking workload.

Policy Support

The NRC is presented regularly with diverse policy matters that require analysis and potential implementation. These matters, which arise continually, affect all agency program areas and are expected to continue to arise in high volumes into and beyond FY 2028. Examples of such matters include issuances from the administration (Executive orders and memoranda from the Office of Management and Budget (OMB)), congressional interactions (legislation, correspondence, hearings), and information law issues (e.g., Freedom of Information Act, Privacy Act, Congressional Review Act, record retention). The NRC expects heightened

congressional interest to continue in matters related to the agency, with concomitant high workload to provide policy-neutral drafting assistance, respond to questions and requests for briefings, and prepare for hearings by the NRC's oversight and appropriations committees. Information law matters steadily increased over FY 2020 and FY 2021.

### Information Technology and Information Management

The NRC strives to maintain a flexible, agile, and innovative IT and information management (IM) environment that can support the implementation and use of new IT solutions and services to address the agency's priority business requirements. Technological advances continue to change the way the NRC staff works, communicates, and interacts. As the agency continues to operate in a hybrid environment, there is an increased need for resources to further automate business processes and provide new and modernized IT capabilities. This provides opportunities and challenges to enhance and continue to support the agency's regulatory mission. The NRC continues its efforts to strategically plan, modernize, and integrate IT systems, applications, and electronic management of records throughout the agency and to increase its internal capacity to gather, define, evaluate, analyze, link, and present data to support decision-making. Consistent with its IT Roadmap and IT/IM Strategic Plan efforts, the NRC has identified strategic approaches to enhance and implement capabilities to meet evolving IT/IM requirements.

To support current agency space and remote work trends, the NRC continues to modify and enhance its enterprise IT infrastructure to be higher performing, accessible, and resilient. This is accomplished by updating network architecture; building a more flexible hosting environment; and continuing to migrate applications to shared services, offsite hosting environments, and the cloud as appropriate. The agency will need to continue to evolve its planning efforts and increase its expertise in cloud optimization. These efforts should be based on meeting technical functionality requirements and cost management strategies.

In accordance with the agency's priority to enhance its use of data as a strategic asset in decision-making and to promote openness with its stakeholders, the NRC seeks to expand the availability of modern data analytics and visualization capabilities for staff use. To support these efforts, the NRC will need to increase its subject matter expertise in the areas of data science, data analysis, data visualization, data architecture, enterprise architecture, data engineering, and advanced analytics techniques (e.g., AI). Additionally, the agency will need to acquire specialized developers, scrum masters, business analysts, and project managers. Filling these roles will address critical gaps in the agency's capacity to address the increasing demand for data management, automation, and agile development capabilities.

The cybersecurity threat landscape continues to grow and evolve. In response to increased risk, there has been an influx of Federal cybersecurity mandates and audits applicable to the NRC. As a result, the NRC must apply heightened scrutiny to the security of its IT assets and infrastructure. Additional staff resources will be needed to support this. The capabilities of malicious actors, including advanced persistent threats and nation-state actors, are growing in complexity on both the tactical and strategic levels, which present heightened strain on the NRC's technology assets and resources. Additionally, Federal mandates, such as the recent Executive Order 14028 on cybersecurity, along with related agency requirements stemming from OMB and the Cybersecurity and Infrastructure Security Agency, have demanded that the NRC apply additional resources to continually address the security threats with the appropriate measures. To do so effectively, and to combat threats and secure its IT enterprise, the NRC needs appropriate resources to be coupled with aligned cybersecurity skills (e.g., information

assurance, vulnerability management, security engineering, supply chain risk). Obtaining resources with the appropriate skillsets is made more challenging by the growing cyber workforce gap, estimated at over 700,000 nationwide and over 3 million worldwide.

The NRC will continue to focus on modernizing IT through FY 2028 to help the agency gain efficiency, improve proficiency, improve its security posture, standardize its system implementation approach, provide effective and secure licensing and oversight software services across the NRC and Agreement States, reduce costs, and improve the performance of enterprise systems. Consistent with OMB's Cloud Smart policy, the NRC will promote its use of shared services and cloud options, where appropriate, when planning new mission or support applications or consolidating existing applications.

### Artificial Intelligence

Artificial intelligence (AI) is one of the fastest growing technologies globally; AI technologies have the potential to enhance decision-making processes for the nuclear industry by providing new and vital insights into vast amounts of data generated during the design and operation of nuclear facilities every day. As a result, interest in deploying these technologies to improve operational performance and to mitigate operational risk has been growing in the nuclear industry.

The deployment of AI technologies by the nuclear industry is on the horizon. The NRC anticipates that applications using AI technologies may be submitted for regulatory review within the next few years. In May 2023, the NRC issued NUREG-2261, "Artificial Intelligence Strategic Plan: Fiscal Years 2023–2027," to ensure the staff's readiness to review and evaluate the use of AI in NRC-regulated activities. In FY 2028, the NRC anticipates revising the AI Strategic Plan to cover FY 2028 through FY 2032 by updating the strategic goals and key activities related to the use of AI in NRC-regulated activities. The NRC needs to ensure that it has the technical skills to develop an appropriate framework for AI technologies and adequate resources to perform any associated licensing and oversight activities as more licensees and vendors move to adopt these technologies.

AI can be a powerful and beneficial asset to the NRC if used to improve and enhance agency processes; using AI, the NRC could better allocate its resources to higher value activities and emerging mission priorities. However, AI tools depend highly on the quantity and quality of the data that support them. As part of the NRC's Evidence Building Plan, as required by the Evidence Act, the agency plans to identify the NRC decision-making processes that could benefit from AI and prioritize the data collections that would have the most significant impact on agency decision-making, AI tool use, and stakeholder use in the next 5 years and beyond. By improving how the NRC collects data and information, AI tools could be used more readily and potentially make decision-making easier, faster, and more efficient.

### Organizational Health

In the coming years, the NRC is expected to face challenges in maintaining and expanding its knowledge, competencies, and skillsets as experienced employees retire or leave the agency. The NRC is expected to continue to rely on the hiring of outside specialized resources on an as-needed basis. The agency also expects a continued shift toward an agile "tiger team" approach in hiring, one that is flexible and focused on outcomes that would benefit the organization. The NRC anticipates that, in the coming years, budgets are likely to remain tight,

and uncertainty about future technologies continues, which requires more “what if” examination and attention paid to the strategic implications of decisions.

### *Workforce*

The NRC’s most valuable resource is its workforce. The agency’s ability to recruit, hire, train, motivate, and retain qualified staff in a competitive job market is critical to meeting its strategic goals. A healthy organizational culture that focuses on equal employment opportunity and values diversity and inclusion is necessary to maintain a high-performing, diverse, engaged, and flexible workforce that supports the agency’s mission. By implementing actions to promote the agency’s ideal culture and employing sustainable approaches to recruitment, development, and knowledge management, the NRC’s staff remains the agency’s greatest asset and the cornerstone of its global reputation as a first-rate safety and security regulator. Since 2001, GAO has considered strategic human capital management to be a high-risk issue for the Federal Government. GAO observed the following:

We, along with OPM [Office of Personnel Management] and individual agencies, have identified skills gaps in such government-wide occupations in the fields of science, technology, engineering, mathematics, cybersecurity, and acquisitions. Causes for these skills gaps vary; however, they often occur due to a shortfall in one or more talent management activities such as robust workforce planning or training.<sup>67</sup>

The NRC’s SWP and competency modeling process is critical to identify skill gaps and to develop necessary strategies to address workforce needs.

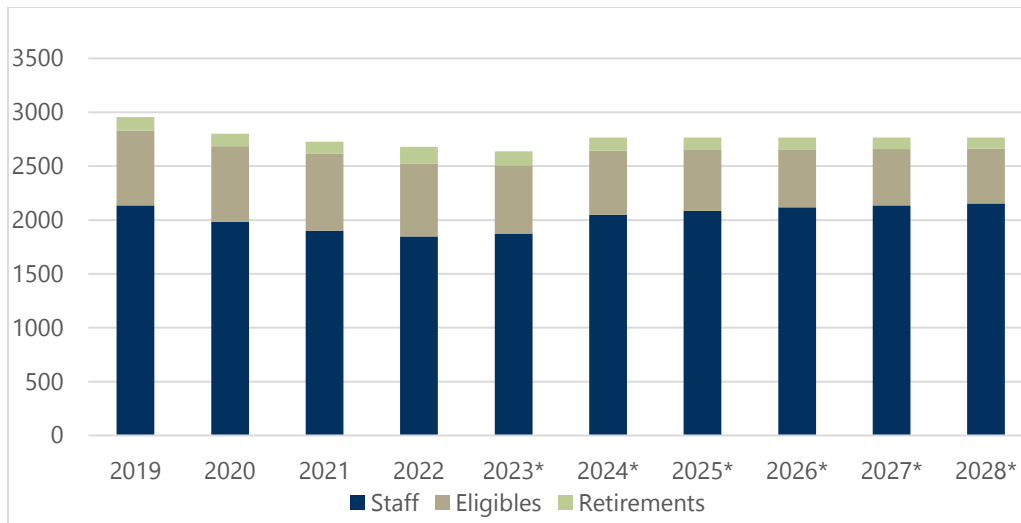
The University Nuclear Leadership Program began in FY 2020 (it was formerly known as the Integrated University Program, which started in 2009). The program traditionally supported educational grants for students and faculty through scholarships, fellowships, and faculty development grants. In 2020, the program was broadened to support research projects relevant to the programmatic mission of the agency. The University Nuclear Leadership Program, congressionally authorized at \$16 million, seeks to develop an entry-level pipeline to support knowledge management and succession planning, address current and future critical skill needs, and support developmental programs, such as the Nuclear Regulator Apprenticeship Network program.

The NRC’s workforce has a high percentage of people eligible to retire in the next 5 years (figure A-13), and the NRC’s SWP process is intended to address potential gaps in the workforce. Additionally, as the workforce experiences more attrition through retirements and other changes, including bringing on new staff, it requires greater emphasis on knowledge management, training, business intelligence, and data analytics tools, including procedures and records management.

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<https://www.fedweek.com/issue-briefs/skills-gaps-in-federal-workforce-still-a-concern-to-gao/>



\*Estimated

**Figure A-13 Retirement Actuals and Projections (2019–2028)**

The quadrennial “Federal Workforce Priorities Report”<sup>68</sup> communicates key governmentwide human capital priorities intended to inform agency strategic planning and human capital planning. The 2022 report identifies eight governmentwide priorities designed to support the Administration’s initiatives: recruitment, succession planning and knowledge management; enhancing employee experience, fostering employee well-being, and building a diverse and inclusive workforce; fostering an agile organization and the growth mindset; enhancing customer experience; preparedness and resilience; leveraging data as a strategic asset; leveraging technology and modernizing IT processes; and developing an agency foresight capability. The emphasis on looking ahead is critical considering experiences during and following the pandemic. Agencies must implement proactive approaches, rather than reacting to workforce and technological changes when they occur. The use of data to inform decision-making will also be an important component of the anticipatory workforce management practices necessary to ensure that the NRC has the workforce needed to perform its important work.

The Program Management Improvement Accountability Act (PMIAA) requires governmentwide standards and policies for program management and establishes a new interagency council to improve practices among agencies. The PMIAA also establishes standard competency models for program and project managers across the Government. The PMIAA raises the bar and sets a standard to improve the effectiveness and efficiency of government programs and projects. The PMIAA is expected to influence workforce training in the areas of technology and data literacy.

*Financial Environment*

The NRC identified and implemented improvements to invoicing, the fee recovery framework, and performance reporting to reflect changes required by NEIMA; the NRC also complied with the specified corporate support percentage to the maximum extent practicable. NEIMA limits corporate support costs to a percentage of the NRC’s total budget authority in the annual budget justification beginning in FY 2021 (30 percent) and decreasing incrementally to FY 2025

<sup>68</sup> <https://www.opm.gov/policy-data-oversight/human-capital-management/federal-workforce-priorities-report/>

(28 percent). The NRC has encountered significant challenges related to the corporate support caps that have inhibited the agency's ability to comply with other Federal mandates and to invest in physical and IT infrastructure. Significant reductions will limit the agency's ability to invest in innovation and may begin to impact basic service levels in some corporate support areas. Budget constraints will impact variable budget cost (e.g., Operations and Maintenance) and agency core high-level planning guidance. As a result, the agency will need to identify opportunities such as shared services, cloud computing, AI, and seat management to reduce costs or to minimize the number of systems used for corporate support. The NRC will need to accomplish this while continuing to effectively support the mission and meet ongoing and emerging Federal compliance, reporting, and auditing requirements.

The NRC and Agreement States are evaluating the effects that an increased number of Agreement States would have on the fees charged to NRC licensees, and whether changes to fee-relief or excluded activities are warranted. A Commission paper with recommendations is expected in early 2023 with potential fee-related evaluations to take place thereafter.

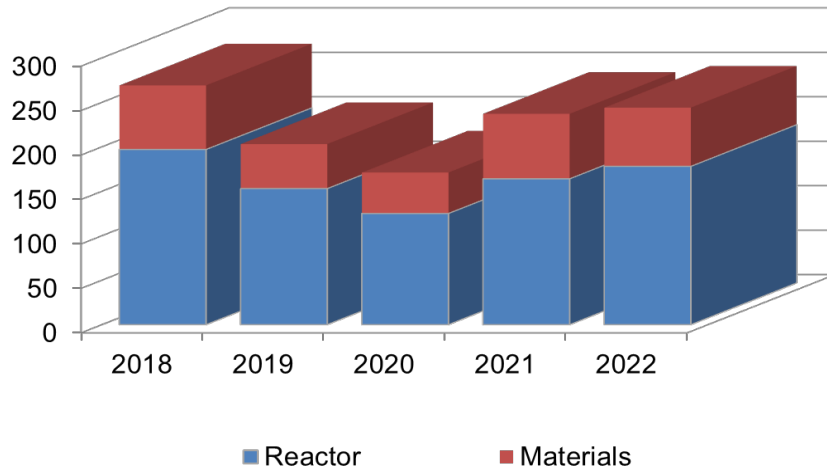
### *Acquisitions*

The NRC will continue to focus on the use of enterprise-wide contracts/agreements (EWCs/EWAs), best-in-class contracts (BICs), and acquisition contracts (GWACs), as well as shared services that are offered throughout the Federal Government. These contracts and services will serve as tools to further streamline the agency's acquisition process and the agency's alignment with the Federal Cross-Agency Priority goal that tracks the agency's implementation of category management. The use of EWCs/EWAs, BICs, GWACs and shared services will continue to help the agency achieve savings and best manage full-time equivalents and related workload for contracting officer representatives, supervisors, and contracting officers. The NRC will also continue, as best practices, to expand its use of innovative procurement techniques to obtain the goods and services needed to support the agency's mission in the most efficient and cost-effective way, to use its existing acquisition portal (the NRC's Enterprise Acquisition Toolset) to communicate innovation-related tools and policies, and to recognize those who use innovative acquisition techniques.

### Allegations, Enforcement, and Investigations

The future of allegations, enforcement, and investigations is uncertain given the unique nature of each action. The number of allegations processed by the NRC declined between CY 2018 and CY 2020; however, in 2021, the number of allegations increased by approximately 40 percent and by another 3 percent in 2022. This increase was driven by allegations associated with both reactor and material licensees and their vendors (figure A-14).



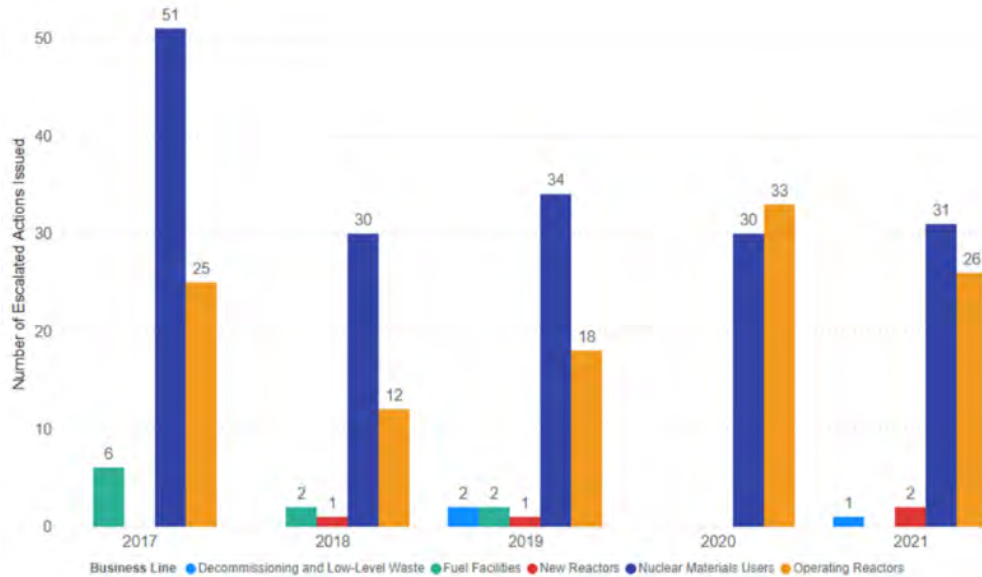


**Figure A-14 Number of Allegations Processed by the NRC (2018–2022)**

The number of escalated enforcement actions (Figure A-15) taken against operating reactors is expected to decline as plants shut down. However, enforcement actions at power reactor sites in various phases of decommissioning, as well as at sites where new construction may take place in the coming years, would likely offset the decline. In CY 2021, the number of enforcement actions for operating reactors, although slightly lower than in CY 2020, was much higher than in CY 2018 and CY 2019. In CY 2021, 45 percent of the escalated enforcement actions issued were the result of Office of Investigations cases.

The number of personnel and resources dedicated to the Counterfeit, Fraudulent, Suspicious Item Program is expected to increase as the nuclear industry increases its use of the commercial-grade dedication process. In this process, a commercial-grade item is designated for use as a basic component. This acceptance process is undertaken to provide reasonable assurance that a commercial-grade item to be used as a basic component will perform its intended safety function and, in this respect, is deemed equivalent to an item designed and manufactured under a 10 CFR Part 50, Appendix B quality assurance program. This assurance is achieved by identifying the critical characteristics of the item and verifying its acceptability by inspections, tests, or analyses by the purchaser or third-party dedicating entity.

Investigative activity related to hostile foreign actors and suspicious export licensing requests is expected to increase. The NRC staff will continue to explore avenues to increase efficiency in detecting suspicious activities, such as establishing an automated licensing check to provide deconfliction and entity checks from over 30 government agencies.



**Figure A-15 Escalated Enforcement by Business Line (CY 2017–CY 2021)**

### International

A degree of uncertainty exists with regards to international development. This uncertainty stems from many factors, including the cost associated with building and operating nuclear power plants, waste disposal, technological advances, shift to other sources of energy, and political pressures. The future of nuclear energy in the context of the Paris Agreement and the goal of achieving zero emissions is also uncertain. According to the International Atomic Energy Agency (IAEA), about two-thirds of nuclear power reactors have been in operation for over 30 years, highlighting the need for significant new nuclear capacity to offset reactor retirements by 2030 and beyond. However, aging management programs and long-term operation are being implemented for an increasing number of reactors. The IAEA raised its annual projections of the potential growth of nuclear power during the coming decades, as many countries are considering the introduction of nuclear power to boost reliable and clean energy production. This potential growth will require an accelerated implementation of innovative nuclear technologies.

The NRC should continue its focus on IAEA and Nuclear Energy Agency safety, safeguards and security, international standard-setting, and guidance development. The NRC must anticipate the need to (1) accomplish U.S. foreign policy and national security objectives (i.e., strengthening domestic and global nuclear safety and security) within budgetary constraints, (2) be flexible and adaptive to changing U.S. policies and priorities that could impact the agency, and (3) respond to emergent situations that could impact nuclear safety, security, and safeguards (e.g., changes in the global and domestic demand for nuclear material and equipment due to the ongoing Ukraine invasion).

The NRC should continue to participate in bilateral and multilateral cooperation and regulatory engagement in priority areas, such as advanced reactor technologies. International assistance for countries developing nuclear regulatory programs and infrastructure for nuclear power plants, research reactors, and radioactive sources must continue to complement

U.S. Government national security goals. The NRC will maintain emphasis on mandatory activities, which include U.S. treaty and convention obligations and export licensing.

The NRC should be aware that the issues of highest priority domestically are also likely to be the areas where staff expertise is sought most frequently internationally. The NRC should ensure that multiple staff experts, at various grade levels, are given opportunities to learn to represent the agency internationally. This is critical to ensuring that the NRC can appropriately demonstrate leadership and influence internationally, consistent with the agency's International Strategy, without compromising domestic priorities. The SWP process should identify staff members with the technical, policy, and representational skillsets necessary for international and interagency policy work. As office travel budgets are finite and not likely to increase, efforts should be made to leverage virtual or hybrid opportunities to allow multiple staff to participate in the same activities for training purposes when feasible.

In addition, access to testing facilities with necessary nuclear capabilities will continue to be a challenge to support research activities. The NRC will need to work with both domestic and international partners to enhance collaboration at new and existing facilities while considering U.S. Government foreign policy that may limit certain engagements.



Two women in safety gear (hard hats and high-visibility vests) are working on a construction site. One woman is kneeling and operating a Troxler 3430 density gauge, which is mounted on a yellow base. She is holding a handheld device and a notebook. The other woman is standing and observing.

3430  
TROXLER

CAUTION  
RADIOACTIVE MATERIAL  
CS-137  
170-1524  
ASSEMBLY  
TROXLER

## APPENDIX B CAPACITY ASSESSMENT SURVEY

### ***Introduction***

As discussed in Section 3 of this report, the survey tool used to inform the Fiscal Year (FY) 2023 Capacity Assessment, along with other available data from the U.S. Nuclear Regulatory Commission (NRC, included both qualitative and quantitative questions. Questions were separated into two main sections that addressed (1) each participant's function area and (2) function areas whose work products each participant consistently relied on (i.e., function areas of which the participant identified as a customer).

Questions that called for respondents to provide information on the frequency of activities using a Likert Scale included the following seven-point scale of response options:

1. Never
  2. Rarely (<10% of the time)
  3. Occasionally (~30% of the time)
  4. Sometimes (~50% of the time)
  5. Frequently (~70% of the time)
  6. Usually (~90% of the time)
  7. Every Time
- Not applicable or I don't know

### ***Screening Questions***

The following question was used to initially screen respondents to determine the function with which they were affiliated:

- Which NRC function have you most directly supported over the past year? If you feel that none of these apply to your current position, please choose the function you have the most experience with.
  - *Response options:*
    1. *Licensing*
    2. *Oversight*
    3. *Research*
    4. *Rulemaking*
    5. *Emergency Preparedness*
    6. *Event/Incident Response*
    7. *State, Tribal, and Federal Programs*
    8. *Acquisitions*
    9. *Administrative Services*
    10. *Financial Management*
    11. *Human Resource Operations*
    12. *Human Resource Training and Development*
    13. *Information Management*
    14. *Information Technology*
    15. *International Activities*
    16. *Small Business and Civil Rights*

After respondents identified their function area, the following question was used to determine whether they frequently conducted evidence-building activities:

- Over the past year, how often did your work in the [X] function area include directly performing analysis, research, statistics, and/or evaluation? (*Likert response*)

(Response to this question determined whether the respondent would be asked the General set of questions or the Evidence-Building set of questions, as listed below.)

Finally, after respondents completed either the General or Evidence-Building questions for their focus area, the following questions were used to determine whether they would rate another function area of which the respondent identified themselves as a customer:

- Over the past year, have you consistently relied on work products from a different NRC function than the function you work in? (*Yes/No response*)
- (*If respondent answered “Yes” to the preceding question*) Which function areas?
  - (*same response options as listed above for identifying respondent function area*)

### **Evidence-Building Staff Questions**

Survey participants who indicated that they participated in evidence-building activities on an occasional or regular basis (i.e., those who responded to the applicable screening question with a Likert score of 3 or higher, as listed above) were asked the following questions about the degree to which their function area exhibited the attributes of (1) Coverage, (2) Quality, (3) Methods, (4) Effectiveness, and (5) Independence:

- Coverage
  - When conducting analysis, research, statistics, and/or evaluation activities over the last year, to what extent do you feel the [X] function area...
    - Has had adequate staff with the needed knowledge, skills, and abilities to handle the workload? (*Likert response*)
    - Has taken advantage of available internal training and development opportunities? (*Likert response*)
    - Has taken advantage of available external training and development opportunities? (*Likert response*)
    - Has used knowledge management tools and processes to share and enhance knowledge, skills, and abilities? (*Likert response*)
    - Has assigned workload evenly across staff given their position and grade level? (*Likert response*)
  - What do you see as the biggest challenge or opportunity related to having the right number of staff with the needed knowledge and skills to perform assigned duties in the [X] function area? (*Write-in response*)

- Quality
  - When conducting analysis, research, statistics, and/or evaluation activities over the last year, to what extent do you feel the [X] function area has...
    - Allocated staff time and effort appropriately based on mission significance? (*Likert response*)
    - Used appropriately high-quality data and information? (*Likert response*)
    - Produced robust and reliable results (e.g., findings, recommendations, decisions)? (*Likert response*)
  - Where do you see opportunities for the [X] function area to improve the quality of its work? (*Write-in response*)
  
- Methods
  - When conducting analysis, research, statistics, and/or evaluation activities over the last year, to what extent do you feel the [X] function area has...
    - Had access to software and computational tools needed? (*Likert response*)
    - Had knowledge and skills to use software and computational tools needed? (*Likert response*)
    - Captured best practices and lessons learned? (*Likert response*)
  - Where do you see opportunities for improved methods (procedures, guides, standards, software, and computational tools) to help the [X] function area perform its work?
  
- Effectiveness
  - When conducting analysis, research, statistics, and/or evaluation in the [X] function area over the last year, to what extent do you feel the activities have...
    - Had transparent and clearly defined objectives? (*Likert response*)
    - Met agreed-upon objectives? (*Likert response*)
    - Communicated approach and results clearly? (*Likert response*)
    - Expended resources efficiently? (*Likert response*)
    - Considered input from internal stakeholders when appropriate? (*Likert response*)
    - Considered input from external stakeholders when appropriate? (*Likert response*)
    - Been completed in a timely manner, given the circumstances? (*Likert response*)
  - What opportunities do you see for the [X] function area's work to be more effective? (*Write-in response*)

- Independence
  - When conducting analysis, research, statistics, and/or evaluation activities over the last year, to what extent do you feel the [X] function area as a whole has...
    - Been supported in performing the work free from undue external influences (e.g., industry, licensees, political)? *(Likert response)*
    - Been supported in performing the work free from undue internal agency influences? *(Likert response)*
    - Taken reasonable measures to reduce bias and undue influence? *(Likert response)*
    - To what extent do you feel contractors that support the [X] function area's analysis, research, statistics, and evaluation activities are free from others' undue influence? *(Likert response)*
    - Where do you see opportunities for the [X] function area's work to be more independent? *(Likert response)*
  - Where do you see opportunities for the [X] function area's work to be more independent? *(Likert response)*

### **General Staff Questions**

Survey participants who indicated that they participated in evidence-building activities either rarely or never (i.e., those who responded to the applicable screening question with a Likert score of 2 or lower, as listed above) were asked the following questions regarding the degree to which their function area exhibited the attributes of (1) Coverage, (2) Quality, (3) Methods, (4) Effectiveness, and (5) Independence:

- Coverage
  - Over the last year, to what extent do you feel the [X] function area...
    - Has had adequate staff with the needed knowledge, skills, and abilities to handle the workload? *(Likert response)*
    - Has taken advantage of available internal training and development opportunities? *(Likert response)*
    - Has taken advantage of available external training and development opportunities? *(Likert response)*
    - Has used knowledge management tools and processes to share and enhance knowledge, skills, and abilities? *(Likert response)*
    - Has assigned workload evenly across staff given their position and grade level? *(Likert response)*
  - What do you see as the biggest challenge or opportunity related to having the right number of staff with the needed knowledge and skills to perform assigned duties in the [X] function area? *(Write-in response)*



- Quality
  - Over the last year, to what extent do you feel the [X] function area has...
    - Allocated staff time and effort appropriately based on mission significance? *(Likert response)*
    - Used appropriately high-quality data and information? *(Likert response)*
    - Produced robust and reliable results (e.g., findings, recommendations, decisions)? *(Likert response)*
  - What opportunities do you see for the [X] function area's work to be more effective? *(Write-in response)*
- Methods
  - Over the last year, to what extent do you feel the [X] function area has...
    - Been able to rely on established procedures, guides, and/or standards? *(Likert response)*
    - Been able to determine when to apply simple vs. complex methods? *(Likert response)*
    - Had access to software and computational tools needed? *(Likert response)*
    - Had knowledge and skills to use software and computational tools needed? *(Likert response)*
    - Captured best practices and lessons learned? *(Likert response)*
  - Where do you see opportunities for improved methods (procedures, guides, standards, software, and computational tools) to help the [X] function area perform its work? *(Write-in response)*
- Effectiveness
  - In the [X] function area over the last year, to what extent have work activities...
    - Produced clear and concise results that facilitate decision-making? *(Write-in response)*
    - Had transparent and clearly defined objectives? *(Likert response)*
    - Met agreed-upon objectives? *(Likert response)*
    - Communicated approach and results clearly? *(Likert response)*
    - Expended resources efficiently? *(Likert response)*
    - Considered input from internal stakeholders when appropriate? *(Likert response)*
    - Considered input from external stakeholders when appropriate? *(Likert response)*
    - Been completed in a timely manner, given the circumstances? *(Likert response)*
  - What opportunities do you see for the [X] function area's work to be more effective? *(Write-in response)*

- Independence
  - Over the last year, to what extent do you feel the [X] function area has...
    - Been supported in performing the work free from undue external influences (e.g., industry, licensees, political)? *(Likert response)*
    - Been supported in performing the work free from undue internal agency influences? *(Likert response)*
    - Taken reasonable measures to reduce bias and undue influence? *(Likert response)*
  - Where do you see opportunities for the [X] function area's work to be more independent? *(Write-in response)*

### Customer Questions

Survey participants who identified as customers of another function area (i.e., other than their own area) were asked the following questions regarding the degree to which that function area exhibited the attributes of (1) Coverage, (2) Quality, (3) Methods, (4) Effectiveness, and (5) Independence:

- Coverage
  - When the [X] function area has generated work products to support your work, to what extent do you feel the [X] function area has...
    - Has had adequate staff with the needed knowledge, skills, and abilities to handle the workload? *(Likert response)*
    - Has taken advantage of available internal training and development opportunities? *(Likert response)*
    - Has assigned workload evenly across staff given their position and grade level? *(Likert response)*
  - What do you see as the biggest challenge or opportunity related to having the right number of staff with the needed knowledge and skills to perform assigned duties in the [X] function area? *(Write-in response)*
- Quality
  - When the [X] function area has generated work products to support your work, to what extent do you feel the [X] function area has...
    - Allocated staff time and effort appropriately based on mission significance? *(Likert response)*
    - Used appropriately high-quality data and information? *(Likert response)*
    - Produced robust and reliable results (e.g., findings, recommendations, decisions)? *(Likert response)*
  - Where do you see opportunities for the [X] function area to improve the quality of its work? *(Write-in response)*

- Methods
  - When the [X] function area has generated work products to support your work, to what extent do you feel the [X] function area has...
    - Been able to determine when to apply simple vs. complex methods? *(Likert response)*
    - Had access to software and computational tools needed? *(Likert response)*
    - Had knowledge and skills to use software and computational tools needed? *(Likert response)*
  - Where do you see opportunities for improved methods (procedures, guides, standards, software, and computational tools) to help the [X] function perform its work? *(Write-in response)*
- Effectiveness
  - When the [X] function area has generated work products to support your work, to what extent do you feel the work products have...
    - Produced clear and concise results that facilitate decision-making? *(Likert response)*
    - Had transparent and clearly defined objectives? *(Likert response)*
    - Met agreed-upon objectives? *(Likert response)*
    - Communicated approach and results clearly? *(Likert response)*
    - Expended resources efficiently? *(Likert response)*
    - Considered input from internal stakeholders when appropriate? *(Likert response)*
    - Considered input from external stakeholders when appropriate? *(Likert response)*
    - Been completed in a timely manner, given the circumstances? *(Likert response)*
  - What opportunities do you see for the [X] area's work to be more effective? *(Write-in response)*
- Independence
  - When the [X] function area has generated work products to support your work, to what extent do you feel the [X] function area has...
    - Been supported in performing the work free from undue external influences (e.g., industry, licensees, political)? *(Likert response)*
    - Been supported in performing the work free from undue internal agency influences? *(Likert response)*
    - Taken reasonable measures to reduce bias and undue influence? *(Likert response)*
    - To what extent do you feel contractors that support the [X] function area's analysis, research, statistics, and evaluation activities are free from others' undue influence? *(Likert response)*

- Where do you see opportunities for the [X] function area's work to be more independent? (*Write-in response*)

### **Closing Question**

The following question was asked at the end of the survey:

- Of all the topics considered throughout this survey, what do you feel represents the biggest opportunity to build the NRC's capacity to achieve its mission? (*Write-in*)

## APPENDIX C CAPACITY ASSESSMENT FINDINGS SUMMARY

Section	Finding	Status
Licensing Findings	Fiscal Year (FY) 2022 Finding 1  Licensing actions vary in their complexity (e.g., some licensing actions will take more review hours than others because of the specifics of the action requested). For this reason, it is difficult to ascertain whether the U.S. Nuclear Regulatory Commission (NRC) licensing actions of a similar scope are becoming more or less efficient while maintaining the agency's internal expectations of high-quality technical analyses performed by the NRC staff.	Ongoing
	FY 2022 Finding 2  The Strategic Workforce Planning (SWP) results indicate that the largest expected staffing gaps are in the following licensing positions: project managers, risk analysts, and engineers (i.e., reactor, nuclear, mechanical, and materials). This information was verified by confirming that these positions have been identified as future staffing gaps by the licensing business lines and that strategies have been developed to fill those positions.	Closed (moved to crosscutting findings for FY 2023)
Oversight Findings	FY 2022 Finding 1  The NRC has observed that the number of reactor inspection findings has been consistently and significantly decreasing year after year since 2015. This trend is observed for reactors across all four NRC regions. In 2015, there were 811 total findings (about 8 per reactor), while in 2020 and 2021, there were only 251 and 177 total findings, respectively (about 2-3 per reactor). The NRC has been making efforts to identify the relationship between the declining trend and its causes.	Ongoing
	FY 2022 Finding 2  The NRC anticipates challenges associated with the Resident Inspector Program regarding recruitment and retention and would benefit from a data-driven approach for monitoring and assessing the program's health. NRC senior leadership have reported challenges in attracting and retaining high-quality senior resident inspectors and resident inspectors to staff the Resident Inspector Program. The program needs to offer sufficient incentives to ensure that resident inspector vacancies can be promptly filled.	Ongoing

	<p>FY 2022 Finding 3</p> <p>The SWP results indicate that the largest expected staffing gaps are in the following Oversight evidence-building positions: project engineer (RIDP), resident inspector, health physicist (materials inspector/license reviewer), and reactor inspector. In addition, filling the senior reactor analyst position has presented challenges because there is no clear pipeline for developing and preparing staff for this position.</p>	<p>Closed (moved to crosscutting findings for FY 2023)</p>
Research Findings	<p>FY 2022 Finding 1</p> <p>The NRC's Future-Focused Research Program is critical to ensure that the NRC is prepared for emerging research topics. Therefore, this program would benefit from an evaluation to ensure that the program is meeting its intended outcomes and NRC is prepared for technological advancements.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 2</p> <p>The NRC routinely uses scientific computer codes and analytical tools to perform confirmatory, sensitivity, and uncertainty analyses to independently analyze the safety of advanced reactor designs. These codes and tools help examine safety margins inherent in the design, commensurate with the risk and safety significance of the phenomena applicable to specific reactor designs. The NRC staff anticipates challenges associated with collecting information, models, and data needed for computer code modeling of advanced non-light-water reactor safety and operations, particularly for the less mature designs.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 3</p> <p>The SWP results indicate that the largest expected staffing gaps are in the following positions: reliability and risk analyst, reactor systems engineer (neutronics), reactor systems engineer (severe accident/source term), and human factors analyst. This finding was validated through discussions with research managers.</p>	<p>Closed (moved to crosscutting findings for FY 2023)</p>
Rulemaking Findings	<p>FY 2022 Finding 1</p> <p>Survey results indicate that the quality attribute has the most potential for improvement. The lowest scores within the quality attribute were on the use of the appropriate level of effort for analysis activities and on the availability of data to perform independent analyses.</p>	<p>Ongoing</p>

	<p>FY 2022 Finding 2</p> <p>The NRC's technical staff can be challenged when applying their technical knowledge to the Rulemaking process. The NRC technical staff who routinely perform analyses to support agency functions such as Licensing and Oversight are infrequently needed to support analysis activities for rulemakings. While procedures for performing regulatory analyses are well established, staff who infrequently conduct analyses to support rulemakings could benefit from training before participating in the Rulemaking process. In addition, some technical analyses (e.g., radiation safety, geologic) used to support rulemakings are unique to the specific regulations being developed or amended. These analyses require staff to make decisions such as which analytical techniques are appropriate, what level of rigor should be applied, and the amount of data required to support a statistically significant result.</p>	Ongoing
	<p>FY 2022 Finding 3</p> <p>The NRC needs to determine if the process for regulatory analysis development can be enhanced with a retrospective review of past rulemakings. Interviews with NRC management indicate that it is unclear if the agency's process for regulatory analysis development can be enhanced to be made more effective (e.g., accuracy of the estimates). Determining the effectiveness of the NRC's regulatory analysis development process would increase stakeholder confidence in the agency's Rulemaking process.</p>	Ongoing
	<p>FY 2022 Finding 4</p> <p>The SWP results indicate that the largest expected staffing gaps are in the following Rulemaking positions: project managers, regulations specialists, and cost analysts. This information was verified by confirming that these positions have been identified as future staffing gaps and that strategies have been developed to fill these positions. Discussions with NRC management in the Rulemaking area further reinforced this finding.</p>	Closed (moved to crosscutting findings for FY 2023)
Financial Management Findings	<p>FY 2022 Finding 1</p> <p>The information collected indicated a need for more resources and development of skills in data analytics and analysis based on the continuing transition to new technology and systems.</p>	Closed (moved to crosscutting findings for FY 2023)
	<p>FY 2022 Finding 2</p> <p>The SWP results indicated that the budget analyst position experiences attrition because of retirement. The position also has a consistently high turnover rate due to staff transfers to other roles within the agency or to other agencies.</p>	Closed (moved to crosscutting findings for FY 2023)

Evaluation Findings	<p>FY 2022 Finding 1</p> <p>The NRC would benefit from institutionalizing program evaluation into agency activities similar to the implementation of enterprise risk management and performance management. Evaluation is a scientific discipline and, as such, credible evaluations must be managed by qualified evaluators with relevant education, skills, and experience for the methods undertaken. An individual or external firm qualified in designing and performing program evaluations should be hired to enhance the effectiveness and efficiency of the NRC's programs, policies, operations, and organizations. The program evaluator would serve as an agencywide resource for designing evaluations consistent with the standards in the NRC's "Evidence-Building and Evaluation Policy Statement" and applicable guidance from the Office of Management and Budget (OMB).</p>	Complete and closed
	<p>FY 2022 Finding 2</p> <p>The NRC staff needs to ensure that its future evaluations use appropriate methods and are of high quality.</p>	Ongoing
	<p>FY 2022 Finding 3</p> <p>The NRC does not have evaluators with training or experience in regularly performing evaluations subject to OMB standards. The NRC will need to build its evaluators' knowledge, skills, and abilities that are required to address this gap.</p>	Ongoing
New (FY 2023) Crosscutting Findings	<p>FY 2023 Finding 1</p> <p>Data indicate that staff are experiencing challenges that prevent them from consistently engaging in and taking advantage of trainings. Staff shared difficulties in prioritizing and finding time for training and development given high workloads. Staff also shared challenges in prioritizing and securing funding for emergent external training requests when requests are submitted after the close of the period during which funds are allocated for initial requests.</p>	New for FY 2023
	<p>FY 2023 Finding 2</p> <p>Within and across function areas, staff communicated challenges with handling high workloads. Some staff also communicated a perception that the distribution of tasks tends to be uneven, with the highest-performing and/or highest-skilled employees often carrying a disproportionately high workload. Task prioritization and distribution challenges can impact stress, burnout, and retention of experienced, skilled staff, as well as supervisors' ability to support their teams and ensure all tasks are accomplished.</p>	New for FY 2023



	<p>FY 2023 Finding 3</p> <p>Staff expressed a desire for improved and more open communications within and across offices, especially from senior leaders. Staff are strongly aligned with the NRC’s values of integrity, service, and openness, among others, and they highly value clarity, consistency, and transparency in communication from leaders, among offices/regions, and with industry. Staff communicated that they seek a better understanding of agency and leadership priorities and more authentic communications from senior management. Staff also seek consistent practices and policies that reflect the NRC’s principle of ensuring independence from undue industry influence. To this end, staff also expressed that they seek increased transparency regarding NRC drop-in meetings with industry.</p>	<p>New for FY 2023</p>
	<p>FY 2023 Finding 4</p> <p>The evolving shift to a hybrid work environment, in the wake of the COVID-19 pandemic, has been difficult for NRC leaders and staff to navigate. This shift has raised new challenges and complexities that are impacting staff morale, stress, and trust. Staff communicated that they are particularly impacted by changing norms and expectations regarding telework are particularly impactful for staff. The NRC has engaged in substantial efforts in the past year to better understand and pursue strategies to help address staff perspectives around the agency’s hybrid work environment, telework policy, and use of physical office space.</p>	<p>New for FY 2023</p>
	<p>FY 2023 Finding 5</p> <p>The information collected for the FY 2022 and FY 2023 Capacity Assessments indicated a need for more resources and development of skills in data analytics and analysis, based on the NRC’s continuing transition to new technologies and systems.</p>	<p>New for FY 2023</p>
<p>Previous (FY 2022) Crosscutting Findings</p>	<p>FY 2022 Finding 1</p> <p>SWP results indicate that there are key evidence-building positions with large, expected staffing gaps across each agency function analyzed in this capacity assessment including Licensing, Oversight, Research, Rulemaking, and Financial Management. In addition, there are key evidence-building positions that are potentially susceptible to high rates of attrition. Specific core positions within each function area are discussed further in Section 4.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 2</p> <p>Knowledge management tools are not utilized to their fullest extent to ensure successful capture and transfer of knowledge</p>	<p>Ongoing</p>

	<p>to staff. Survey results for each of the key agency functions show that approximately half of surveyed staff and management usually use knowledge management resources and processes (internal wiki site, videos, publications, etc.) to capture best practices. Knowledge management will influence agency performance over the next 5 years, given that approximately 26 percent of the NRC’s workforce is currently eligible to retire and approximately 44 percent will be eligible to retire within the next 5 years. High attrition over the next 5 years could negatively impact some positions identified in this assessment and will leave a critical knowledge gap.</p>	
	<p>FY 2022 Finding 3</p> <p>The NRC competency modeling program requires refinement in order to provide insights into agencywide skill gaps. The NRC’s competency modeling program has the potential to be a powerful tool for identifying agencywide skill gaps that, if addressed, would strengthen agency evidence-building capacity. However, the competency model assessment data from FY 2020 and FY 2021 were not sufficient to identify critical skill gaps. Analysis of FY 2020 and FY 2021 competency model assessment results has enabled a better understanding of the ways to improve this tool so that skill gaps may be identified in future capacity assessments. Potential improvements to this tool include: (1) increasing participation rates for both staff and managers, (2) establishing a core set of skills for competency models with the same position across offices (e.g., project managers, engineers), (3) adding competency models for staff without a model currently assigned, (4) refining the existing models to verify that staff are assessed only for competencies that apply to them, (5) ensuring a more consistent approach for establishing target ratings, and (6) addressing limitations to the current tool to improve reports and the ability to produce individual development plans directly from the system.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 4</p> <p>A recent agency data literacy survey showed that 75 percent of participants scored a 3 or higher on a 5-point scale on the skills related to analyzing data for decision-making, selecting relevant data sources, and formulating meaningful questions. 36 participants scored lower on skills related to accessing data, organizing data collections, and maintaining data resources to ensure sufficient data quality. Additionally, the NRC has recognized the need to make data more accessible to agency staff. The NRC’s development, modernization, and enhancement (DME) percentage of the overall information technology budget is much smaller compared to the Federal Government DME percentage, and this may continue to hamper the introduction of new technologies to NRC staff. For example, the use of data analytics has increased at a rate</p>	<p>Ongoing</p>

	<p>slower than needed as a result of the underfunding of supporting technology projects such as the development and expansion of the NRC Enterprise Data Warehouse; and purchasing of additional licenses to support increased use of data analytics tools. Additionally, the inability to fund technology modernization activities has delayed efforts to improve the search capability of the NRC's Enterprise Content Management System.</p>	
	<p>FY 2022 Finding 5</p> <p>The NRC needs a sufficient knowledge base both to effectively regulate nuclear facilities that use AI and to leverage software that has integrated AI technologies into NRC processes. AI tools can be a powerful and beneficial asset to the agency. To maximize the usefulness of AI tools, the NRC needs to have (1) sufficient staff knowledge and familiarity with them, (2) access to the latest programs, software, and libraries, and (3) high-quality datasets. The NRC is exploring the potential ways that applicants and licensees can use AI and digital twins. However, the NRC staff currently has limited technical capacity to review and regulate technologies relying on AI. Technical knowledge and skills should be enhanced to improve readiness in the future. Staff needs to be familiar with a range of potential technologies, have adequate training support in place, and have a data science and AI knowledge base available. The NRC needs to develop a way to track its progress toward achieving technical and regulatory readiness to review such applications to ensure sufficient licensing and oversight capacity.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 6</p> <p>Prior to 2021, the NRC had not systematically and holistically reviewed the effectiveness with which its programs, policies, and activities address environmental justice.</p>	<p>Completed and closed</p>
	<p>FY 2022 Finding 7</p> <p>The NRC's licensing and oversight analyses may be enhanced by lessons learned from the COVID-19 pandemic and other recent operating experience.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 8</p> <p>At the end of each phase or year, the NRC's SWP process is reviewed and improved based on lessons learned from participants. Now that the entire agency has participated, it is an appropriate time to conduct a comprehensive evaluation of the effectiveness and efficiency of the processes, procedures, and technology used to support the SWP process.</p>	<p>Ongoing</p>

	<p>FY 2022 Finding 9</p> <p>The NRC should assess the extent to which past reductions in mission and corporate support staff (including Nuclear Energy Innovation and Modernization Act (NEIMA) reductions) have led to efficiency gains in program functions. An assessment should be performed to determine if the reduction in support staff has led to NRC technical staff performing more non-technical business support work. This crosscutting issue may affect the capacity of NRC staff to perform licensing, oversight, research, and rulemaking analyses.</p>	<p>Ongoing</p>
	<p>FY 2022 Finding 10</p> <p>Attempts to meet the NEIMA cap on corporate support costs have caused the NRC to reduce or postpone critical investments and services. Continued postponements of critical investments and services will negatively impact the NRC's capacity to perform evidence-building activities to support the agency mission. These reductions and postponements have slowed the rate at which modern data analytics tools may be used across the agency to support evidence-building activities. The NRC identified major efficiencies and areas for cost savings within corporate support just prior to, and within the initial implementation of NEIMA, and has prioritized spending that is integral to the success of the agency's mission. Continued reductions to meet the corporate support cap are not sustainable, are already negatively impacting the agency, and will have an even greater impact as the corporate support cap declines in future years.</p>	<p>Ongoing</p>

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10. SUPPLEMENTARY NOTES

11. ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) is required by the Foundations for Evidence-Based Policymaking Act of 2018 to generate a capacity assessment, which is an accounting of the NRC's capacity to carry out the evidence-building activities needed to meet its mission-related functions and its general capacity to disseminate and use evidence. This capacity assessment relies on a structured, iterative approach for assessing and building the agency's capacity (e.g., staffing, funding, infrastructure, and processes) to carry out evidence-building activities (e.g., analysis, research, and evaluation) necessary to support agency functions. The purpose of this approach is to identify areas where new or different investments could strengthen or improve the agency's ability to meet its mission and strategic goals. The current year, Fiscal Year (FY) 2023, marks the NRC's second annual capacity assessment, which builds on the 27 findings documented in FY 2022 and identifies new areas of focus related to the NRC's capacity for evidence building activities. The FY 2023 Capacity Assessment identifies five new crosscutting findings, as well as associated mitigating strategies, that represent opportunities to enhance the NRC's ability to perform evidence-building activities to support associated key agency functions.

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