Fuel Cycle Facility Inspection Program Self-Assessment

1. BACKGROUND ON SMARTER INSPECTION PROGRAM

On April 26, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff issued a charter to conduct a holistic assessment of the fuel cycle inspection program. The working group consisted of staff experienced in oversight of fuel cycle facilities and was tasked to look for areas of transformation and innovation in the Fuel Cycle inspection program while adhering to the key Principles of Good Regulation that guide the way the NRC conducts its work. All phases of the inspection program (scheduling, preparation, inspection, enforcement, documentation, etc.) were considered (Agencywide Documents Access and Management System Accession No. ML19074A159).

The primary objectives of the working group were to improve the effectiveness and efficiency of the program inspections in areas of safety and safeguards by further integrating risk informed insights. To do so, the working group solicited and assessed feedback from internal and external stakeholders (including the NRC staff, the public, and industry) on potential changes to the inspection program, leveraged operating experience (both domestic and international), risk insights, inspection data and changes to the program because of the lessons learned from previous events in its assessment to determine whether the inspection program applied the appropriate focus on areas that provide the greatest safety benefit.

By memorandum dated March 18, 2020 (ML20077L247), the Director of the Division of Fuel Management (DFM) of the Office of Nuclear Material Safety and Safeguards (NMSS) endorsed the recommendation to build a Smarter Fuel Cycle Inspection Program (ML20073G659).

With the execution of the Smarter Fuel Cycle Inspection Program Implementation Plan (ML20189A064) the staff has implemented the working group recommendations to enhance inspection manual chapters and inspection procedures (IPs) related to fuel facilities.

By memorandum dated March 29, 2021 (ML21029A332) from the Chief of the Inspection and Oversight Branch to the Director of DFM, NMSS documented the implementation of the enhancement efforts. NMSS committed to evaluate the outcomes of the changes made by the Smarter Inspection Program (SIP) after sufficient runtime with the enhanced program.

2. INTRODUCTION

This report presents the results of the NRC staff's self-assessment of the Fuel Cycle Facility Inspection Program for calendar years (CY) 2021 to CY 2023. This is the first self-assessment conducted since the SIP was fully implemented, and as such, this review includes an assessment of the implementation and outcomes of each major change to the inspection program made through the SIP. The SIP implemented some triennial inspection frequencies, so the 3-year analysis period (CY 2021 to CY 2023) was chosen to ensure that sufficient data was available to meaningfully analyze these changes. Data was also analyzed from before the implementation of the SIP to make a comparison with data from after the SIP.

The self-assessment team included representatives from NMSS and the Region II office with extensive knowledge and experience in Fuel Cycle Facility inspection and oversight activities. The team developed an approach to measure the effectiveness of the Fuel Cycle Facility Inspection Program and of the enhancements made to the program through the SIP. The team

then established conclusions and recommendations based on findings and observations from the information gathered.

As part of this approach, the team developed a set of criteria, based on existing program assessment guidance, and used a combination of qualitative data and quantitative data to assess the effectiveness of the program. The team assessed inspection data available in agency and regional tracking systems and sought feedback from inspection and oversight staff to gain greater detail on their personal experiences under the program.

Overall, the results of this self-assessment show that the Fuel Cycle Facility Inspection Program is effective in achieving its program goals. Further, most of the enhancements made to the program through the SIP improved inspection efficiency and consistency, while maintaining reasonable assurance of adequate protection of public health and safety. While the self-assessment team concluded that the Fuel Cycle Facility Inspection Program is effective, the team developed several recommendations for consideration to further enhance the inspection program. These include but are not limited to items such as further risk informing IPs where appropriate to add flexibility to sample selection, and standing up an Operations/Facility Support Community of Practice to improve knowledge management and to share best practices in the Operations Safety and Facility Support inspection areas.

3. SELF-ASSESSMENT RESULTS

Element 1: Efficacy Review

This assessment element, a) Determined if changes in frequency or level of effort are needed to address trends and concerns identified by operating experience, and b) Determined whether the relevant guidance has the appropriate scope and focus to identify and assess the issues revealed through recent experience.

a) Determine if changes in frequency or level of effort are needed to address trends and concerns identified by operating experience:

The team assessed Operating Experience (OpE) and other quantitative data such as actual hours of direct inspection compared to resource estimates from before and after the SIP implementation. Additionally, the team analyzed inspector feedback related to sufficiency of inspection frequency and level of effort as outlined in Inspection Manual Chapter (IMC) 2600, “Fuel Cycle Facility Operational Safety and Safeguards Inspection Program – Appendix B”. The team concluded that most inspection frequencies and levels of effort are appropriate, and changes made by the SIP mostly had a positive effect on the program.

Results

The Smarter Inspection Program resulted in changes designed to increase the efficiency and effectiveness of the Fuel Cycle Facility Operational Safety and Safeguards Inspection Program. The SIP evaluated each inspection technical area and developed a ranking of their importance based on a comprehensive set of criteria, which included among other inputs operating experience and input from experts in the field. The goal of the ranking was to ensure the inspection program applied the appropriate level of effort based on the safety and risk significance of each inspection area. This analysis resulted in a tiered ranking of inspection performance areas and adjustments to inspection frequencies and direct inspection estimates in IMC 2600, Appendix B. This risk-informed approach resulted in an overall reduction in the

estimated direct inspection hours but increased the resource estimates for the highest risk significant areas of inspection, notably chemical safety. For a summary of these changes and the tiers (see memorandum, “Proposed Recommendations for Building a Smarter Fuel Cycle Inspection Program” (ML20073G659)). These changes were implemented in IMC 2600, Appendix B, and became effective at the beginning of CY 2021. All fuel cycle facilities were inspected as required by the program.

The staff provided feedback indicating that these changes to inspection duration and frequency, that resulted in an overall reduction in direct inspection hours and additional focus on the most risk significant areas, resulted in an appropriate level of inspection and reasonable assurance of adequate protection of public health and safety. The team reviewed the most recent OpE report (ML24019A045) and confirmed that no significant trends were observed since the SIP. The team noted that the most recent OpE report evaluated data related to reported events prior to and after the SIP, but it only evaluated inspection findings after the SIP. Therefore, the team analyzed data for findings from 4 years before the SIP (fiscal year [FY] 2017 to FY 2020) and compared this data to the data on findings in the OpE report (FY 2021 to FY 2023). Although the team noted small increases and decreases year-to-year in the number and performance areas of findings at fuel facilities, the average number and performance areas of findings over longer periods of time is stable, therefore the team concluded there are no significant changes observed in the number or type of findings before and after the SIP.

The type of findings since the SIP remained consistent with the type of findings prior to the SIP. The highest number of findings remained in the performance area of Criticality Safety, followed by Operational Safety – Chemical. These two inspection areas were assigned the highest safety significance based on the risk informed evaluation performed during the SIP. As noted in the FY2023 OpE report, there has been an increase in construction related findings over the past couple of years, but these issues are isolated to one licensee, are being addressed through the IMC 2604, “Licensee Performance Review” process, and do not constitute a need to reevaluate the frequency or direct inspection estimates for other licensees. If data from the partially complete FY2024 is considered, there is an increase in events and findings related to Criticality Accident Alarm Systems (CAAS) since FY2021. The team has formulated a recommendation to address this trend (see recommendations section below).

The team also evaluated the number of direct inspection hours expended in the 3 calendar years prior to the SIP and compared them to the hours expended in the 3 calendar years after the SIP and determined that the average number of hours expended decreased for all licensees. In addition, hours expended matched more closely with hours estimated in the IMC 2600, Appendix B. The team concluded that further risk informing the focus, frequency, and inspection estimates of the fuel facility inspection program played a role in this improvement in consistency, and the team’s analysis concluded that the changes implemented by the SIP to inspection frequency and duration were effective, and many efficiencies envisioned by the SIP were realized. The team did note that the level of effort needed to complete the emergency preparedness IP 88051, “Evaluation of Exercise and Drills,” could be lower than the 48-hour estimate in IMC 2600 because these inspections are highly dependent on the licensee’s schedule and the overall speed of the drill. The team has formulated a recommendation to address this observation (see recommendations section below).

The SIP clarified guidance in IMC 2600 regarding the acceptable variance in actual hours expended compared to the resource estimate for all inspection areas of plus or minus 10

percent and specified that inspectors shall obtain Branch Chief approval for hours expended falling outside of this band with the basis for the approval documented in the notes section of the Replacement Reactor Program System. These changes were implemented in IMC 2600.

The staff provided feedback through survey responses indicating that this guidance was a useful tool and allowed for flexibility to meet inspection goals. Evaluation of inspection hour data from the 3 years since the SIP implementation supports this feedback and indicates that most inspections are completed within the plus or minus 10 percent allowance. Staff only expended hours outside of the allowed plus or minus 10 percent band during execution of approximately 10 percent of IPs in the 2021 – 2023 timeframe. Although the plus or minus 10 percent threshold was not established prior to the SIP, analysis of data from the 2017 – 2020 timeframe shows that prior to the SIP, staff expended hours outside of the plus or minus 10 percent band approximately 30 percent of the time. This is a good indicator that the adjustments to resource estimates and the 10 percent allowance implemented by the SIP have had a positive effect on the consistency of meeting the inspection resource estimates. It also indicates that qualified inspection staff feel empowered to focus on the most risk significant items during inspections, and to determine when inspections are complete, regardless of the resource estimate.

Inspection staff and leadership provided additional feedback to the team indicating that while the guidance related to the acceptable allowance for the resource estimate was a positive change, the guidance does not accurately reflect the preferred process for managing cases where inspections exceed the plus or minus 10 percent allowance. Both inspection staff and leadership share the opinion that communication with the branch chief should occur to facilitate discussion between staff and supervisors to ensure management is aware of possible inspection trends, but not to obtain approval. The team has formulated a recommendation to address this observation (see recommendations section below).

Recommendations

1. Frequency of CAAS design inspection: The team reviewed existing guidance for CAAS inspections in IP 88015, “Nuclear Criticality Safety,” in light of a recent increase in CAAS related events and findings and recommends adding a minimum inspection of CAAS design characteristics and coverage every 5 years, regardless of whether significant changes have been made to the CAAS design. This ensures that changes to adjacent processes or equipment are considered and acknowledges that initial inspection of new or modified CAAS systems is a sample and never an evaluation of the entire system.

2. Level of Effort for IP 88051, “Evaluation of Exercise and Drills,”: The team noted that the level of effort would be more accurately expressed as a range of 24 to 48 hours. The team recommends changing the level of effort specified in IMC 2600, Appendix B, to reflect this range. It is important to note that regardless of the estimate, at a minimum, three inspectors should continue to participate in these drills due to the need for coverage of different physical locations during the exercise.

3. Acceptable variance of plus or minus 10 percent of the resource estimate: The team recommends that guidance in IMC 2600 related to the acceptable variance of ±10 percent of the resource estimate be updated to allow qualified inspection staff to determine if they need to exceed the plus or minus 10 percent allowance to complete the inspection without requiring prior branch chief approval. Communication with the branch chief should occur to facilitate discussion between staff and supervisors to ensure

management is aware of possible inspection trends, but not to obtain approval. The team also recommends further clarifying that the variance of ±10 percent applies to the sum of the resource estimates in all IPs used on inspections performed using multiple IPs.

b) Determine whether the relevant guidance has the appropriate scope and focus to identify and assess the issues revealed through recent experience:

The team analyzed inspection guidance with a focus on specific changes to guidance made by the SIP. The data assessed by the team indicate that the Fuel Cycle Facility Operational Safety and Safeguards Inspection Program has the appropriate scope and focus to identify and assess the issues revealed through recent experience.

Results:

The Smarter Inspection Program increased level of effort in the plant operations inspection area for region-based inspections for Category I facilities and decreased resident inspector level of effort in this area. This shift in scope was made to provide the Senior Resident Inspectors (SRI) with more flexibility to respond to or follow-up on events and other indirect inspection activities, and to bring a specialized technical focus from the region. This shift resulted in a reduction of annual direct inspection for an SRI from 797 hours to 752 hours, and an increase of annual direct inspection for regional inspectors in the area of plant operations at CAT I facilities from 0 hours to 105 hours. These changes were implemented in IMC 2600, Appendix B.

Inspector feedback indicates that this change was positive, specifically, the team received feedback from the SRIs that the regional inspection staff bring a valuable diversity of perspectives to the plant operations inspection area, and there are increased peer-to-peer training opportunities as the SRI and regional inspectors can share information and experiences more frequently and easily. The team evaluated the number of event reports and inspection hours expended by the SRI in the 3 calendar years prior to the SIP and compared them to event reports and hours expended by the SRI in the 3 calendar years after the SIP. The team determined that there was an overall decrease in the deviation from the resource estimate after SIP implementation, while the number of event reports at these CAT I facilities remained similar. The reduced deviation in hours could be attributed to the increased flexibility built into the resource estimate for the SRI. These changes to the scope and focus of SRIs and regional inspection staff appear to have had their intended effect.

The SIP reduced inspection overlap by a) incorporating risk significant elements of the "Maintenance and Surveillance of Safety Controls" IP into the "Plant Operations", "Radiation Protection", and "Criticality Safety" IPs, b) incorporating risk significant elements of the "Radioactive Waste Processing, Handling, Storage, and Transportation" IP into the "Radiation Protection", and “Environmental Control and Environmental Protection” IP's, and c) giving credit in certain regional IPs for facilities that have a resident inspector since the scope is performed as part of the resident inspection program. For example, sections of IP 88030, “Radiation Protection,” are omitted at facilities that have a resident inspector. These changes further shifted the focus of inspections to risk significant elements and reduced the overall level of effort in these inspection areas by removing scope that was not risk significant. These changes allowed for the retirement of the "Maintenance and Surveillance of Safety Controls" and “Radioactive

Waste Processing, Handling, Storage, and Transportation" IPs. These changes were implemented in IMC 2600, Appendix B.

The staff provided feedback indicating that these changes resulted in an appropriate level of inspection despite the lower overall number of inspection hours. The team analyzed the inspection hours for IPs that absorbed risk significant elements of the retired IPs for the 3 years following the SIP. Inspection hours expended for these procedures matched closely with the estimates, and no adverse performance trends were detected in any of the areas of inspection impacted by these changes (Operational Safety, Radiation Protection, Environmental Protection). Overall, most of the efficiencies envisioned by reducing the overlaps have been realized and an appropriate level of inspection has been achieved with fewer hours.

The team received negative feedback from inspection staff in one area related to changes made to reduce inspection overlap. Staff communicated that there is a lack of compatibility of the risk significant elements of IP 88035 (retired), "Radioactive Waste Processing, Handling, Storage, and Transportation," incorporated into the IP 88030, "Radiation Protection." Specifically, it was noted that sample selection does not easily allow for inclusion of the added waste elements, and inspection staff felt that they were not always able to inspect these areas with sufficient depth. The team has formulated a recommendation to address this observation (see recommendations section below).

The team also received feedback from inspection staff indicating that certain IPs were excessively prescriptive, and inspectors communicated the desire for more flexibility to adjust the inspection focus by adjusting the inspection sample based on observations made during the inspection. Staff identified IP 88030, “Radiation Protection,” and IP 88045, “Effluent Control and Environmental Protection,” as being particularly prescriptive. In contrast, IP 88020, “Operational Safety,” was identified as a good example of an IP that strikes the right balance between a beneficial amount of guidance while still allowing for sufficient flexibility during inspections. The team has formulated a recommendation to address this observation (see recommendations section below).

Staff also provided feedback related to challenges with inspecting records in IP 88072, “Plant Modifications (Triennial),” inspection. The focus of this inspection is an extensive review into the cumulative impact of all modifications on a specific system (back to the beginning of the system) to verify that these modifications did not adversely impact the system operation and/or the Integrated Safety Analysis. Due to the age of certain licensee records, inspection staff had some issues with the quality of the records inspected. Additionally, inspection staff requested further clarification of the focus of the IP 88072 inspection compared to the focus of the IP 88070, “Plant Modifications (Annual),” inspection. The team has formulated a recommendation to address these observations (see recommendations section below).

The team reviewed recent Technical Assistance Requests (TAR) and noted that a TAR related to the applicability of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21 to 10 CFR Part 70 facilities (ML23258A040, non-public) indicated there may be a lack of clear guidance for inspection of 10 CFR Part 21 regulations at 10 CFR Part 70 facilities. The team performed a preliminary review of inspection guidance and training and acknowledged that guidance and training may need additional clarity. The team has formulated a recommendation to address this observation, see recommendations section below.

The team reviewed guidance for performing routine event follow-up inspections (i.e., when reactive inspection is not needed), which are typically performed as part of the next scheduled applicable core inspection. As previously stated, the actual hours of inspection have been closer to the estimated level of effort since the SIP, indicating that current inspection estimates are sufficient to cover most cases of event follow-up. On rare occasions, a specific additional inspection may need to be performed to gather more information to determine if a reactive inspection is warranted. This inspection is not considered a core inspection and is performed using IP 88075, “Event Follow-up.” Discussions with staff indicated that additional clarification regarding the scope and focus of IP 88075 would be useful. The team has formulated a recommendation to address this observation (see recommendations section below).

The team also reviewed guidance added by the SIP to further risk inform sample selection by focusing on an in-depth vertical slice of a small number of samples instead of a superficial review of many samples. The team reviewed a random sample of a limited number of inspection reports to determine if the guidance was effectively implemented. The team noted that this guidance did result in slightly fewer samples selected as compared to before the SIP for IP 88020, “Operational Safety,” inspections. This reduction in sample size is a semi-quantitative indication of a more thorough examination of the selected samples. The team also noted that the guidance added to the IP 88020 was not added to the IP 88015, “Nuclear Criticality Safety,” and the team has formulated a recommendation to address this observation (see recommendations section below).

Recommendations

1. Focus of IP 88030, "Radiation Protection": The team recommends removing the waste elements from the IP 88030 and adding them to the IP 88045, “Environmental Control and Environmental Protection.” This would align better with the scope of the IP 88045 and would group all risk significant elements from the retired IP 88035, "Radioactive Waste Processing, Handling, Storage, and Transportation," into the IP 88045. These changes may result in using more hours for IP 88035, but would not require a change to the resource estimate for IP 88035 in IMC 2600, Appendix B.

2. Prescriptiveness of IP 88030, “Radiation Protection,” and IP 88045, “Effluent Control and Environmental Protection:” The team recommends updating the guidance in the IP 88030, and the IP 88045 to give inspectors more flexibility to adjust the inspection focus by adjusting the inspection sample based on observations made during the inspection. This recommendation may also be valid for other fuel facility IPs, and the team recommends evaluating the results of the modifications to the IP 88030 and IP 88045, and applying lessons learned to other IPs as applicable.

3. Scope of IP 88072, “Plant Modifications (Triennial):” As part of the OPS/Facility Support Community of Practice (see recommendation related to OPS/Facility Support COP in Element 2 below), the team recommends further clarifying the differences between the scope of the IP 88072 inspection and the IP 88070, “Plant Modifications (Annual),” inspection. The team also recommends further improving the guidance in IP 88072 by adding additional clarification for inspection of records.

4. Inspection Scope of 10 CFR Part 21: The team recommends establishing a working group to evaluate the adequacy of inspection program guidance and training related to 10 CFR Part 21 requirements in IMC 2600, “Fuel Cycle Facility Operational Safety and Safeguards Inspection Program”, IMC 2694 “Fuel Cycle Facility Construction and Pre-Operational Readiness Review Inspection Program” and associated IPs. Note, a working group has already been established.

5. Clarification of IP 88075, “Event Follow-up,” Scope: The team recommends adding additional clarification to internal guidance documents to clarify that routine event follow-up is performed under the appropriate core IP, and IP 88075 is only used if additional information is needed to determine if a reactive inspection is necessary.

6. Vertical slice guidance: The team recommends adding similar” in-depth vertical slice” guidance to the IP 88015, “Nuclear Criticality Safety,” and to review other IPs to determine if adding this guidance would be appropriate.

Element 2: Consistency

This assessment element, a) Assessed the sufficiency of inspection guidance to ensure technical adequacy and consistency of inspection reports, and b) Assessed the sufficiency of inspector training, qualification, and knowledge management.

a) Assess the sufficiency of inspection guidance to ensure technical adequacy and consistency of inspection reports:

The team reviewed inspection reports to determine if they contained adequate detail to enable traceability, through the available documentation to the determinations and conclusions. The team also reviewed changes made by the SIP to improve inspection report consistency and efficiency. The team concluded that inspection reports have adequate detail to enable traceability, through the available documentation to the determinations and conclusions, and have improved because of changes made by the SIP.

Results

The SIP implemented standardized report templates in the Replacement Reactor Program System to improve the consistency and efficiency of inspection documentation. Qualitatively, inspection staff felt that the templates were a positive change making the reporting process more consistent and saving time. The team analyzed data from CY 2018 – CY 2023 to determine if the standardized report templates had a measurable impact on documentation time. Due to limitations in the granularity of accounting for inspection preparation and documentation hours (e.g., documentation and preparation hours use the same charge code and are not able to be differentiated), the team was unable to determine if there was a quantitative reduction in documentation hours because of the use of report templates.

The team reviewed a sample of randomly selected inspection reports from CY 2021 – CY 2023 in the inspection areas of IP 88020, “Operational Safety,” and IP 88015, “Nuclear Criticality Safety,” and assessed them against the relevant IP guidance. Inspection reports had a consistent format, and their structure (which follows the IP structure), made it easy to determine that the IP was completed and followed the guidance. Inspection sample selection was also clearly detailed, with all accident sequences, Criticality Safety Evaluations, Criticality Safety

Analyses, and items relied on for safety (IROFS) listed in every inspection report. When violations were identified, there was a description of the violation, an analysis of how the issue violated the regulations/license, and an enforcement description.

The team increased the sample to include randomly selected inspection reports from before the SIP to qualitatively compare them to post-SIP reports. There was a clear improvement in consistency and clarity post-SIP as pre-SIP reports had a more narrative format that did not make it easy to connect back to specific sections of the IP. Additionally, the team found that pre-SIP Operational Safety inspection reports did not always list the specific accident sequences inspected, only the IROFS inspected. Staff comments related to the standardized report templates were mostly positive. Some staff indicated that while the narrative format is more variable and can potentially be harder to directly tie back to the IP guidance, it could, in certain circumstances, provide more specific detail regarding what the inspector examined. The team concluded that in most cases inspection reports are clearer and more consistent post-SIP leading to better traceability to determinations and conclusions but acknowledges that there could be instances where certain pre-SIP inspection reports contain more detail regarding specific inspection activities.

The team noted that several IPs did not have the same description of procedure completion. The meanings were all very similar, but the wording was not fully consistent. DFFI management clarified that the expectation for procedure completion is completion of the Principal Inspection Plan (PIP) submitted for management approval. The team has formulated a recommendation to address this observation, see recommendations section below.

Recommendations

1. Procedure Completion: Although similar, wording for procedure completion is not identical in all IPs. The working group recommends determining if the differences are justified, and if not, the wording should be harmonizing to improve consistency. The working group also recommends that the PIP should include a list of any sections of the relevant IP that will not be performed during the inspection with a short justification of why they do not apply. Note, this practice has already been implemented.

b) <u>Assess the sufficiency of inspector training, qualification, and knowledge management:</u>

Results

Inspection staff are qualified to implement the fuel facilities inspection program but provided feedback for ways to improve training and knowledge management in specific inspection areas.

The SIP changed the frequency of existing inspections which resulted in some inspections moving to a triennial frequency. Inspection staff communicated that although the frequency and level of effort for triennial inspections is sufficient for meeting the inspection program goals, the triennial frequency has resulted in fewer inspections and therefore fewer opportunities to gain experience, retain familiarity with, and refine skills in these inspection areas. The team has formulated a recommendation to address these observations, see recommendations section below (recommendation 1).

In addition to the general feedback related to the training and knowledge management challenges that triennial inspections pose, inspection staff provided specific feedback regarding

the unique skillset needed for IP 88161, “Corrective Action Program,” inspections. These inspections are only performed at one licensee every 3 years as only one licensee currently has an NRC approved Corrective Action Program (CAP), so opportunities to participate in these inspections are even less frequent than other triennial inspections. CAP inspections are performed to verify that licensees with an NRC approved CAP are implementing their programs effectively and to justify the credit given to licensees with the NRC approved CAPs. The team has formulated a recommendation to address this observation, see recommendations section below (recommendation 2).

The SIP identified Operational Safety – Chemical as one of the highest risk significant inspection areas (tier 1). While the SIP reduced resource estimates in most inspection areas including other tier 1 inspection areas such as nuclear criticality safety and Category I material control and accountability, it added additional inspection hours to the Operational Safety – Chemical inspection area. As previously described, operating experience from the past three years demonstrates that Operational Safety – Chemical remains a focus area of inspection due to its high safety significance. Therefore, inspection staff communicated that additional opportunities to deepen experience and skills should be made available in the Operational Safety – Chemical inspection area. The team has formulated a recommendation to address these observations, see recommendations section below (recommendation 1).

Recommendations

1. Inspection Training and Guidance: The team recommends reviewing existing training resources related to triennial inspections and Operational Safety inspections and ensuring that staff are aware of these resources and use them when appropriate. If existing training resources are not sufficient, updates to existing training or new training resources may be needed in the areas of Transportation, Environmental Protection, Triennial Plant Modifications, Corrective Action Programs, and Chemical Safety. A working group has already been established to further enhance the existing Chemical Safety training for inspectors. A Community of Practice (COP) was established in the 2013 to 2014 timeframe that includes Transportation and Environmental inspection area topics (both are triennial inspections), and participation in this COP can help inspection staff gain additional experience in these areas. There is not an Operations/Plant Support COP to provide ongoing training and best practices for Chemical Safety, Triennial Plant Modifications, and Corrective Action Program inspection areas. The team recommends creating an Operations/ Plant Support COP for Region II DFFI to cover these topics.

2. Corrective Action Program Inspections: The team recommends specifying in internal guidance documents that the CAP inspection team lead should, when practical, be a member of the OPS/Facility Support COP and should have previously participated in a CAP or Problem Identification and Resolution (PI&R) inspection. There are differences between PI&R inspections and CAP inspections, but they share many similarities. Due to the infrequency of CAP inspections at fuel cycle facilities the team also recommends specifying in internal guidance documents that participation in PI&R inspections as a training activity are a good opportunity for increasing knowledge of CAP inspection topics and techniques.

Element 3: Completeness Review

This assessment element determined whether the inspection program is being implemented consistent with established metrics to ensure the timely coverage of all licensees, disciplines, and facility/process areas, as appropriate.

Results

The team measured the effectiveness of, and adherence to, the current Fuel Facilities Inspection Program using the Congressional Budget Justification (CBJ), CBJ-FF-15, metric. The CBJ-SF15 metric was put in place in FY 2022 and captures the percent of inspections completed in accordance with Manual Chapter 2600 requirements. The percent completed is calculated by the number of IMC 2600 inspections completed during the quarter divided by IMC 2600 inspections required to be performed.

The team concluded that this new metric has been effective in ensuring IPs are performed within timeliness requirements as stated in the IMC and ensuring inspection objectives are completed in accordance with IP requirements. There were no overdue inspections during FY 2022 or FY 2023.

NMSS staff recently developed a dashboard that clearly displays inspection hour data. This dashboard may be used to streamline the data collection for the CBJ-FF-15 metric in the future.

Although there were no overdue inspections during FY 2022 or FY 2023, and all inspections in accordance with Manual Chapter 2600 requirements, inspection staff reported challenges meeting the core inspection program over this time-period due to a decrease in qualified staff. This decrease resulted in more back-to-back inspections and inspections after holiday weeks which complicates inspection planning and preparation. Qualified staff are particularly needed in the areas of material control and accountability (MC&A) and nuclear criticality safety. Qualified headquarters staff in the inspection areas of MC&A and nuclear criticality safety have supported regional inspection staff when necessary to ensure the needed skillsets were present on inspection. Over the last 2 years, DFFI management has been proactive with additional hiring and a focus on cross-qualification of inspectors. These actions have had a positive impact, and this issue is expected to continue to improve over time. The team has formulated two recommendations to address this observation, see recommendations section below.

The team also reviewed relevant assessment guidance and determined that although the IMC 2650, “Fuel Cycle Inspection Assessment Program” (implemented in 2018), indicates that an assessment should be performed yearly, there has not been an assessment of the fuel cycle program since the SIP. The absence of a self-assessment was justified because the SIP started in 2019 and ended in 2021, and there was no reason to concurrently perform a self-assessment per IMC 2650 during that time. The self-assessment was also not performed between 2021 and 2023 because the enhanced program needed to be implemented for a least three years before enough data was available to perform a meaningful self-assessment. Now that there is sufficient data, this self-assessment fulfils the IMC 2650 requirement.

The team also noted that during self-assessments and other audits, many observations, insights, and recommendations were discussed and considered. These observations, insights, and recommendations could become difficult to track if they are only recorded in reports. The

team has formulated a recommendation to address this observation, see recommendations section below.

Recommendations

1. Improving qualified inspection staffing: The team recommends continuing to prioritize cross-qualification in the areas of MC&A and Criticality Safety and recommends maximizing the use of available incentives as detailed in applicable agency guidance (e.g. Management Directive 10.72 “Awards and Recognition” and Management Directive 10.51 “Recruitment, Relocation, and Retention Incentives”) to promote cross-qualification. The team recommends increasing communications related to resource planning between DFFI management and inspection staff to ensure staff are aware of actions being taken to address staffing issues and to include ideas from staff. The team also recommends additional program office staff become qualified inspectors, as necessary, to further support fuel facility inspections, if needed.

2. Improving inspection planning and preparation: The team recommends increased communication between the DFFI lead scheduler and inspection staff to ensure scheduling preferences are clearly communicated and integrated into the DFFI schedule, and to ensure staff are aware of limitations and unavoidable scheduling constraints. The team also recommends that the lead DFFI scheduler update scheduling guidelines in internal guidance documents to better reflect achievable targets. The team also recommends assigning a backup DFFI scheduler to ensure someone knowledgeable about the schedule is available to answer questions and to make adjustments as necessary.

3. Tracking observations, insights, and recommendations: The team recommends DFM establish a database for observations, insights, and recommendations related to assessments of the fuel facility inspection program to make future assessments more effective and efficient by ensuring that work is not repeated and that recommendations are implemented as necessary based on their return-on-investment potential and risk significance.

4. CONCLUSIONS

The data reviewed by the team (OpE, CBJ Metric, inspection reports, inspection hours, meetings and discussions with inspection staff, etc.) indicates that the fuel facility inspection program is effective in meeting its goal of reasonable assurance of adequate protection of public health and safety.

The Smarter Inspection Program made significant adjustments to the inspection program through changes to IP guidance, level of effort estimates, direct inspection frequency, reduction of inspection overlaps, and inspection reporting optimizations which resulted in fewer overall inspection hours. Most of these changes were appropriate and have had a positive impact on the efficiency and consistency of the program.

The current inspection program provides reasonable assurance of adequate protection of public safety and health, and the recommendations of the team could further improve the effectiveness

and efficiency of the inspection program. An implementation plan will be created, and the recommendations will be prioritized based on their return-on-investment (ROI) potential. As such, it is possible that not all recommendations will be implemented at the same time, and in some cases the ROI of a recommendation may not justify the resources needed to implement it at all. Recommendations implemented from this self-assessment will be assessed as part of a future Fuel Facility Inspection Program Self-Assessment when sufficient data exists to make a meaningful assessment.