

**Project Plan for the U.S.
Nuclear Regulatory
Commission Artificial
Intelligence Strategic Plan
Fiscal Years 2023–2027,
Revision 0**

TABLE OF CONTENTS

1	INTRODUCTION	1-1
2	TASKS FOR ACHIEVING STRATEGIC GOALS	2-1
2.1	Strategic Goal 1: Ensure NRC Readiness for Regulatory Decision-Making	2-1
2.1.1	Task 1.1: Regulatory Framework Applicability Assessment of AI in Nuclear Applications	2-3
2.1.2	Task 1.2: Standards Applicability Assessment of AI in Nuclear Applications	2-4
2.1.3	Task 1.3: AI Safety and Security Evaluation Framework for Nuclear Applications	2-5
2.1.4	Task 1.4: Pre-Application Communication and Planning for AI Submittals	2-6
2.1.5	Task 1.5: Develop Regulatory Framework for AI-Enabled Autonomous Nuclear Operations	2-7
2.2	Strategic Goal 2: Establish an Organizational Framework to Review AI Applications	2-8
2.2.1	Task 2.1: Establish and Utilize AI Steering Committee and Working Groups	2-10
2.2.2	Task 2.2: Launch and Utilize AI Community of Practice	2-11
2.2.3	Task 2.3: Establish and Maintain Centralized AI Projects Database	2-12
2.3	Strategic Goal 3: Strengthen and Expand AI Partnerships	2-13
2.3.1	Task 3.1: Domestic Partnerships	2-15
2.3.2	Task 3.2: International Partnerships	2-16
2.3.3	Task 3.3: Host and Participate in Public Workshops, Conferences, and Meetings	2-17
2.4	Strategic Goal 4: Cultivate an AI-Proficient Workforce	2-18
2.4.1	Task 4.1: Assess the NRC’s AI Skills and Identify Gaps	2-20
2.4.2	Task 4.2: Identify, Develop, and Implement AI Training Opportunities	2-21
2.4.3	Task 4.3: Recruit, Hire, and Retain AI Talent	2-23
2.5	Strategic Goal 5: Pursue Use-Cases to Build an AI Foundation Across the NRC	2-24
2.5.1	Task 5.1: Proof-of-Concept Applications for AI Test and Analysis	2-26
2.5.2	Task 5.2: Develop and Maintain AI Ecosystem	2-27
2.5.3	Task 5.3: Survey AI Tools and Methods for Safety Evaluation	2-28
2.5.4	Task 5.4: Facilitate and Invest in AI Regulatory Research	2-29

1 INTRODUCTION

Artificial intelligence (AI) is one of the fastest-growing global technologies. By providing insights into the vast amounts of data generated during the design and operation of nuclear facilities, AI has the potential to enhance decision-making processes for the nuclear industry. As a result, the industry has expressed a growing interest in researching and using AI technologies to improve operational performance and mitigate operational risk. Licensing applications that include the use of AI technologies may be submitted to the U.S. Nuclear Regulatory Commission (NRC) for review and approval in the next few years. The agency is committed to keeping pace with technological innovations to be in position to review and evaluate the nuclear industry's use of AI in NRC-regulated activities.

For the purposes of this document, AI refers to a machine-based system that can go beyond defined results and scenarios and can emulate human-like perception, cognition, planning, learning, communication, or physical action. For a given set of human-defined objectives, AI can make predictions, recommendations, or decisions influencing real or virtual environments. An AI algorithm is a computer program that has been trained on a set of data to recognize certain types of patterns. AI uses various types of algorithms to analyze and learn from these data, with the overarching goal of providing solutions that mimic human-based decisions and predictions for problems. Unlike developing and coding a traditional software program with specific instructions to complete a task, AI seeks to learn to recognize patterns and make predictions.

In May 2023, the NRC issued NUREG-2261, "Artificial Intelligence Strategic Plan: Fiscal Years 2023–2027" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23132A305), to communicate its overall vision and supporting goals to ensure the staff's readiness to review the use of AI in NRC-regulated activities. The AI Strategic Plan focuses on a broad spectrum of AI subspecialties (e.g., natural language processing, machine learning, deep learning), which could encompass various algorithms and application examples that the NRC has not previously reviewed and evaluated. The five strategic goals are as follows:

- (1) Ensure NRC readiness for regulatory decision-making.
- (2) Establish an organizational framework to review AI applications.
- (3) Strengthen and expand AI partnerships.
- (4) Cultivate an AI-proficient workforce.
- (5) Pursue use-cases¹ to build an AI foundation across the NRC.

The AI Project Plan describes how the agency will execute the five strategic goals from the AI Strategic Plan. Section 2 is organized by each strategic goal and divided into subsections for the primary tasks required to achieve that goal. The tasks are arranged sequentially and include a description and a milestone table with planned start dates and due dates, as well as potential challenges and mitigation strategies. Section 2 also provides a timeline for the milestones related to the strategic goals. Note that the timelines represent the NRC's current estimates and consider needs as well as available resources. Uncertainties could impact the estimated timelines, particularly in fiscal year (FY) 2026 and FY 2027, as the agency aims to develop or update regulatory guidance and procedures and potentially initiate rulemaking, if necessary, to enable the use of AI in NRC-regulated activities.

¹ A use-case is a specific situation in which a product or service could potentially be applied.

The NRC plans to provide opportunities for communicating with external stakeholders to ensure that the agency will be prepared for applicant and licensee plans and improve transparency with the general public. These opportunities include public workshops, conferences, and meetings with the NRC's Advisory Committee for Reactor Safeguards.

2 TASKS FOR ACHIEVING STRATEGIC GOALS

The AI Strategic Plan identifies five strategic goals to ensure the NRC's readiness to review AI in NRC-regulated activities. This AI Project Plan provides details to guide the execution of tasks needed to achieve the five strategic goals. Several organizations within the NRC play a significant role in completing the tasks described here, and expertise from multiple offices will be required to achieve a successful outcome. The NRC will also continue to monitor external factors that may influence the ability to complete these tasks and achieve the strategic goals.

As required by the Foundations for Evidence-Based Policymaking Act of 2018, the NRC developed an agency evidence-building plan for identifying and addressing priority questions relevant to the agency's programs, policies, and regulations ([NUREG-2252, "Evidence Building Plan: Fiscal Year 2022," issued April 2022](#)). The NRC plans to leverage the resulting evidence gathered through the execution of the agency's evidence-building plan to support the AI strategic goals. The priority questions cover a broad spectrum of topical areas relevant to the AI Strategic Plan including Priority Question 2, "What data received and maintained would be most beneficial for use in advanced analytical tools (e.g., machine learning, artificial intelligence) to support NRC decisionmaking?" Furthermore, the AI strategic goals may inform the use of AI tools within the agency for mission support functions and business process improvements.

2.1 Strategic Goal 1: Ensure NRC Readiness for Regulatory Decision-Making

This goal focuses on developing the regulatory framework to prepare the staff to assess AI as part of NRC regulatory activities. The NRC will conduct research and work with agency stakeholders, other Federal partners, and the international regulatory community to determine the currently available AI standards and identify technical areas where regulatory gaps may exist. The NRC will consider unique aspects of AI applications such as, but not limited to, the topics shown in Table 2, "Potential AI Technical Considerations for Regulatory Decision-Making," of the AI Strategic Plan. The NRC will maintain transparency and communicate with agency stakeholders and the public during the development of the AI framework. The successful outcome would be the provision of regulatory guidance and tools for the NRC staff to ensure readiness for reviewing the use of AI in NRC-regulated activities. To meet Strategic Goal 1, five tasks are envisioned as described in the following subsections. Figure 1 illustrates the expected timeframe for completing all tasks and subtasks supporting Strategic Goal 1.

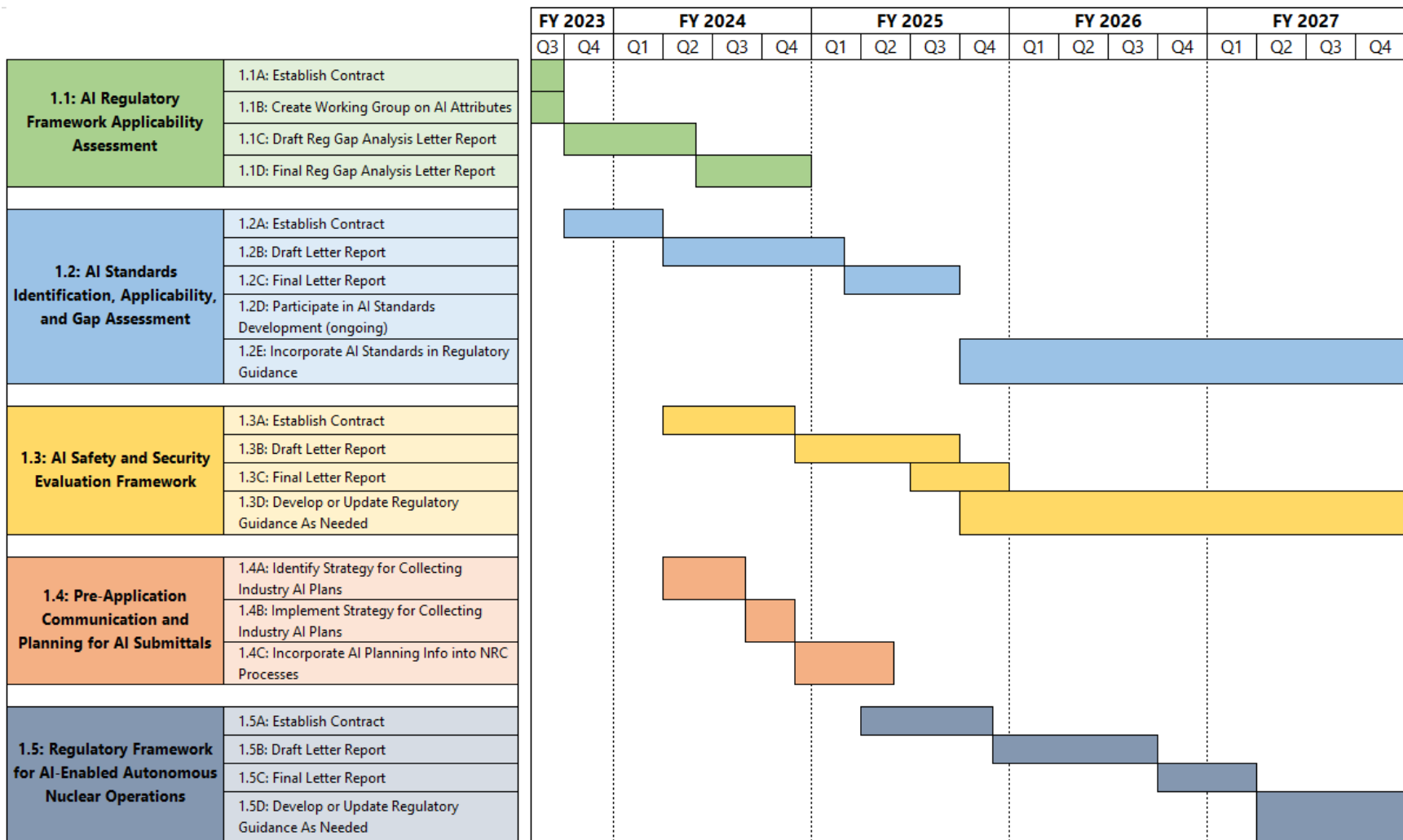


Figure 1 Gantt chart for tasks supporting AI Strategic Goal 1

2.1.1 Task 1.1: Regulatory Framework Applicability Assessment of AI in Nuclear Applications

- Description: The objective of this task is to assess the applicability of the existing regulatory framework for licensing and oversight of AI in NRC-regulated activities. The assessment will consider existing rules and guidance. The outcome of this task will inform determinations of whether any regulations, regulatory guidance, or inspection procedures need to be updated or created. The outcome of this task will also provide insights for Task 4.2, which focuses on identifying potential training needs for NRC staff (e.g., inspectors and technical reviewers).

- Milestones:

Subtask	Milestone	Planned Dates
1.1A	Issue new contract to support this task.	Completed: FY23 Q3
1.1B	Create Working Group on AI Attributes.	Completed: FY23 Q3
1.1C	Contractor submits draft regulatory gap analysis letter report for NRC review.	Start: FY23 Q4 Due: FY24 Q2
1.1D	Contractor issues final regulatory gap analysis letter report to NRC.	Start: FY24 Q2 Due: FY24 Q4

- Potential Challenges and Mitigation Strategies: The limited availability of contractors with a comprehensive knowledge of AI and NRC regulations and guidance poses a challenge for this task. However, this challenge can be mitigated by conducting thorough scrutiny of contractor qualifications, availability, and capacity upfront to ensure the contractor has the necessary expertise and capacity to complete this task.

2.1.2 Task 1.2: Standards Applicability Assessment of AI in Nuclear Applications

- Description:** A variety of organizations are developing various non-nuclear-related AI standards, both domestically and internationally. The objective of this task is to identify and assess existing AI standards and determine their applicability to NRC-regulated activities. The research will also identify areas where gaps in the standards may exist and recommend potential updates or new standards. The task will involve collaboration with agency stakeholders and the international regulatory community to gather information and perspectives on developing and implementing AI standards. The outcome of this task will inform the development of an AI framework and regulatory guidance for the NRC staff to assess the use of AI in NRC-regulated activities.

- Milestones:**

Subtask	Milestone	Planned Dates
1.2A	Establish new contract (or task order) to support this task. ²	Start: FY23 Q4 Due: FY24 Q1
1.2B	Contractor submits draft letter report for NRC review.	Start: FY24 Q2 Due: FY25 Q1
1.2C	Contractor issues final letter report to NRC.	Start: FY25 Q1 Due: FY25 Q3
1.2D	Participate as committee chair or voting member in AI standard development processes including ISO/IEC AI Standard for Nuclear Applications and NIST AI RMF .	Ongoing
1.2E	Incorporate AI standards in regulatory guidance based on the outcome of Subtasks 1.2C and 1.2D.	TBD

- Potential Challenges and Mitigation Strategies:** Identifying and assessing existing AI standards may be difficult, given the lack of consensus on what constitutes a comprehensive AI standard. Incorporating AI standards in regulatory guidance may exceed the AI Strategic Plan’s timeframe, which is from FY 2023 to FY 2027. To mitigate this challenge, the staff will actively engage with various external organizations involved in standards development, staying up to date with the latest developments and ensuring that the necessary resources are incorporated into the budget.

² This item will be an optional follow-on task for the contractor in Task 1.1.

2.1.3 Task 1.3: AI Safety and Security Evaluation Framework for Nuclear Applications

- Description:** The objective of this task is to research and develop a comprehensive safety and security evaluation framework for the use of AI in NRC-regulated activities. The framework will consider the unique aspects of AI applications, such as, but not limited to, the topics shown in Table 2 of the AI Strategic Plan. The task will involve collaboration with the public, external stakeholders, Federal partners, and the international regulatory community to gather information and perspectives on the development and implementation of the AI safety and security framework. This task will be developed in conjunction with Task 1.4.

- Milestones:**

Subtask	Milestone	Planned Dates
1.3A	Establish contract to inform AI safety and security evaluation framework.	Start: FY24 Q2 Due: FY24 Q4
1.3B	Contractor issues draft letter report documenting proposed AI safety and security evaluation framework for NRC review.	Start: FY24 Q4 Due: FY25 Q3
1.3C	Contractor issues final letter report documenting proposed AI safety and security evaluation framework to the NRC.	Start: FY25 Q3 Due: FY25 Q4
1.3D	Based on the outcome of Tasks 1.1, 1.2, and 1.4 and Subtask 1.3C, develop or update regulatory guidance (e.g., regulatory guides, inspection procedures, or regulations) as needed.	TBD

- Potential Challenges and Mitigation Strategies:** The results of Tasks 1.1 and 1.2 will inform the Task 1.3 efforts. Furthermore, Subtask 1.3D may require significant resources to develop a comprehensive safety and security evaluation framework. To mitigate this challenge, there will be enhanced upfront communication and coordination with regulatory guide development staff in different NRC offices. It is anticipated that the timeline for creating and/or updating regulatory guidance or regulations may exceed the timeframe of the AI Strategic Plan, which is from FY 2023 to FY 2027. Industry stakeholders may offer significant feedback on the proposed framework, which could take substantial efforts to understand, evaluate, and resolve.

2.1.4 Task 1.4: Pre-Application Communication and Planning for AI Submittals

- **Description:** The objective of this task is to inform the NRC’s budget and resource planning for the eventual review of AI-related applications. The NRC will seek AI planning information for pre-application activities, topical report submittals, and other licensing submittals from vendors, applicants, and license holders. This will occur on a continuing basis, the frequency of which has yet to be determined. This will enable the NRC to better understand the industry’s planned uses of AI and seek to promote early and frequent communication between the agency and external stakeholders. The NRC will evaluate various potential processes with varying levels of formality to determine the most effective strategy for information collection, which could include, for example, public meetings or regulatory issue summaries.

- **Milestones:**

Subtask	Milestone	Planned Dates
1.4A	Identify strategy for collecting AI planning information from nuclear industry (e.g., regulatory issue summary).	Start: FY24 Q2 Due: FY24 Q3
1.4B	Implement strategy for collecting AI planning information from nuclear industry.	Start: FY24 Q3 Due: FY24 Q4
1.4C	Incorporate the AI scheduling information into the NRC’s budget and resource planning processes to facilitate the review of AI-related applications.	Start: FY24 Q4 Due: FY25 Q2

- **Potential Challenges and Mitigation Strategies:** There may be difficulties in obtaining accurate and comprehensive AI planning information from vendors, applicants, and license holders. To mitigate this challenge, the staff has been actively engaging with the nuclear industry to stay abreast of industry interests, activities, and plans to deploy AI.

2.1.5 Task 1.5: Develop Regulatory Framework for AI-Enabled Autonomous Nuclear Operations

- Description: The objective of this task is to develop the technical basis and requisite regulatory framework for AI-enabled autonomy in nuclear operations, considering various potential levels of autonomy, staffing plans, and remote operation concepts. This task will involve close coordination with the advanced reactor program staff and rulemaking staff and will focus on ensuring that the requisite regulatory rigor is applied to AI-enabled autonomy in nuclear operations. The regulatory framework will consider the unique aspects of AI applications including, but not limited to, the topics shown in Table 2 of the AI Strategic Plan in the context of AI-enabled autonomy in nuclear operations. This task will be developed in conjunction with Task 1.3: AI Safety and Security Evaluation Framework for Nuclear Applications.
- Milestones:

Subtask	Milestone	Planned Dates
1.5A	Establish contract to support this task.	Start: FY25 Q2 Due: FY25 Q4
1.5B	Contractor draft letter report documenting technical basis for regulatory rigor applied to different levels of AI-enabled autonomous operations.	Start: FY25 Q4 Due: FY26 Q3
1.5C	Contractor final letter report documenting technical basis for regulatory rigor applied to different levels of AI-enabled autonomous operations.	Start: FY26 Q3 Due: FY27 Q1
1.5D	Develop or update regulatory guidance (e.g., regulatory guides, inspection procedures) or regulations (e.g., rulemaking), as needed, based on the outcome of Subtask 1.5C.	TBD

- Potential Challenges and Mitigation Strategies: The task may require significant resources to develop a requisite regulatory framework for AI-enabled autonomy in nuclear operations (e.g., rulemaking). To mitigate this challenge, regular communication and coordination will be established with the advanced reactor program staff and rulemaking staff. It is anticipated that the timeline for creating and updating regulatory guidance or regulations may exceed the timeframe of the AI Strategic Plan, which is from FY 2023 to FY 2027. Industry stakeholders may offer significant feedback on the proposed framework, which could take substantial efforts to understand, evaluate, and resolve.

2.2 Strategic Goal 2: Establish an Organizational Framework to Review AI Applications

The successful implementation of the AI Strategic Plan requires effective coordination and collaboration across the NRC. The initial organizational framework for reviewing AI applications will include a management AI Steering Committee (AISC), a staff-led AI Community of Practice (AICoP), and AI Working Groups (AIWGs). The AISC provides cross-office coordination and direction to prepare the agency for the future use of AI in NRC-regulated activities. Furthermore, the AISC will ensure a forward-looking, strategic, risk-informed application of AI technologies in the NRC's business processes. The AICoP will facilitate the sharing of best practices and lessons learned for reviewing requests that include the use of AI technologies and provide agencywide awareness of active and potential use-cases. AIWGs will support the AISC's efforts as needed to execute the tasks described in this project plan, such as prioritization of AI tasks and funding. As the NRC gains experience in reviewing AI applications, the organizational framework will be adjusted to improve its efficiency and effectiveness. To meet Strategic Goal 2, three tasks are envisioned as described in the following subsections. Figure 2 illustrates the expected timeframe for completing all tasks and subtasks supporting Strategic Goal 2.

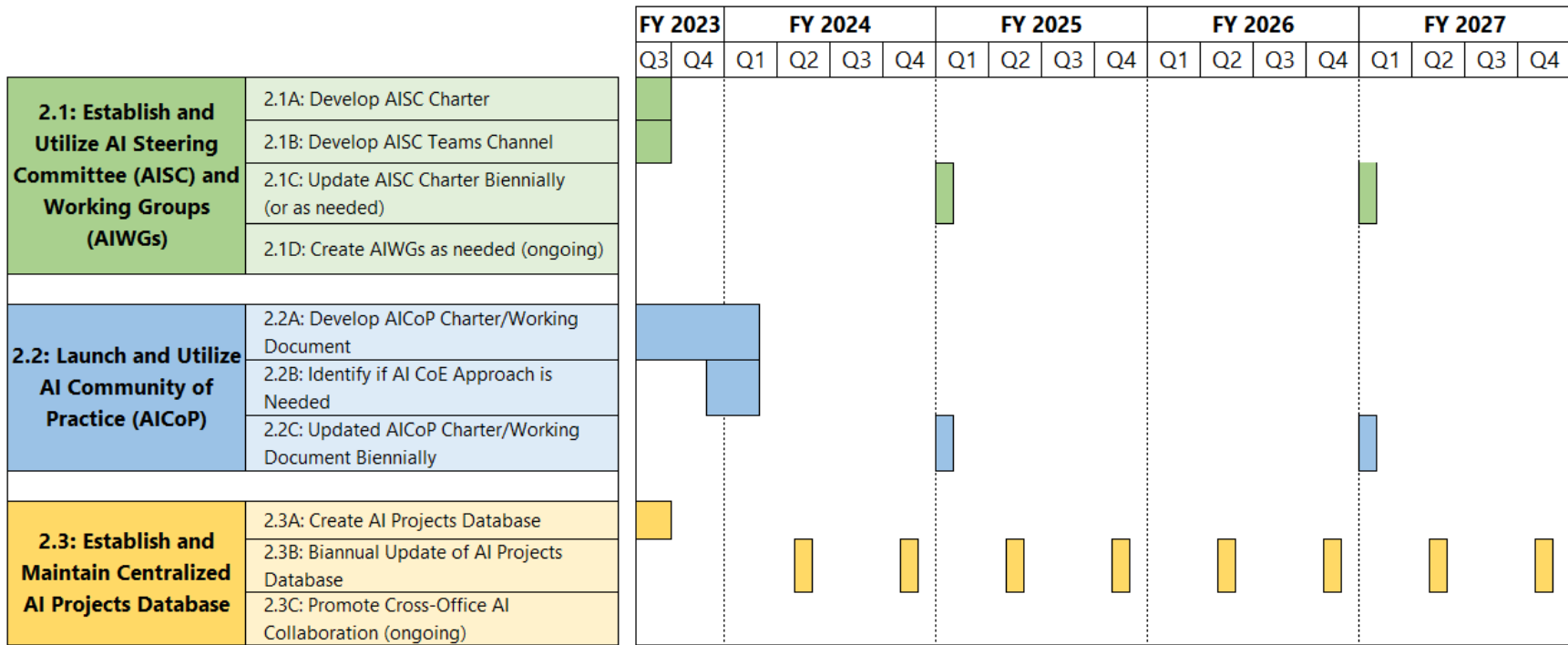


Figure 2 Gantt chart for tasks supporting AI Strategic Goal 2

2.2.1 Task 2.1: Establish and Utilize AI Steering Committee and Working Groups

- Description: The objective of this task is to establish an AISC to provide cross-office coordination and direction to prepare the agency for the future use of AI in U.S. nuclear facilities and ensure the consistent application of AI technologies in the NRC's business processes. The AISC will include senior management oversight of the implementation of the AI Strategic Plan. The AISC will guide budgetary decisions for tasks described in this plan. The AISC may engage external subject matter experts with AI expertise to assist with specific issues as needed. The AISC will coordinate with the Information Technology and Information Management Portfolio Executive Council to ensure direct prioritization of the activities to achieve the strategic goals outlined in the AI Strategic Plan. Lastly, the AISC will create AIWGs, as needed, to implement the activities in the AI Project Plan.
- Milestones:

Subtask	Milestone	Planned Dates
2.1A	Develop AISC Charter to establish structure, scope, roles, and responsibilities.	Completed: FY23 Q3
2.1B	Develop AISC Teams Channel to facilitate information sharing with AISC members.	Completed: FY23 Q3
2.1C	Update AISC Charter biennially (or as needed).	Due biennially (or as needed)
2.1D	Create AIWGs as needed.	Ongoing

- Potential Challenges and Mitigation Strategies: No known challenges.

2.2.2 Task 2.2: Launch and Utilize AI Community of Practice

- Description: The objective of this task is to establish and use an AICoP as a collaborative forum to (1) facilitate the sharing of best practices and lessons learned for reviewing requests that include the use of AI technologies and (2) provide agencywide awareness of active and potential use-cases. The AICoP will include lead staff points of contact from each NRC program and regional office who are active in or interested in AI technology, policy, standards, and programs. Lastly, the AICoP will include at least one Senior Executive Service manager and a branch chief.
- Milestones:

Subtask	Milestone	Planned Dates
2.2A	Develop AICoP charter or working document to establish structure, scope, roles, and responsibilities. Review and update charter annually as needed.	Start: FY23 Q3 Due: FY24 Q1
2.2B	Identify if there is a need to develop a center of expertise (CoE) to serve as an aggregation of AI subject matter experts to support AI-related regulatory reviews.	Start: FY23 Q4 Due: FY24 Q1
2.2C	Update AICoP charter or working document biennially (or as needed).	Due biennially

- Potential Challenges and Mitigation Strategies: No known challenges.

2.2.3 Task 2.3: Establish and Maintain Centralized AI Projects Database

- Description: The objective of this task is to establish and maintain a centralized database that captures all AI-related projects being conducted at the NRC. The database will leverage existing platforms to the extent practical and be updated with information on the lead office and division, project title, expected outcome, supporting user office, description of the activity, primary point of contact, and project initiation date. This will enable the NRC to maintain an agencywide list of ongoing AI projects, identify areas for potential collaboration and resource sharing, and promote effective communication and coordination. In addition, the database will be regularly maintained and updated to ensure the accuracy and completeness of the information.

- Milestones:

Subtask	Milestone	Planned Dates
2.3A	Create and populate with current AI-related projects and initiatives from all offices and divisions within the NRC.	Completed: FY23 Q1
2.3B	Regularly update the database with new and completed AI-related projects and initiatives from all offices and divisions within the NRC.	Due Quarterly
2.3C	Promote collaboration across NRC offices and divisions by sharing the AI projects database with staff and highlighting potential opportunities for collaboration via the AICoP and AISC.	Ongoing

- Potential Challenges and Mitigation Strategies: No known challenges.

2.3 Strategic Goal 3: Strengthen and Expand AI Partnerships

The NRC is maintaining and developing strong partnerships with domestic and international counterparts in the nuclear industry and other Government agencies to gain valuable information and leverage resources for safely deploying, overseeing, and evaluating AI technologies. The NRC plans to engage with stakeholders through memoranda of understanding, public meetings, and workshops to gather information, collaborate, and influence the development of domestic and international standards and guidance. Incorporating external knowledge and information into the NRC staff knowledge base will allow for timely and informed regulatory decision-making. The NRC will coordinate external interactions, disseminate information to staff, and support technical training and workshops to build AI awareness across the agency.

When achieved, this goal will provide established mechanisms to (1) maintain awareness of industry plans, (2) establish communication forums to discuss future plans and regulatory needs, and (3) effectively partner with other Federal agencies and international stakeholders on AI topics of mutual benefit.

To meet Strategic Goal 3, three tasks are envisioned as described in the following subsections. Figure 3 illustrates the expected timeframe for completing all tasks and subtasks supporting Strategic Goal 3.

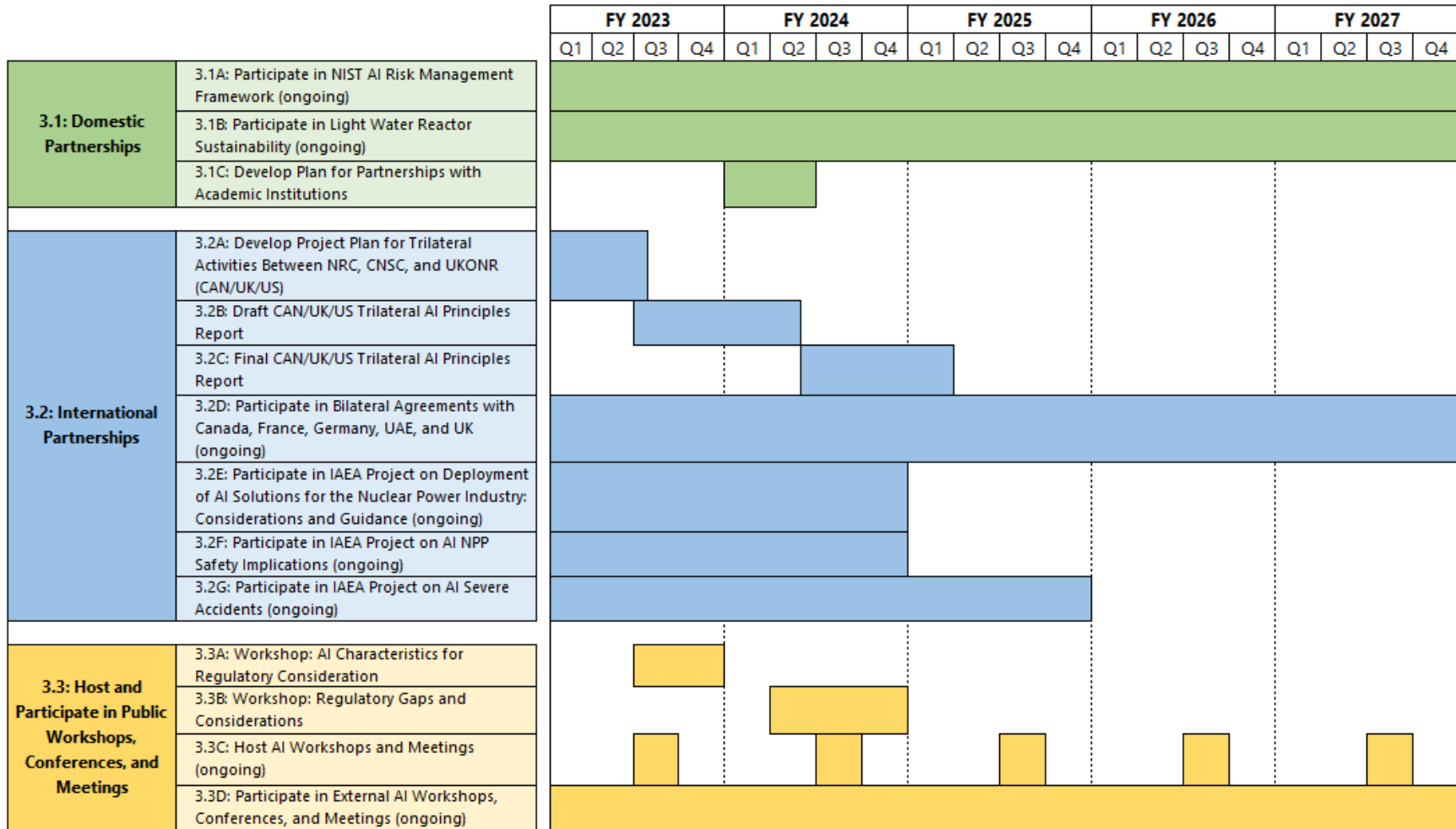


Figure 3 Gantt chart for tasks supporting AI Strategic Goal 3

2.3.1 Task 3.1: Domestic Partnerships

- Description: The objective of this task is to build and maintain partnerships with U.S. Government agencies, national laboratories, nongovernmental organizations, academia, and other research organizations to ensure that the NRC can leverage domestic AI best practices and lessons learned. The NRC has two memoranda of understanding (MOUs) with the Electric Power Research Institute (EPRI) and the Department of Energy (DOE) on data science, AI, and operating experience. These have served as the foundation of cooperation and collaboration for AI. The NRC has also been participating in the National Institute of Standards and Technology (NIST) AI Risk Management Framework. In addition, the NRC will continue to engage with other Government agencies, such as the Federal Aviation Administration and the Food and Drug Administration, to exchange ideas, practices, and procedures on AI. Lastly, to maintain awareness of AI activities across the Federal Government, the NRC is participating in the monthly meetings of Responsible AI Officials per Executive Order 13960, “Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government,” dated December 3, 2020, and the General Services Administration Governmentwide AICoP.
- Milestones:

Subtask	Milestone	Planned Dates
3.1A	Participate in NIST AI Risk Management Framework.	Ongoing (as needed)
3.1B	Participate in Cooperative Nuclear Safety Research Related to Light-Water Reactor Sustainability.	Ongoing (monthly)
3.1C	Develop plan for partnerships with academic institutions.	Start: FY24 Q1 Due: FY24 Q2

- Potential Challenges and Mitigation Strategies: No known challenges.

2.3.2 Task 3.2: International Partnerships

- Description:** The objective of this task is to build and maintain partnerships with international regulatory and research organizations to ensure that the NRC can (1) learn from the experiences of other organizations, (2) share its own best practices and lessons learned, and (3) influence international regulatory practice to promote global nuclear safety. Recognizing that the development of international frameworks for AI is still in its early stages, this objective aims to maintain the consistency of the ongoing development of the NRC’s AI regulatory framework with proposed revisions to international standards and guidance and seek to influence revision processes at an early stage with priority given to the most significant standards and guidance. The NRC, along with other member states, continues to work with the International Atomic Energy Agency (IAEA) on several technical meetings on AI. The NRC also has several bilateral agreements on AI activities with Canada, France, Germany, the United Arab Emirates (UAE), and the United Kingdom of Great Britain and Northern Ireland (UK). These bilateral relationships include cooperative research and information exchanges on regulatory approaches and best practices on AI. For example, Canada and the UK have active research programs and industry intentions to use AI technologies to support autonomous operation. The NRC’s annual Regulatory Information Conference will be leveraged to promote in-person exchanges with the agency’s international partners.
- Milestones:**

Subtask	Milestone	Planned Dates
3.2A	Develop project plan for trilateral activities between the NRC, Canadian Nuclear Safety Commission (CNSC), and the United Kingdom’s Office for Nuclear Regulation (ONR) (CANUKUS).	Completed: FY23 Q2
3.2B	Complete draft trilateral CANUKUS report on AI principles.	Start: FY23 Q2 Due: FY24 Q2
3.2C	Publish final trilateral CANUKUS report on AI principles.	Start: FY24 Q2 Due: FY25 Q1
3.2D	Participate in bilateral agreements with Canada, France, Germany, UAE, and UK.	Ongoing
3.2E	Participate in IAEA project on the deployment of AI Solutions for the Nuclear Power Industry: Considerations and Guidance.	Ongoing
3.2F	Participate in IAEA project on Safety Implications of AI in NPPs.	Ongoing
3.2G	Participate in IAEA project on AI and severe accidents.	Ongoing

- Potential Challenges and Mitigation Strategies:** No known challenges.

2.3.3 Task 3.3: Host and Participate in Public Workshops, Conferences, and Meetings

- Description: The objective of this task is for NRC staff to participate in AI conferences, workshops, and meetings to continue to build and maintain external partnerships and learn from other organizations. The NRC will also host periodic public workshops and meetings to disseminate agency progress and plans, and engage a wide range of stakeholders to obtain feedback on AI topics of interest.
- Milestones:

Subtask	Milestone	Planned Dates
3.3A	Host workshop on AI Characteristics for Regulatory Consideration .	Start: FY23 Q3 Due: FY23 Q4
3.3B	Host workshop on Regulatory Gaps and Considerations.	Start: FY24 Q2 Due: FY24 Q4
3.3C	Host periodic public workshops and meetings to discuss AI topics of interest and update the NRC's public AI website, as needed.	Ongoing
3.3D	Participate in external AI workshops, conferences, and meetings.	Ongoing

- Potential Challenges and Mitigation Strategies: No known challenges.

2.4 Strategic Goal 4: Cultivate an AI-Proficient Workforce

This goal focuses on developing the technical information, knowledge, and tools to prepare the staff to review AI applications. To achieve this, the NRC will establish a pipeline for AI talent and leverage existing hiring processes. The agency will also invest in comprehensive training programs that range from basic to advanced concepts, applications, and AI tools. A successful outcome of this goal is to ensure that appropriate qualifications, training, expertise, and access to tools exist for the workforce to review and evaluate AI usage in NRC-regulated activities effectively, efficiently and in a timely manner. To meet Strategic Goal 4, three tasks are envisioned as described in the following subsections. Figure 4 illustrates the expected timeframe for completing all tasks and subtasks supporting Strategic Goal 4.

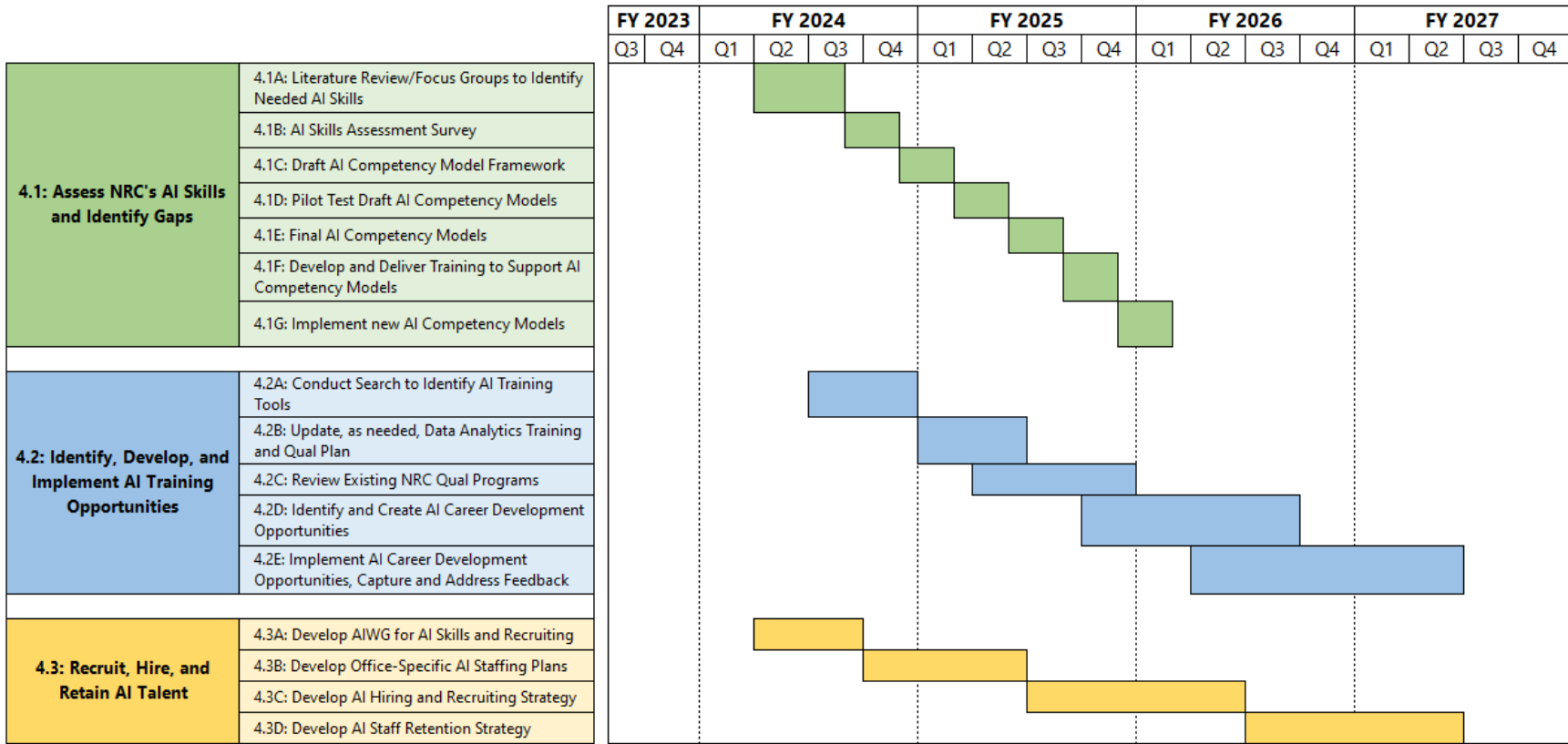


Figure 4 Gantt chart for tasks supporting AI Strategic Goal 4

2.4.1 Task 4.1: Assess the NRC’s AI Skills and Identify Gaps

- Description:** The objective of this task is to assess the NRC’s current AI-related skills and identify skill gaps to ensure that the agency can effectively and efficiently conduct regulatory reviews involving the use of AI. This will involve identifying critical skill areas, assessing staff against those skills for various AI-related roles, and updating the existing competency modeling program. The NRC has developed and implemented over the last few years a competency modeling program that could be useful for this task; however, updates are needed. The Office of Personnel Management (OPM) issued a [memorandum](#) dated July 6, 2023, listing general and technical AI competencies and has indicated that it will issue a validated AI competency model. All subtasks should leverage the OPM-issued AI competency model information to the extent it is useful for NRC applications.
- Milestones:**

Subtask	Milestone	Planned Dates
4.1A	Conduct a literature review and/or focus groups to identify and document the AI-related skills needed by the NRC.	Start: FY24 Q2 Due: FY24 Q3
4.1B	Conduct AI skills assessment survey.	Start: FY24 Q3 Due: FY24 Q4
4.1C	Develop draft AI competency model framework leveraging OPM’s AI competency model.	Start: FY24 Q4 Due: FY25 Q1
4.1D	Pilot test draft AI competency models.	Start: FY25 Q1 Due: FY25 Q2
4.1E	Refine and finalize the AI competency models.	Start: FY25 Q2 Due: FY25 Q3
4.1F	Develop and deliver training on the AI competency models.	Start: FY25 Q3 Due: FY25 Q4
4.1G	Implement the new AI competency models.	Start: FY25 Q4 Due: FY26 Q1

- Potential Challenges and Mitigation Strategies:** A potential challenge is determining the appropriate criteria to evaluate staff skills for various AI-related roles. To mitigate this challenge, the NRC will actively coordinate with other internal and external organizations conducting similar efforts to learn from their experiences. Additionally, the NRC will coordinate extensively with various offices to update the existing competency models and incorporate new AI-related skills.

2.4.2 Task 4.2: Identify, Develop, and Implement AI Training Opportunities

- Description:** The objective of this task is to address the AI skill gaps found in Task 4.1 to identify, develop, and implement training and development opportunities. The NRC's data analytics training and qualification program, which includes a tiered approach for identifying skills and training needs for various roles, will serve as a valuable tool for this task. However, periodic updates may be necessary to ensure that it helps the NRC address the skill gaps identified in Task 4.1. Existing NRC training and qualification programs (e.g., reactor inspector and risk/reliability analyst) will also be reviewed to assess whether any AI-related competencies should be added.

- Milestones:**

Subtask	Milestone	Planned Dates
4.2A	Conduct an extensive search of academic and industry publications to identify suitable and effective training tools, courses, and development opportunities beyond those currently available.	Start: FY24 Q3 Due: FY24 Q4
4.2B	Update the Data Analytics Training and Qualification Plan to incorporate the most current and effective training resources identified in Task 4.2A. This should include a process for gathering feedback and conducting effectiveness reviews to continually improve the program, along with developing an internal website for easy access.	Start: FY25 Q1 Due: FY25 Q2
4.2C	Review the NRC's current qualification programs such as inspector and risk/reliability analyst to determine if they require AI-related competencies. Collaborate with the agency points of contact and implement any necessary updates to the qualification programs.	Start: FY25 Q2 Due: FY25 Q4
4.2D	Identify and create AI career development opportunities to encourage AI experts to seek new challenges within the NRC, participate in external rotational opportunities, and keep abreast of AI developments. Explore opportunities for personnel exchanges with Federal agencies and eligible organizations through the Intergovernmental Personnel Act Mobility Program.	Start: FY25 Q4 Due: FY26 Q3
4.2E	Implement the identified AI career development opportunities and establish a feedback mechanism to ensure that the opportunities are meeting their intended goals and objectives. Make necessary	Start: FY26 Q2 Due: FY27 Q2

	improvements based on the feedback received.	
--	--	--

- Potential Challenges and Mitigation Strategies: As AI technology continues to evolve rapidly, it may be challenging to keep training materials up to date and relevant. To mitigate this challenge, the NRC staff will actively seek new AI training opportunities and leverage them for continuous professional development.

2.4.3 Task 4.3: Recruit, Hire, and Retain AI Talent

- Description:** The objective of this task is to establish and maintain a pipeline for AI talent and use Federal retention authorities to maintain a skilled AI workforce. This will involve leveraging existing hiring processes and using the scientific, technical, engineering, and mathematics (STEM) occupations hiring authority to recruit and hire AI talent. In addition, the NRC will develop and update individual development plans, position descriptions, performance plans, and career paths to retain an AI-proficient workforce. The overall objective is to ensure that the NRC has the right number of people with the right skills at the right time in the right place to conduct effective and efficient regulatory reviews and oversight activities involving the use of AI. The outcomes of other tasks, as well as the nuclear industry’s plans for using AI, will inform NRC projections of AI staffing demands.
- Milestones:**

Subtask	Milestone	Planned Dates
4.3A	Convene an AIWG to support and advise on all tasks under Strategic Goal 4.	Start: FY24 Q2 Due: FY24 Q3
4.3B	Considering the outcome of Task 1.4, identify anticipated workload and necessary skill sets to perform future regulatory reviews and inspections. In addition, offices will leverage Strategic Workforce Planning to determine areas where additional hiring is required.	Start: FY24 Q4 Due: FY25 Q2
4.3C	Create an AI recruitment strategy that outlines hiring mechanisms, target learning institutions, and professional societies. Identify appropriate recruiting events and career fairs to attract AI talent and develop compelling recruitment materials to promote the NRC and the Federal Government as an attractive employer. This effort should consider how to use the Nuclear Regulatory Apprenticeship Network program and summer intern and co-op programs to support AI recruitment.	Start: FY25 Q3 Due: FY26 Q2
4.3D	Create an AI staff retention plan that addresses the needs and concerns of AI personnel. Conduct regular feedback interviews with AI staff (or as needed) to identify areas for improvement and implement strategies to retain AI talent within the NRC.	Start: FY26 Q3 Due: FY27 Q2

- Potential Challenges and Mitigation Strategies:** The NRC may not have a strong presence in the AI community, which could affect its ability to attract and retain top talent. To mitigate this challenge, the NRC can implement targeted recruitment strategies, engage the University Champions program in the AI arena, and leverage the summer intern program to cultivate potential candidates. In addition, the NRC’s ability to anticipate future workload and necessary skill sets will rely on the outcome of Task 1.4.

2.5 Strategic Goal 5: Pursue Use-Cases to Build an AI Foundation Across the NRC

This goal focuses on developing and pursuing use-cases to build technical expertise for reviewing the use of AI in NRC-regulated activities and create a cyber ecosystem that supports data science, assessment, and integration of emerging AI tools and hands-on talent development. To achieve this, the NRC will undertake research to develop use-cases with data from various sources and in multiple forms and will collaborate with the nuclear industry to pursue potential pilot studies and proofs of concept. The NRC will also investigate (1) improving staff access to software-based AI tools, (2) providing staff access to training and development tools, and (3) facilitating staff engagement in training exercises that may mimic future regulatory reviews. As a successful outcome for this goal, the NRC staff would possess an information technology ecosystem that is self-contained and supports end-to-end research and development of AI analysis, integration of emerging AI tools, and hands-on talent development for reviewing AI applications from the nuclear industry. To meet Strategic Goal 5, four tasks are envisioned as described in the following subsections. Figure 5 illustrates the expected timeframe for completing all tasks and subtasks supporting Strategic Goal 5.

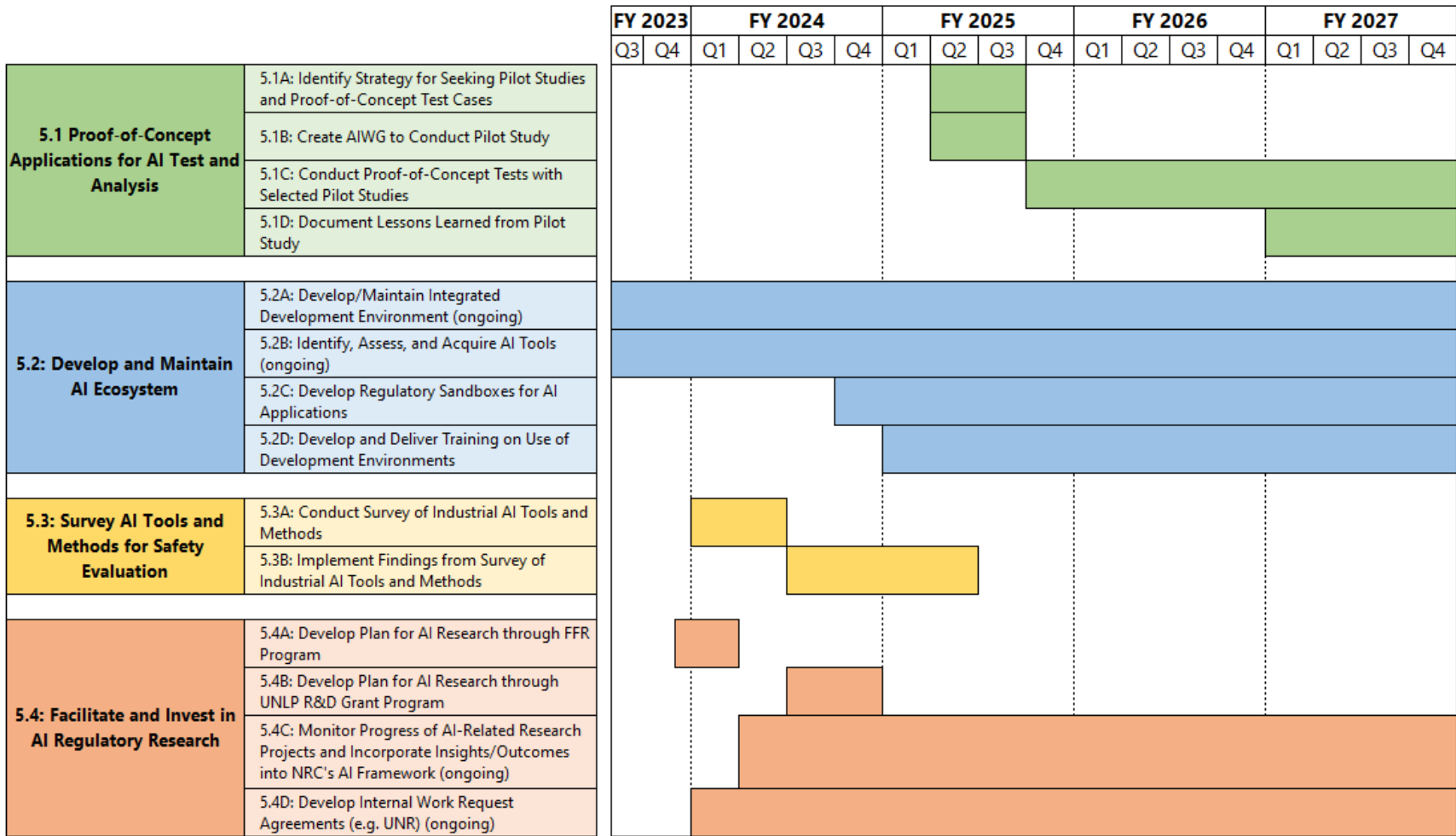


Figure 5 Gantt chart for tasks supporting AI Strategic Goal 5

2.5.1 Task 5.1: Proof-of-Concept Applications for AI Test and Analysis

- Description:** The objective of this task is to engage with the nuclear industry to identify pilot studies and proof-of-concept test cases that will help the NRC staff gain expertise and facilitate future regulatory reviews. It involves collaboration with licensees, applicants, research organizations, and national laboratories to develop use-cases with data from various sources and in multiple forms. The results of this research will be applied to build technical expertise for reviewing the use of AI in NRC-regulated activities. These joint efforts will help identify challenges associated with the NRC’s review of AI applications and licensing actions and may lead to improvements and enhancements in the AI ecosystem for the NRC staff.

- Milestones:**

Subtask	Milestone	Planned Dates
5.1A	Considering the outcome of Task 1.4, identify a strategy for seeking pilot studies and proof-of-concept test cases with the nuclear industry.	Start: FY25 Q2 Due: FY25 Q3
5.1B	Create a working group(s) to conduct pilot studies.	Start: FY25 Q2 Due: FY25 Q3
5.1C	Conduct proof-of-concept tests with selected pilot studies and use-cases.	Start: FY25 Q4 Due: FY27 Q4
5.1D	Document lessons learned from conducting pilot study and share the NRC’s findings as appropriate.	Start: FY27 Q1 Due: FY27 Q4

- Potential Challenges and Mitigation Strategies:** Limited engagement and collaboration from the nuclear industry, licensees, and applicants may impede the identification of suitable pilot studies and proof-of-concept test cases, potentially causing delays. To mitigate this challenge, the NRC will actively engage with the nuclear industry to identify suitable pilot studies. The NRC’s ability to identify pilot studies and proof-of-concept test cases with the nuclear industry will be contingent on the outcome of Task 1.4.

2.5.2 Task 5.2: Develop and Maintain AI Ecosystem

- Description:** The objective of this task is to establish an ecosystem that supports the NRC’s AI activities and regulatory reviews by creating integrated development environments,³ common AI tools, and regulatory sandboxes.⁴ The NRC will need to identify and integrate appropriate AI tools and data systems to support the staff in using these tools for regulatory reviews. The agency will also need to maintain and update these tools and systems to keep pace with emerging AI technologies. Finally, the NRC will need to train the staff on how to use these tools and systems effectively to support regulatory reviews and assessments. This task is similar to several tasks supporting NUREG-1908, “Information Technology/Information Management Strategic Plan: Fiscal Years 2020–2024,” Volume 4, issued November 2019 (ML19323D858). Activities will be coordinated to ensure efficiency and avoid duplication of effort.
- Milestones:**

Subtask	Milestone	Planned Dates
5.2A	Develop and maintain integrated development and test environment(s) for AI-specific regulatory applications, including planning for cloud or hardware solutions.	Ongoing
5.2B	Identify, assess, and acquire AI tools and make them readily available in the NRC’s Technical Reference Model.	Ongoing
5.2C	Develop regulatory sandboxes that enable NRC staff to test and evaluate AI applications for regulatory reviews.	Start: FY24 Q4 Ongoing
5.2D	Develop and deliver training programs to NRC staff on how to effectively use the integrated development environments, common data science tools, and regulatory sandboxes to support regulatory reviews and assessments.	Start: FY25 Q1 Ongoing

- Potential Challenges and Mitigation Strategies:** A potential challenge may be tracking the latest AI developments to ensure that the NRC’s AI ecosystem is equipped with the most up-to-date tools and systems. In addition, ensuring that the staff has access to adequate training and support to effectively use the AI tools and data systems could be a challenge, given that AI technology can be complex and require specialized knowledge and skills. To mitigate these challenges, the NRC can actively engage in meetings with partner organizations to learn from their experiences in developing an AI ecosystem.

³ An “integrated development environment” refers to a software application that helps programmers develop software code efficiently by combining capabilities such as editing, building, testing, and packaging.

⁴ A “regulatory sandbox” refers to an isolated, independent environment, not connected to any other system or process, where innovators can develop and test products and identify limitations and applications of the technology to inform regulatory decisions.

2.5.3 Task 5.3: Survey AI Tools and Methods for Safety Evaluation

- Description: The objective of this task is to conduct a survey of existing industrial AI tools and methods, as well as current research and development, to assess the applicability of these methods and tools for evaluating AI safety, security, and reliability. The survey will include a review of methods used by other regulatory agencies such as the Federal Aviation Administration and Food and Drug Administration. The objective is to identify the most effective methods and tools for evaluating AI safety, as well as any gaps or limitations in the current regulatory framework that need to be addressed. The survey results will inform the development of new or updated regulatory guidelines for the use of AI in NRC-regulated activities.

- Milestones:

Subtask	Milestone	Planned Dates
5.3A	Conduct a survey of industrial AI tools and methods, then assess their applicability to the NRC.	Start: FY24 Q1 Due: FY24 Q2
5.3B	Implement findings from the survey of industrial AI tools and methods.	Start: FY24 Q3 Due: FY25 Q2

- Potential Challenges and Mitigation Strategies: Discerning which AI methods and tools may be applicable to safety evaluations in the nuclear industry could be challenging. Another challenge could be the lack of standardization and consistency in AI safety evaluations across different regulatory agencies and industries, which may hinder the comparison and evaluation of the effectiveness of different methods and tools in safety applications. To mitigate these challenges, the NRC will actively engage in meetings with partner organizations to learn from their experiences and gain insights into addressing these issues.

2.5.4 Task 5.4: Facilitate and Invest in AI Regulatory Research

- Description:** The objective of this task is to facilitate and invest in AI regulatory research through a variety of existing research mechanisms. These research mechanisms include program office work requests, the NRC’s future-focused research (FFR) program, and the University Nuclear Leadership Program (UNLP). This involves supporting research proposals and development grants that focus on AI-related topics of interest to the NRC. The aim is to proactively continue investing in AI-related regulatory research that improves the agency’s ability to address all five AI strategic goals. As an example of the breadth of the UNLP portfolio, in 2022, the NRC awarded 20 research and development grants totaling approximately \$10 million. Of these awarded grants, three research proposals included use of machine learning or other data science applications.

- Milestones:**

Subtask	Milestone	Planned Dates
5.4A	Develop a plan to facilitate AI research through the future-focused research program.	Start: FY23 Q4 Due: FY24 Q1
5.4B	Develop a plan to facilitate AI research through the UNLP research and development grant program.	Start: FY24 Q3 Due: FY24 Q4
5.4C	Monitor progress of selected research projects and incorporate research outcomes into the NRC’s AI regulatory framework.	Ongoing
5.4D	Develop work request agreements (e.g., user need request, research assistance request) as needed to formalize work arrangements including resource needs.	Ongoing

- Potential Challenges and Mitigation Strategies:** A potential challenge is that UNLP AI research proposals may have limited relevance for nuclear regulatory purposes. To address this challenge, the NRC can proactively engage in information sharing with university faculty and staff, allowing them to develop a better understanding of the NRC’s specific AI needs within the context of nuclear regulation.