



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
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March 29, 2021

MEMORANDUM TO: Andrea Kock, Director
Division of Fuel Management
Office of Nuclear Material Safety and Safeguards

FROM: Leira Cuadrado, Chief
Inspection and Oversight Branch
Division of Fuel Management
Office of Nuclear Material Safety and Safeguards

SUBJECT: IMPLEMENTATION OF SMARTER FUEL CYCLE INSPECTION PROGRAM

By memorandum dated March 18, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20077L247), the Director of the Division of Fuel Management of the Office of Nuclear Material Safety and Safeguards endorsed the recommendation to build a smarter fuel cycle inspection program (ADAMS Accession No. ML20073G659).

With the execution of the Smarter Fuel Cycle Inspection Program Implementation Plan (ADAMS Accession No. ML20189A064), the staff has implemented a large part of the working group recommendations to enhance inspection manual chapters and inspection procedures related to fuel facilities.

This memorandum documents the implementation of the smarter fuel cycle inspection program, to date, as well as remaining actions for calendar year 2021.

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Enclosure:
Implementation of a Smarter Fuel Cycle Inspection Program

SUBJECT: IMPLEMENTATION OF SMARTER FUEL CYCLE INSPECTION PROGRAM

DOCUMENT DATE: March 29, 2021

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Implementation of a Smarter Fuel Cycle Inspection Program

Background and Objective:

On April 26, 2019, the U.S. Nuclear Regulatory Commission (NRC) established a working group to conduct a holistic assessment of the fuel cycle inspection program to improve the effectiveness and efficiency of the program (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19074A139).

In consideration of the agency's focus on transformation and innovation, the primary objective of the working group was to integrate risk-informed insights to ensure that the appropriate focus is applied to those areas most important to safety. The working group, composed of experienced staff from the Office of Nuclear Material Safety and Safeguards (NMSS) and Region II, used both domestic and international operating experience, risk insights, inspection data, and lessons learned to assess the program and develop recommendations for enhancement.

Recommendations:

By memorandum dated March 18, 2020 (ADAMS Accession No. ML20073G659), the working group proposed a series of changes to the fuel cycle inspection program, including:

(1) modifications to inspection frequencies and resource estimates associated with completion of inspection procedures, (2) modifications to inspection procedures to reduce overlaps, and (3) modifications to inspection frequencies of inspection procedures for facilities with an NRC--approved corrective action program.

Specifically, the working group issued the following six recommendations in the development of a smarter fuel cycle inspection program:

- 1) In-depth assessment of the scope of resident inspector guidance and its referenced procedures as part of the implementation phase of this initiative. The assessment should consider potential changes to ensure the scope of the resident inspector program is focused on the areas that provide the greatest safety benefit and should also consider recommendations provided by external stakeholders. Based on this review, further adjustment of inspection activities between regional and resident inspector activities may be recommended.
- 2) A reduction in the frequency of inspection to Tier 2 and Tier 3 inspection technical areas for licensees with an NRC-approved CAP.
- 3) The following inspection frequencies and hours based on the tier ranking of each of the inspection areas.
 - Tier 1 areas – Annual inspection frequency and a minimum of 90 hours
 - Tier 2 areas – Biennial inspection frequency and a minimum of 60 hours
 - Tier 3 areas – Triennial inspection frequency and a minimum of 30 hours with a range of hours to accommodate for any necessary adjustments on inspection scope based on the length of time between inspections

- 4) A revision to Inspection Manual Chapter (IMC) 2600 to include an acceptable variance of plus or minus 10 percent in the core hours. In addition, language on the acceptable variance should be included in the resources estimate section for each inspection procedure.
- 5) Incorporation of changes described in Section d. of the report (ADAMS Accession No. ML20073G659), along with the marked-up version of the Appendix B to IMC 2600 with the recommended hours and frequencies for each area of the core inspection program.
- 6) Formalizing into the inspection program the results of the Operating Experience Program and the Fuel Cycle Inspection Assessment Program to determine, on a frequent basis, if changes to the core inspection program are needed.

Approval of Recommendations and Staff Plan for Implementation:

By memorandum dated March 18, 2020 (ADAMS Accession No. ML20077L247), the Director of Division of Fuel Management (DFM) of NMSS endorsed the working group’s recommendations to build a smarter fuel cycle inspection program, with completion of updates to inspection guidance by December 2020, and implementation of inspection activities starting in calendar year 2021.

On August 26, 2019, the staff developed an Implementation Plan (ADAMS Accession No. ML20189A064), with the objective to implement the working group’s recommendations to enhance IMCs and inspection procedures (Ips) related to fuel facilities, as endorsed by the DFM Director on March 19, 2020. Specifically, the staff focused its initial implementation efforts on Recommendations 1 – 5.

The staff deferred the implementation of Recommendation 6 to calendar year 2021.

Implementation of Recommendations:

To date, the staff revised 91 percent of the fuel cycle program guidance, including all procedures to support scheduled inspections in the first quarter of 2021. Four training sessions were conducted to familiarize inspection staff with the revisions to the procedures and to ensure common understanding of any new and revised guidance. The training sessions were recorded for future use and made available to the staff as a reference.

The remaining 9 percent will be issued in early 2021 or retired by late 2021.

The following procedures have been issued for use:

	IP/IMC	Title
1	IP 88015	Nuclear Criticality Safety
2	IP 85401	Management Structure
3	IP 85309	Measurement Systems and Control
4	IP 85311	Physical Inventory Program
5	IP 85313	Alarm Resolution Program

6	IP 88055	Fire Protection
7	IP 88051	Evaluation of Exercises and Drills
8	IP 88020	Operational Safety
9	IP 88135	Resident Inspection Program for Category I Fuel Cycle Facilities
10	IP 88135.02	Resident Inspection Program Plant Status Activities
11	IP 88135.04	Resident Inspection Program Operational Safety
12	IP 88135.05	Resident Inspection Program Fire Protection
13	IP 88135.17	Resident Inspection Program Plant Modifications
14	IP 88135.19	Post Maintenance Testing
15	IP 88135.22	Surveillance Testing
16	IP 88070	Plant Modifications
17	IMC 2683	Material Control and Accounting Inspection of Fuel Cycle Facilities
18	IMC 2600	Fuel Cycle Facility Operational Safety and Safeguards Inspection Program
19	IMC 2600, Appendix B	NRC Core Inspection Requirements
20	IMC 2600, Appendix E	Inspection Program Modifications During Pandemics, Epidemics, or Other Widespread Illnesses or Diseases
21	IP 85303	Material Control and Accounting Management Structure and Personnel Training and Qualification
22	IP 85305	Item Monitoring
23	IP 85307	Processing Monitoring
24	IP 86740	Inspection of Transportation Activities
25	IP 85315	Internal Control
26	IP 85402	Measurement Program
27	IP 85403	Measurement Control Program
28	IP 85407	Assessment Program
29	IP 85408	Recordkeeping
30	IP 85501	Physical Inventory Program for Uranium Enrichment Facilities
31	IP 85502	Detection Program for Uranium Enrichment Facilities
32	IP 88050	Emergency Preparedness
33	IP 85404	Physical Inventory Program for Low Enriched Uranium Fuel Facilities
34	IP 85405	Item Control
35	IP 85406	Resolution Program for Low Enriched Uranium Fuel Facilities
36	IP 85503	Resolution Program for Uranium Enrichment Facilities
37	IP 88030	Radiation Protection
38	IP 88045	Effluent Control and Environmental Protection

The remaining procedure will be issued in early 2021:

	IP/IMC	Title
1	IMC 0616	Fuel Cycle Safety and Safeguards Inspection Reports

Additionally, another revision of IMC 2600, Appendix B was issued in February 2021, to clarify how estimated resources for some functional areas will be distributed. Specifically, for those functional areas that will receive two inspections in one year, the frequency of inspections and estimated resources were revised to clarify the estimated resources per inspection.

Three procedures will be retired in 2021, the contents of which have already been incorporated into other documents:

Retiring Procedure		Information Incorporated Into
1	IP 88025, "Maintenance and Surveillance of Safety Controls"	<ul style="list-style-type: none"> • IP 88020, "Operational Safety" • IP 88015, "Nuclear Criticality Safety" • IP 88030, "Radiation Protection"
2	IP 88035, "Radioactive Waste Processing, Handling, Storage, and Transportation"	<ul style="list-style-type: none"> • IP 88030, "Radiation Protection" • IP 88045, "Effluent Control and Environmental Protection"
3	IP 88054, "Fire Protection Triennial"	<ul style="list-style-type: none"> • IP 88055, "Fire Protection"

The following table summarizes the current status of the Smarter Fuel Cycle Inspection Program working group recommendations:

Recommendation		Status as of March 2021	Planned Actions for 2021
1	Assessment of the scope of resident inspector guidance	Issued revisions to the resident inspector guidance to reduce overlap.	The staff plans to reassess the scope of the resident inspector guidance by May 2021.
2	Reduction of frequency of inspection to Tier 2 and Tier 3 inspection technical areas for licensees with an NRC-approved CAP	Completed in the revisions to IMC 2600, Appendix B.	Not Applicable
3	<p>Recommends the following inspection frequencies and hours based on the tier ranking of each of the inspection areas.</p> <ul style="list-style-type: none"> ○ Tier 1 areas – annual inspection frequency and a minimum of 90 hours. ○ Tier 2 areas – biennial inspection frequency and a minimum of 60 hours. ○ Tier 3 areas – triennial inspection frequency and a minimum of 30 hours with a range of hours to accommodate for any necessary adjustments on inspection scope based on the length of time between inspections. 	Completed in the revisions to all IPs and IMCs.	Not Applicable
4	Revision to IMC 2600 to include an acceptable variance of plus or minus 10 percent in the core hours. Language on the acceptable variance	The "Resource Estimate" section of each of the revised IPs includes language for a variance of	Not Applicable

	<p>should be included in the resources estimate section for each inspection procedure.</p>	<p>plus or minus 10 percent of the estimate contained in IMC 2600 Appendix B. Where appropriate, increases or decreases greater than 10 percent shall be approved by a Branch Chief, as described in IMC 2600 Section 7.02.</p>	
<p>5</p>	<p>Incorporation of changes described in Section d. of the report (ADAMS Accession No. ML20073G659), along with the marked-up version of the Appendix B to IMC 2600 with the recommended hours and frequencies for each area of the core inspection program</p>	<p>The changes described in Section d. of the report, related to inspection frequency, resource estimates, plant operations, criticality safety, fire protection, material control and accounting, radiation protection, environmental protection, waste management, transportation, maintenance and surveillance, emergency preparedness and plant modifications were completed with revisions to IMC 2600, Appendix B, all IPs and applicable IMCs.</p> <p>The changes described in Section d. of the report related to inspection preparation and documentation were evaluated and where appropriate, incorporated into revisions to IMC 2600, IMC 0616 and internal inspection guidance. Specifically, the recommendations were addressed as follows:</p> <ul style="list-style-type: none"> • Guidance on increasing the use of 	<p>Not Applicable</p>

		<p>technology to aide in document reviews and the efficient review of licensing documents was added to IMC 2600.</p> <ul style="list-style-type: none">• The staff considered a range of variables involved in inspection preparation and documentation including the varying experience of inspectors, inspection type, facility type, the complexity of issues and potential event follow up, and determined that expectations for the appropriate depth and time for inspection preparation and documentation are sufficient. Additionally, significant deviations for inspection preparation and documentation will continue to be managed at the supervisor level and no further action is needed.• The staff implemented updates to the Reactor Program System and expanded the use of Inspection Scheduling, Tracking and Reporting (ISTAR). These updates standardize inspection documentation and report generation. IMC 0616 was revised to include tables, fields and instructions required to use ISTAR to generate reports.	
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		<p>The staff expects these updates to result in reduced inspection documentation time.</p> <ul style="list-style-type: none"> • Appropriate IPs were revised to include additional guidance on sample selection, and internal guidance is being used to ensure inspection preparation is focused on items of regulatory significance to the specific licensee or facility type. 	
6	<p>Formalizing into the inspection program the results of the Operating Experience Program and the Fuel Cycle Inspection Assessment Program to determine, on a frequent basis, if changes to core inspection program are needed</p>	<p>The 2020 implementation effort focused on revising all the inspection guidance and excluded this recommendation from the implementation plan for 2020.</p>	<p>The staff has initiated an effort to improve the effectiveness of the FC OpE program, to address this recommendation and explore how to provide more meaningful insights based on a variety of relevant data sources and best practices from other operating experience programs. This effort is kicking off in Quarter 3 of CY2021 and is expected to be completed by the end of the calendar year.</p>