
INSPECTION MANUAL CHAPTER 2801

URANIUM RECOVERY AND 11e.(2) BYPRODUCT MATERIAL FACILITY INSPECTION PROGRAM

Effective Date: 07/26/2024

2801-01 PURPOSE

To establish policies and guidance for the U.S. Nuclear Regulatory Commission (NRC) inspection program for conventional uranium mills, in situ recovery uranium mills, and other 11e.(2) byproduct material facilities licensed and regulated under Title 10 to the *Code of Federal Regulations* (10 CFR) Part 40, "Domestic Licensing of Source Material."

2801-02 OBJECTIVES

- 02.01 To provide guidance for the coordination, planning, and performance of inspections of NRC-licensed uranium recovery and 11e.(2) byproduct material sites in pre-construction, construction, pre-operation, operational, and standby modes. The inspection program will be implemented in a risk-informed and performance-based manner with an emphasis on activities that impact safety and the environment.
- 02.02 To determine through direct observation and verification of licensee activities if uranium recovery and 11e.(2) byproduct material sites are managed in a manner that is safe and in accordance with applicable regulatory requirements, that licensed material is safely stored onsite prior to removal from the site, and to identify trends in licensee performance before performance declines below acceptable levels.
- 02.03 To achieve consistency in the performance of inspections by inspectors based in regional offices and the program office to ensure the health and safety of workers and the public, protect the environment, and promote the common defense.

2801-03 APPLICABILITY

The information provided in this Inspection Manual Chapter (IMC) applies to conventional, heap leach, and in situ recovery (ISR) uranium mills. This IMC also applies to other sites authorized to possess 11e.(2) byproduct material. The information provided in this IMC would apply to thorium mills, if constructed in the future.

This IMC does not apply to: (1) former uranium mill and tailing sites undergoing decommissioning; (2) former uranium mill and tailings sites managed by the U.S. Department of Energy (DOE) under the general license provisions of 10 CFR 40.27 and 40.28; (3) unrefined and unprocessed ore; and (4) the import or export of uranium. The decommissioning inspection program requirements for uranium recovery and 11e.(2) byproduct material facilities, including those managed by the DOE, are provided in IMC 2602, "Decommissioning, Fuel Cycle, Uranium Recovery and Materials Inspection Program."

Some uranium recovery and byproduct material sites may conduct decommissioning activities in conjunction with operations. In these situations, inspectors should plan and conduct inspections using the guidance provide in IMC 2801 for operational activities and IMC 2602 for decommissioning-related activities.

2801-04 DEFINITIONS

04.01 11e.(2) byproduct material

Tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

04.02 As Low As Is Reasonably Achievable (ALARA)

Making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical, consistent with the purpose for which the licensed activity is undertaken, and taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to the benefits to public health and safety and other societal an socioeconomic considerations and in relation to utilization of licensed materials in the public interest. (See 10 CFR 20.1003, "Definitions.")

04.03 Be riskSMART

A framework designed to give inspector staff confidence to consistently apply and communicate risk insights for decisions without compromising the NRC mission. The framework includes guidance and steps for identifying and managing risk based on the use of the risk triplet questions and applying the following specific steps: (1) spot the problem and answer the risk triplet questions; (2) managing the risks and hazards identified; (3) act on the decision; (4) realize the results; and (5) teach others what you have learned. The risk triplet questions are identified and discussed in Section 04.10 of this IMC. The NRC framework can be found in NUREG/KM-0016.

04.04 Construction

As defined in 10 CFR 40.4, construction means the installation of wells associated with radiological operations (e.g., production, injection, or monitoring well networks associated with ISR or other facilities), installation of foundations, or in place assembly, erection, fabrication, or testing for any structure, system, or component of a facility or activity subject to the regulations in this part that are related to radiological safety or security.

04.05 Groundwater

The water below land surface in a zone of saturation, or water contained within an aquifer.

04.06 Heap leach process

A process in which uranium is removed from a pile of crushed ore that has been placed on a liner system by a percolating solution that flows through the ore and is collected for further processing.

04.07 Hybrid Inspection

A hybrid inspection is a combination of onsite and remote inspection.

04.08 In situ recovery (ISR)

In situ recovery involves the use of a leaching solution (lixiviant) to extract the mineral of interest from the geological formation in which it occurs.

04.09 Master Inspection Plan (MIP)

A region-specific plan of inspection activities that ensures the inspection program is properly focused and facilitates the efficient allocation of regional inspection resources.

04.10 Onsite Inspection

An onsite inspection is any direct inspection procedure effort performed through in-person observation of licensee personnel and walkdowns of licensee equipment. An inspection is still considered as onsite even if some records or documents were reviewed remotely. Note, inspection preparation and documentation are not considered direct inspection procedure effort.

04.11 Operation

Operation for a mill is the process of extracting uranium from ore. For an 11e.(2) disposal facility, operation means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement.

04.12 Performance-based approach

As applied to inspection, a performance-based approach focuses on results (e.g., can the pump perform its intended function) over process and method (e.g., completion of training requirements for maintenance of a pump). For example, if a licensee is unsuccessful in meeting the criteria defined by a performance-based regulation, the inspector should then focus on the licensee's process and method to understand the root cause of the breakdown in performance and to understand how future poor performance can be avoided.

04.13 Remote Inspection

A remote inspection is any direct inspection procedure effort that is performed off site from the licensee's facility or associated location.

04.14 Risk-informed approach

A philosophy in which risk insights are considered together with other factors to determine a course of action that focuses inspection activities on issues commensurate with their importance to health and safety. Risk can be determined by evaluating the combined answer to three questions (i.e., the risk triplet): (1) what can go wrong; (2) how likely it is; and (3) what its consequences might be.

04.15 Risk Modules (RMs)

Program areas that present higher risk or are expected to effectively reduce risk to health, safety and security that are identified in each inspection procedure in order to focus inspection efforts on these particular program areas.

04.16 Safety and Environmental Review Panel (SERP)

A licensee panel with at least three individuals representing management/financial, operations/construction and radiation safety matters. The SERP with support from other qualified licensee staff members or consultants as appropriate decides when proposed changes, tests or experiments at a licensed facility require a license amendment. Licenses with SERP license conditions are sometimes referred to as performance-based licenses.

04.17 Source material

Uranium or thorium, or any combination thereof, in any physical or chemical form or ores containing by weight one-twentieth of one percent (0.05 percent) or more of uranium; thorium; or any combination of uranium and thorium. Source material does not include special nuclear material.

04.18 Standby mode

Situation where a uranium recovery or 11e.(2) byproduct material licensee has chosen to stop production, or processing, of uranium or other 11e.(2) byproduct material but does not want to proceed with the decommissioning of the site. This typically occurs when the driver to cease production, such as a decrease in the price of uranium, is expected to be resolved and the facility plans to resume production. In certain situations, the licensee may have to submit an alternate schedule for completion of decommissioning in accordance with 10 CFR 40.42, if no principal activities are conducted for a period of 24 months.

04.19 Uranium milling

Any activity that results in the production of byproduct material as defined in 10 CFR 40.4.

04.20 Unrefined and unprocessed ore

Ore in its natural form prior to any processing, such as grinding, roasting or beneficiating, or refining. Processing does not include sieving or encapsulation of ore or preparation of samples for laboratory analysis.

04.21 Very low safety significance issue resolution process (VLSSIR Process)

A process used to discontinue inspection of an issue involving an unresolved licensing basis question in which: (1) the resolution of the issue would require considerable staff effort; and (2) the agency has chosen to not expend further effort to resolve the question because the issue would be no greater than severity level IV under the traditional enforcement process if it were determined to be a violation.

2801-05 RESPONSIBILITIES AND AUTHORITIES

05.01 Director, Office of Nuclear Material Safety and Safeguards (NMSS)

- a. Provides overall program direction for the NRC uranium recovery inspection program.
- b. Provides resource as needed to NRC materials and waste inspection programs.

05.02 Director, Division of Decommissioning, Uranium Recovery and Waste Program (DUWP)

- a. Coordinates, develops, and implements uranium recovery and 11e.(2) byproduct material inspection requirements and policies.
- b. In accordance with NMSS policy, periodically reviews this IMC and its associated inspection procedures and either affirms the existing procedures (if still valid) or initiates a revision.
- c. Characterizes, assesses, and mitigates the risks to the decommissioning and low-level waste business line of each program adjustment or aggregation of program adjustments.

05.03 Branch Chief, Division of Decommissioning, Uranium Recovery and Waste Programs

- a. Provides support, as requested, for implementation of the inspection program by the regions, Support includes providing technical experts for complex program areas such as groundwater program evaluation.
- b. Stays informed of the results on the inspection program and provides advice to the responsible Branch Chief regarding site status, staffing, budgets and evolving priorities.

05.04 NRC Project Manager (PM)

- a. Coordinates, develops, and implements the uranium recovery project and 11.e(2) byproduct management program and provides programmatic oversight of the regional inspection requirements and policies.
- b. Approves in concert with the regional Branch Chief, program adjustments based on current or planned activities at the licensee site.

05.05 Regional Administrator (RA)

- a. In concert with headquarters, directs the implementation of the uranium recovery and 11e.(2) byproduct material inspection program at their region.
- b. Ensures that the regional office staff includes adequate numbers of inspectors in various disciplines to carry out the inspection program as assigned and described in this IMC.
- c. Applies inspection resources, as necessary to deal with issues and problems that arise at specific facilities licensed for uranium recovery or 11e.(2) byproduct materials.
- d. Provides staffing and financial resources for implementation of the routine inspection program.

05.06 Regional Division Director

- a. Manages the implementation of the inspection elements performed by their respective region.
- b. Ensures, within budget limitations, that the regional office staff includes adequate number of inspectors in various disciplines to carry out the inspection program as assigned and described in this IMC.
- c. Applies the inspection resources necessary to deal with issues and problems that arise at specific facilities during uranium recovery operations.

05.07 Regional Branch Chief (BC)

- a. Directs and implements the uranium recovery and 11e.(2) byproduct materials inspection program in the region in accordance with the IMC and coordinates with the appropriate Headquarters or regional managers as applicable to implement this IMC.
- b. Review and approve inspection schedules.
- c. Approves, in concert with the site-specific PM, changes in the inspection intervals based on activities at the licensed sites.
- d. Provides regional management awareness of changes to the inspection plans.
- e. Reviews enforcement actions in accordance with the NRC enforcement guidance.

05.08 Inspectors

- a. All NRC personnel implementing the uranium recovery and 11e.(2) byproduct material inspection program shall use the guidance identified in this IMC and associated Inspection Procedures (IPs) referenced in the appendices.
- b. If changes are necessary to the inspection schedule, or if changes are necessary in the manner in which inspections are performed, the inspector, in consultation with the associated licensing PM will present these proposed changes to the regional BC for review and approval.

05.09 Program Adjustments

A program adjustment is any action regarding the inspection program taken by regional management, which is not consistent with guidance contained in this IMC. Program adjustments include but are not limited to changing intervals between inspections (beyond the established baseline plus scheduling window), level of effort for inspections, method of inspection, or the level at which decisions concerning the adjustment are made. Program adjustments are made by regional staff in conjunction with the NRC PM for the site. Program adjustments shall be documented and placed in the respective docket file in the Agencywide Documents Access and Management System (ADAMS).

05.10 Inspector Qualifications and Use of Technical Experts

The inspector qualification requirements are provided in IMC 1248, Qualification Programs for Federal, State Materials and Environmental Management Programs,

Appendix H, "Training Requirements and Qualification Journal for Uranium Recovery Inspectors." The qualifications include health physics and uranium recovery experience and training requirements. Other qualifications may be accepted by NRC management based on the experience of the inspector and the inspection requirements. The lead inspector should be qualified in accordance with IMC 1248, Appendix H. Other inspectors may support the inspection, but the lead inspector is responsible for oversight of unqualified inspectors or inspectors in training. The lead inspector is also responsible for oversight of the development and issuance of the inspection report.

In some cases, based on the site, the regional inspectors may not have the expertise for certain program areas. Common examples include the need for hydrogeologists or geotechnical experts. In these situations, the regional staff should request support from the NRC's program office. With proper planning and advance notice, the program office should be able to provide qualified technical staff to support the inspections. In some situations, regional staff will need support from other regions, headquarters, or contractors. These requests for support should be coordinated with NRC management, headquarters, and the other regions.

05.11 Independent Inspection Effort

The NRC's inspection program has traditionally allocated time to independent inspection effort. The amount of time spend should be commensurate with the level of risk, the complexity of the facility and the degree to which inspection resources have already been committed to significant safety and environmental issues that have been identified at the facility. This effort may include more in-depth inspection effort in selected technical areas. The objectives of this effort should be to gain increased understanding of potential safety and environmental hazards of activities of interest. Activities of interest may include a detailed review of the licensee's collection and analysis of radiological samples, control of spreadsheets that are used to manage data, and reasons for a series of non-reportable events. Independent inspection findings may uncover unresolved safety and environmental concerns, improper radiological practices, or other problems that may not be discovered through other means.

2801-06 REQUIREMENTS

This section provides specific instructions to satisfy the inspection requirements of the IMC.

06.01 Performance-based, Risk-informed Inspections

In accordance with Commission Policy (SECY-98-144), inspectors must conduct performance-based inspections with an emphasis on risk-significant activities that have an impact on safety and the environment. Inspectors shall focus their attention on activities and programs important to safety by using a performance-based, risk-informed approach.

A performance-based inspection emphasizes the observation of activities and results of the licensees' programs over the review of procedures or records for conformance to programs. The risk-informed inspection approach considers risk insights together with other factors to focus inspection activities commensurate with the risks associated with the implementation of the licensee's NRC-approved programs.

The inspector will verify compliance primarily through observations of site conditions, observations of work activities, interviews with workers, demonstrations by workers, and reviews of critical records. The inspector shall focus attention on the most important, risk-significant activities and the results of the licensee's efforts.

The risk-significant activities at uranium recovery and 11e.(2) byproduct material sites are described in NUREG-CR/6733, "A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees," and NUREG-2150, "A Proposed Risk Management Regulatory Framework."

06.02 Types of Inspections and Timing of Routine Inspections

Title 10 CFR 40.62, "Inspections," requires licensees to make reasonable accommodations for the conduct of inspections at facilities where source or byproduct materials are used and stored and to make records associated with compliance with the license requirements available for review.

The inspection program includes routine, non-routine, and reactive inspections. Routine inspections are the most common type of inspection. As described in Section 07.10 below, routine inspections should be conducted at 12-month intervals (\pm 25 percent). The intervals for routine inspections can be reduced or increased based on site-specific conditions such as operational activities, enforcement history, major facility or program changes, and other significant factors. See Program Adjustments in Section 5.09 for additional detail on modifying inspection frequencies.

Non-routine inspections may be conducted based on site conditions or unique site activities. Examples of non-routine inspections include inspections of new operational modes, construction work, preoperational activities, and implementation of Temporary Instructions. Non-routine inspections will be scheduled and conducted as needed.

Reactive inspections will be conducted as necessary in response to spills, unplanned releases, worker uptakes, enforcement actions, NRC Orders, allegations, bankruptcies, or similar events. Reactive inspections will be conducted in accordance with NRC policies after consultation with NRC management and program office staff. These inspections will be conducted using the guidance provided in IMC 1301, "Response to Radioactive Material Incidents That Do Not Require Activation of the NRC Incident Response Plan," and IP 87103, "Inspection of Material Licensees Involved in an Incident or Bankruptcy Filing."

Inspections may be conducted remotely or partially remotely (hybrid) as needed depending on site accessibility or travel concerns. The decision to conduct a remote inspection would be made in consultation with the inspector's management and program office staff. If needed, the onsite portion of an inspection could be conducted later, when travel restrictions are no longer an issue.

06.03 Core and Discretionary Procedures

Appendices A and B provide the core and discretionary IPs for use during routine and non-routine inspections. The core procedures provide the minimum inspection program requirements necessary to determine whether there is reasonable assurance that a facility is operating safely and in accordance with regulatory and license requirements. The core procedures must be implemented during each routine inspection.

Inspectors should implement the discretionary IPs as needed based on site conditions and as specified in the Master Inspection Plan or site-specific inspection plan. These discretionary procedures include the program areas that are important to safety but are less risk significant. The discretionary inspection program includes the reactive inspection program, to be implemented as needed in response to spills, accidents, or bankruptcies. With branch chief approval, the inspector may choose to implement other IPs not specifically mentioned in this IMC based on site-specific situations. These changes to the defined inspection program should be documented in the associated Master Inspection Plan and/or site-specific inspection plan.

Temporary Instructions may be issued by the NRC as needed in response to uncommon situations such as promulgation of new regulations or in response to industry events. Inspectors will implement and document temporary instructions using the guidance provided in these instructions.

Due to the wide variation between sites, the number of hours needed to complete the inspection will vary. The estimated number of hours to complete each IP is provided in the associated IPs. The estimated number of days needed to complete each inspection should be documented in the Master Inspection Plan.

The inspection is considered complete when the objectives of the IPs selected for that inspection have been fulfilled. The inspector will use a risk-informed approach to determine when the objectives of the various IPs have been satisfied.

06.04 Records Management and Financial Assurance

NRC regulations as described in 10 CFR 40.36 describe recordkeeping responsibilities for NRC licensees for uranium recovery and 11e.(2) byproduct material. During licensed operations, NRC requires licensees to maintain records important to safe and effective decommissioning and use these records for decommissioning planning when the site decides it no longer wishes to be operational. This section also ties uranium recovery and 11e.(2) licensees to the financial assurance requirements of Appendix A to Part 40 to ensure adequate funding to decommission the site will be available when the decision to decommission the site is made.

Additional records retention requirements associated with uranium recovery and 11e.(2) byproduct material licensees are detailed in 10 CFR 40.61.

2801-07 GUIDANCE AND POLICY

Published in the *Federal Register* (FR) on August 10, 1995, the Commission issued a final policy statement mandating the use of probabilistic risk assessment methods in nuclear regulatory activities (60 FR 42622). As a result of this policy statement, NRC staff started transitioning to a risk-informed, performance-based inspection program. This mandate and the white paper associated with achieving this mandate, as documented in SECY-98-144 (ML003753601), resulted in a major shift in the way the agency conducts business.

Using a performance-based, risk-informed approach, inspectors shall focus their attention on activities important to safety. Elements of a performance-based, risk-informed inspection approach include, observation of activities, interviews with licensee personnel, independent and confirmatory surveys, and limited review of records. A performance-based inspection emphasizes

observation of activities and the results of licensee programs over the review of procedures and records. The risk-informed inspection approach considers risk insights together with other factors to focus inspection activities commensurate with the risks associated with the implementation of the licensee's NRC-approved programs. For example, the inspector may identify an issue by observing a licensee activity in progress, monitoring equipment performance, or reviewing the results of an activity (e.g., a calculation). The inspector should discuss the issue with licensee personnel and review selected documents as needed to enhance or verify performance-based, risk-informed observations.

This IMC summarizes the basic framework for the uranium recovery and 11e.(2) operations inspection program.

07.01 Performance-Based, Risk-Informed Inspection Approach

For the purposes of this IMC, the risks include safety and security risks, reputational risks, and cost-benefit considerations. The qualitative safety risk of an activity can be determined by evaluation using the NRC's Be *risk*SMART model or an equivalent risk-informed, decision-making model and determining the combined answer to three questions (i.e., the risk triplet): (1) what can do wrong? (2) how likely is it? and (3) what are the consequences? Reputational risk qualitatively assesses the impact to the public's view of the effectiveness of the inspection program from identified deficiencies or events in each of the inspection areas. Cost-benefit considerations are used at NRC to manage limited resources for optimum benefit.

At uranium recovery facilities, risk will vary based on the level of operations. Due to the price of uranium, these facilities may be in standby mode, partially operational, or fully operational. Dryer operations present the most risk-significant radiological hazard, but chemical hazards are also present due to the use of acids and alkaline caustics in the process of converting uranium ore to yellowcake. For partial operations and full operations, dryer hazards and chemical storage and use are the primary risk concerns. During standby operations, when dryers are not in routine use, the integrity of the tanks storing the chemicals presents the primary risk. Often when in standby, the licensee is only circulating enough water to maintain an inward hydraulic gradient to limit or preclude offsite effluent releases.

Inspectors should focus their attention on activities important to safety by using a performance-based, risk-informed approach. The performance-based, risk-informed approach emphasizes observation of activities that are the most risk-significant in terms of safety. The NRC has identified the risks associated with uranium recovery and 11e.(2) byproduct material site operations. These risks are documented in NUREG-CR/6733, "A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees," and NUREG-2150, "A Proposed Risk Management Regulatory Framework." As discussed in NUREG-CR/6733, the higher risk activities include:

- hazardous chemical management and use (this program area may not be regulated by NRC unless hazardous chemicals are mixed with licensed material)
- security and stability of conventional mill tailings impoundments
- radiological spill response and other radiological emergencies
- yellowcake dryer operations and accidents
- groundwater contamination including excursions
- environmental contamination

- responses to transportation incidents involving radioactive material
- procedures and training for the risks listed above

NUREG-2150 provides supplementation information regarding the risks of dryer operations and environmental contamination:

- Dryer risks include excessive occupational exposures under certain accident scenarios.
- Environmental risks include potential or actual groundwater contamination, long-term tailings management, and radon emissions.

In summary, the inspection program should be implemented to concentrate on areas that have higher risk significance and emphasizes direct observation of site conditions and activities. In other words, the inspector should focus attention on the most important, risk-significant activities and the results of the licensee's efforts. Additional guidance for risk-informed decision-making is provided in NUREG/KM-0016, *Be riskSMART: Guidance for Integrating Risk Insights into NRC Decisions*.

07.02 Risk Modules (RMs)

In this manual chapter, RMs are discernable topics or program areas that have been determined to be important to reducing risks at uranium recovery facilities and focus inspection efforts on those activities that impact the health and safety of occupational workers, the public, and/or the environment. The application of RMs vary based on the operational mode of the site. The RMs, in order of priority, are:

1. observation of uranium recovery operations
2. occupational radiation protection
3. security and control of radioactive materials
4. waste generation, storage, and transportation
5. public dose, effluent releases, and environmental monitoring
6. management organization and control

The above RMs are listed in order of importance and should be kept in mind by the inspector as they use the IPs to inspect uranium recovery facilities. Inspections can be considered complete even if all RMs are not reviewed; however, the RMs that carry the highest risk components should always be complete to the extent possible. Additional inspection elements for less risk-significant or safety program areas are not required to be reviewed as part of the risk-informed inspection approach but may be reviewed if the inspector has time available.

If an inspector has a concern that the licensee did not meet performance expectations for a given RM, the inspector may consider conducting a more thorough review of that portion of the licensee's program. However, the inspector should consider the underlying risk significance of the concern, as well as the licensee's response to and resolution of that concern when determining the level of increased inspection effort to expend.

In addition to considering the risk significance of the concern, the inspector should obtain sufficient information to determine whether the issue pertains to an NRC requirement in applicable orders, license conditions, or regulations.

For issues of low safety, regulatory, or programmatic significance it may not be necessary to either expend additional effort to cite a violation if adequate protection of public health and safety is already apparent. The inspector may instead inform licensee management and allow the issue to be addressed within the licensee's corrective action program or similar program.

If questions arise about the applicability or risk significance of an issue, and particularly where there is no pre-determined answer in law, regulation, policy, or applicable standards, NRC's *Be riskSMART* framework (NUREG/KM-0016) provides a systemic approach to making risk-informed decisions. An equivalent risk-informed, decision-making process other than *Be riskSMART* may also be used to make this determination for co-regulators. NRC staff wanting to use an alternative program should obtain approval from NRC management.

07.03 Inspection Frequency

Ideally an operational uranium recovery facility should be subject to a risk-informed, performance-based inspection annually. However, routine inspections can occur more or less frequently based on site activities and licensee performance. Refer to Section 7.10 for additional information on program adjustment of inspection frequency.

07.04 Remote and Hybrid inspections

Most inspections are conducted onsite using direct observation supplemented with onsite reviews of documentation and interviews with personnel. Where appropriate, supplementing onsite with remote inspection techniques may be used (also referred to as a hybrid inspection). Direct observation shall be regarded as the preferred method of inspection. Remote inspection of activities that are normally directly observed should be considered only in rare or unusual circumstances and headquarters or regional management approval must be received as applicable. Hybrid inspections are frequently used during Pandemics, Epidemics, or Other Widespread Illnesses or Diseases. Details associated with the use of hybrid inspections under these circumstances are provided in Appendix C of this IMC.

07.05 Regulatory Requirements

The inspector should evaluate the licensee's performance against the following regulatory requirements, using a risk-informed, performance-based approach:

- 10 CFR Part 19, "Notices, Instructions and Report to Workers: Inspections and Investigations"
- 10 CFR Part 20, "Standards for Protection Against Radiation"
- 10 CFR Part 21, "Reporting of Defects and Noncompliance"
- 10 CFR Part 40, "Domestic Licensing of Source Material," including Appendix A
- 10 CFR Part 71, "Packaging and Transportation of Radioactive Material"
- 10 CFR Part 75, "Safeguards on Nuclear Material-Implementation of Safeguards Agreements Between the United States and the International Atomic Energy Agency"

The NRC Memorandum dated June 22, 2012, "Verification of Additional Protocol Reporting at Uranium Recovery Facilities" (ML12171A355), provides guidance to inspectors explaining how to implement the Additional Protocol requirements specified in 10 CFR Part 75.

07.06 Inspection Procedures

A list of core and discretionary inspection procedures that could be used by the inspection staff to conduct routine, non-routine or reactive inspections is provided in Appendices A and B of this IMC. Appendix A provides IPs for construction and pre-operational inspections and Appendix B provides IPs for operational inspections.

Core IPs listed in Appendices A and B should be used for each inspection. Discretionary IPs also listed in Appendices A and B are IPs that may be performed as needed at a uranium recovery facility as determined by NRC regional management or used as supplemental guidance during the conduct of the core inspection program. Discretionary procedures should be used to augment the core inspection program and to assess particular areas, safety concerns or aspects of licensee performance and maybe used to inform inspectors conducting work under a core IP. Many of the IPs identified as discretionary are applicable to multiple programs and are not specific to uranium recovery.

An inspection is considered complete when the NRC determines that the objectives of the core and discretionary inspection procedures have been met.

07.07 Coordination with State Agencies

For NRC inspections in both Agreement and non-Agreement States, State radiation control program personnel shall be notified in advance of the inspection. Under routine circumstances, the notification should be made at least one week in advance of the inspection. Whenever possible, for reactive inspections, the State should be notified before the start of the inspection so that any public inquiries that may come to the State may be referred to the NRC.

State personnel may observe NRC inspections, so long as their presence does not affect the inspection. Observers should be informed that information gathered during the inspection is pre-decisional and shall not be disclosed until the final inspection results are issued.

07.08 Coordination with Federal Agencies

NRC does not conduct inspections of licensee compliance with the requirements of other Federal agencies, except the U.S. Department of Transportation (DOT); however, NRC inspectors may identify concerns during an inspection that are within another agency's regulatory authority. The inspector should discuss the concerns with the licensee; but inspectors are cautioned not to judge whether a given condition is a violation of another agency's rules or regulations. The inspector may also discuss the concerns with the appropriate liaisons within the NRC to determine if a formal referral is necessary.

In the case of complaints or allegations involving another federal agency's jurisdiction, the inspector should withhold the information from the licensee management and submit the concern(s) to the appropriate NRC liaison as soon as practicable after the onsite inspection to forward to the appropriate agency. The NRC has entered into several Memorandum of Understanding (MOUs) with other Federal Agencies. A listing of MOUs by year can be found at the following website: <https://www.nrc.gov/reading-rm/doc-collections/memo-understanding/>

Please note that this listing only goes back to 1984. Older MOUs may need to be obtained by other means. Please check the website to make sure you have the most current versions of the MOUs.

The following MOUs contain information that is relevant to inspection activities:

a. U.S. Department of Transportation

1. The NRC/DOT MOU, "Transportation of Radioactive Materials," published in the *Federal Register* on July 2, 1979 (44 FR 38690), delineates DOT's and NRC's respective responsibilities for regulating safety in transportation of radioactive materials.

b. U.S. Department of Justice (DOJ)

1. The NRC/DOJ Federal Bureau of Investigation (FBI) MOU, "Cooperation Regarding Threat, Theft, or Sabotage in U.S. Nuclear Industry," published in the *Federal Register* on May 16, 2000 (65 FR 31197), provides a basis for contingency response planning, coordination, and cooperation between the FBI and the NRC, to deal effectively with threats, and with acts associated with theft or sabotage attempts against NRC-licensed nuclear facilities and activities.
2. The NRC/DOJ MOU published in the *Federal Register* on December 14, 1988 (Volume 53, Issue 240), provides for coordination between the two agencies for matters that could lead to NRC enforcement action, as well as DOJ criminal prosecution. The MOU also facilitates exchange of information on matters within their respective jurisdictions.

c. U.S. Department of Labor (DOL)

1. The NRC/DOL MOU, "Cooperation Regarding Employee Protection Matters," published in the *Federal Register* on October 27, 1998 (63 FR 57324), provides coordination of employee protection provisions in Section 211 of the Energy Reorganization Act of 1974. Section 211 prohibits a licensee, applicant, or contractor or subcontractor of same from discriminating against any employee who assisted or participated, or is about to assist or participate, in an NRC inspection.
2. The NRC/DOL Occupational Safety and Health Administration (OSHA), MOU, "Worker Protection at NRC-licensed Facilities," published in the *Federal Register* on October 31, 1988 (53 FR 43950), was designed to ensure that there will be no gaps in the protection of workers at NRC-licensed facilities where the OSHA also has health and safety jurisdiction. At the same time, the MOU is designed to avoid NRC and OSHA duplication of effort in those cases where it is not always practical to sharply identify boundaries between the NRC's responsibilities for nuclear safety and the OSHA's responsibilities for industrial safety.

Specific guidance on the responsibilities and "Interfacing Activities Between Regional Offices of NRC and OSHA," can be found in IMC 1007, "Interfacing Activities Between Regional Offices of the NRC and OSHA." There are four categories of occupational hazards that may be associated the licensed materials:

- (a) radiation hazards produced by radioactive materials

- (b) chemical hazards produced by radioactive materials
- (c) facility conditions that affect the safety of radioactive materials and thus present an increased risk to workers
- (d) facility conditions that result in an occupational hazard that do not involve the use of licensed materials

Generally, NRC has jurisdiction over categories (a), (b), and (c). OSHA has authority and responsibility for category (d). Through this MOU, NRC supports OSHA by reporting category (d) conditions to the licensee and OSHA so appropriate action(s) can be taken.

d. U.S. Environmental Protection Agency (EPA)

1. The NRC/EPA MOU, "Regulation of Radionuclide Emissions," published in the *Federal Register* on November 3, 1980 (Volume 45, No. 214), defines in general terms the respective roles of the two agencies and establishes a framework of cooperation for avoiding unnecessary duplication of effort and for conserving resources in establishing, implementing, and enforcing standards for airborne radionuclide emissions from sources and facilities licensed by the NRC.
2. The NRC/EPA MOU published in the *Federal Register* on November 16, 1992 (Volume 57, No. 221), was designed to foster NRC/EPA cooperation in protecting health and safety and the environment on issues relating to the regulation of radionuclides in the environment.
3. The NRC/EPA MOU published in the *Federal Register* on December 22, 1992 (Volume 57, No. 246), concerns "Clean Air Act Standards for Radionuclide Releases from Facilities Other than Nuclear Power Reactors Licensed by NRC or its Agreement States." The MOU was designed to ensure that facilities other than nuclear power reactors, licensed by the NRC, will continue to limit air emissions of radionuclides to levels that result in protection of the public health with an ample margin of safety.

In 2002, the NRC and the EPA signed an MOU to facilitate cooperation in the decommissioning of NRC-licensed sites. Under the MOU, NRC staff will consult with EPA staff if the proposed Derived Concentration Guideline Levels in the Decommissioning Plan (DP) or the final residual radioactivity at the site, as evidenced by the Final Status Survey Report (FSSR), exceed trigger levels in the MOU, if groundwater at the site will exceed the EPA's Maximum Concentration Levels, or if the licensee requests license termination pursuant to the restricted use provisions of 10 CFR 20 Subpart E.

07.09 General Description of Inspection Program

Inspections are used to verify that licensees are implementing the NRC's regulatory and license requirements. When licensees implement these requirements, it is assumed that they are most likely conducting operations in a manner that is protective of the public and environment from undue risk. The inspection program for uranium recovery and 11e.(2) byproduct material sites is divided into three overlapping areas: construction, pre-operation, and operations. Inspection requirements for decommissioning facilities

are described in IMC 2602, "Decommissioning Fuel Cycle, Uranium Recovery, and Materials Inspection Program." For sites conducting decommissioning activities in conjunction with site construction and/or operations, inspection planning and implementation will include the relevant components of both IMCs 2801 and 2602 appropriate for the activities being inspected.

The goals of the construction and preoperational inspections are to ensure that the licensee has established programs, constructed the facility, and trained the staff in accordance with license and regulatory requirements prior to commencing operations with licensed material. The goal of the operational inspection program is to verify compliance with license and regulatory requirements using a risk-informed, performance-based inspection approach.

In general, inspections of uranium recovery and 11e.(2) byproduct material sites will be announced inspections. The inspections should be announced to ensure that pertinent licensee staff are available to support the inspection since most sites are remotely located. The NRC inspection staff may choose to conduct unannounced inspections in certain situations. The most common reasons for unannounced inspections are to observe plant operations, transportation activities, and security controls without prior licensee notification.

Regulations state that each licensee shall afford to the Commission at all reasonable times the opportunity to inspect source or byproduct material and the premises and facilities wherein source or byproduct material is used or stored. If the licensee does not maintain a 24-hour presence at a site, NRC inspectors are not expected to conduct inspections after normal working hours without prior notification to the licensee. However, if the licensee maintains a 24-hour presence at a site, unannounced inspections during evenings or weekends may be appropriate to review site status, security, and operations without prior notification.

The licensee is required by regulation and license conditions to maintain a significant number of records. The inspector is expected to review select risk-significant records as part of the inspection process. Risk-significant records include environmental monitoring, spill cleanup, groundwater restoration, and training records. The inspector should also look for potential trends in occupational doses or effluent releases that may be indicative of declining performance. The inspector should retain copies of records as needed to support future enforcement actions.

The inspector should use a risk-informed, performance-based approach when reviewing records. For example, the inspector may choose to select random records of significance for review, such as occupational exposure records. The inspector should also consider reviewing records of activities or problems that were observed during site tours.

When reviewing the licensee's performance, the inspector should cover the period from the last to the current inspection. Corrective actions related to older issues that precede the last inspection, such as incidents, non-compliances, or elevated radiological exposures, should also be reviewed.

All inspections should include a review of licensee reportable events and other incidents that involve contamination, releases, spills, and equipment malfunctions that may impact safety. The review should include the licensee's assessment of worker and

environmental consequences and corrective actions taken to correct and prevent recurrence of the event.

The number of inspectors for each inspection will be determined by the complexity of the inspection. Many inspections tend to be multi-discipline team inspections that include expertise in radiation safety, operations, groundwater corrective actions, construction, transportation, and so forth. The required number of inspectors will be referenced in the MIP and approved by NRC management. Less complex inspections will require fewer inspectors.

Inspectors should conduct independent confirmatory radiological surveys as part of each inspection. The purpose of the independent survey is to ensure that the licensee has adequately implemented its radiation protection program. For example, inspectors may want to verify that radiation areas are properly posted or that shipping containers are properly packaged and labeled. The inspector should ask licensee representatives to verify any unusual or out-of-compliance measurements. The inspector's survey meter must be appropriate for the radionuclides of concern, and the inspector should have detailed knowledge of the operation and limitations of the meter.

During site tours, inspectors may identify findings that are not within the NRC's regulatory authority. Examples include industrial or safety hazards such as open holes, unmarked confined spaces, or inadequate lockout/tagout controls. These hazards should be reported to the licensee's management during the inspection. At the discretion of NRC management and depending on severity level, these findings may be reported to the proper regulatory authorities for follow-up review, in accordance with the agreements provided in the NRC's MOUs with these agencies (See Section 07.08 of this IMC for more information).

07.10 Timing and Frequency of Inspections

The uranium recovery inspection program as described in this IMC is formally initiated when the licensee begins construction under NRC regulations. The inspection program continues until the site, or portions of the site, enters the decommissioning process. Decommissioning inspections of uranium recovery and 11e.(2) licensed sites are managed under IMC 2602.

The frequency of inspections will vary depending on site activities and licensee performance. In determining the inspection frequency, the region, in consultation with the licensing PM, should factor in the radiological history of the licensee, the licensee's past performance, the licensee's planned schedule of activities, the potential for the site activities to affect the public health and safety or workers and the public, and the level of public interest. In other words, the decision to extend or reduce an inspection interval should be made using a risk-informed approach.

In addition, it may also be beneficial to conduct periodic conference calls between the NRC PM, regional staff, and licensee. Conducting calls on a routine schedule helps the NRC keep abreast of site activities and aids in development of an effective inspection schedule and site visits. These calls also help licensees keep informed about current NRC regulatory activities and licensing actions related to their site activities.

The NRC maintains open channels of communication with regard to access by the public, State, Tribal, or local officials to the NRC staff or to publicly available electronic

documentation concerning a licensee's performance. Some local officials or community groups may desire increased interaction with the NRC's staff and inspectors. The degree of interaction that is considered necessary to ensure openness in the NRC's inspection program is expected to vary widely depending on the situation at each uranium recovery site.

Inspections should be scheduled to allow the inspector to observe, at a minimum, all significant site activities. Inspection of significant activities can include activities such as:

- constructing a new wellfield
- observing the removal or dismantlement of equipment that possesses a high source term
- conducting confirmatory measurements that coincide with the licensee's surveying activities or to determine dose rates in header houses,
- observation of environmental or well sampling
- verifying licensee compliance with new license commitments, regulatory requirements, or procedures
- following up on previously identified violations or other identified weaknesses
- evaluating performance following a significant change in the licensee or contractor work force
- conducting a special inspection to address public concerns

Although inspections are expected to be conducted at sites that are under construction, in operation, or being actively remediated, there are times when inspections or site visits are warranted even though there is little to no construction, operations or site remediation taking place. For example, when a significant amount of public, State, Tribal and/or Congressional interest exists, inspections and visits may be warranted to ensure that regional staff and management have firsthand knowledge of the condition of a site as well as familiarization with licensee personnel. In other cases, no inspection activities may be needed. For example, a formal inspection is normally not necessary for a license that has been issued but the licensee has not started construction at the site.

At a minimum, inspections of complex materials sites in uranium recovery should be performed annually ($\pm 25\%$ scheduling interval), and if not, the decision or justification for deferring the annual inspection should be documented and placed in ADAMS. For sites where major construction, transportation campaigns or decommissioning activities are occurring, inspections shall be scheduled to conform to significant site activities. For major site efforts that involve large quantities of contaminated material (soils, buildings, or equipment), groundwater contamination, onsite or shipment off site for disposal, extensive surface contamination, dismantlement of major buildings and structures, or public exposures, at least one inspection should be conducted while the site is being characterized for future decommissioning. In general, inspections may be conducted more frequently, if necessary, to verify that worker and public exposures are maintained ALARA.

The implementation of individual IPs can also be extended or reduced based on site-specific conditions. The decision to extend or reduce an inspection interval should be made using a risk-informed approach. Proposed changes to the inspection interval should be discussed with regional management and the responsible PM in the NRC's program office and should be documented in the MIP and/or by memoranda to the associated docket file.

The inspection interval can be reduced (increased frequency of inspections) based on significant program changes, changes in management staffing, poor performance, poor enforcement history, bankruptcies, strikes, unanticipated events or incidents, or other situations where safety may have been compromised.

The inspection interval can be increased (reduced frequency of inspections) due to superior performance over time, good enforcement history, strong management commitment to safety, and low number of incidents or events. Extensions may also be granted for sites in long-term standby, sites with radioactive material in long-term storage, and sites conducting operations with limited quantities of licensed radioactive material that pose little risk to workers, the public, and the environment. Extensions should not be considered for licensees who have recently undergone significant program or management staffing changes to ensure that the licensee can maintain adequate performance over the next several inspection periods.

If escalated enforcement action has been taken for a licensee, a follow-up inspection should be conducted approximately six months after completion of the escalated enforcement action to assess the licensee's corrective actions taken in response to the enforcement action. This follow-up inspection can be conducted as part of the next routine inspection.

Inspections conducted during the construction and preoperational phase should be planned and implemented on a case-by-case basis. Ideally, the inspection should be conducted when risk-significant activities are in progress such as installation of wells, testing of critical systems and controls, or installation of pond liners. Preoperational inspections should be conducted at least once prior to startup of facility operations; although, more than one preoperational inspection may be necessary to ensure that the site is ready for operations with licensed material.

Some licensees may have a license for construction and operation of a uranium mill but have not started actual construction or operation of the mill. Other licensees may be in long-term standby. At these sites, the NRC inspection staff shall verify, at least once per year, that these licensees have not taken action to start construction or restart of the mill. This information will be recorded in annual memoranda to the docket file for the respective sites.

07.11 Master Inspection Plan (MIP)

At the onset of uranium recovery activities at a licensed site, the site should be added to the MIP. The purpose of the MIP is to ensure that the inspection program is properly focused and that sufficient resources are available to conduct the inspections when necessary. The MIP should be based on the expected schedule of licensee activities and include inspections of all significant decommissioning activities. The regional lead inspector is responsible for developing the MIP, working with the agreement of the cognizant NRC PM to determine site priorities and issues for inspection. The inspection schedule provided in the MIP should be periodically reviewed and modified as needed.

The MIP should provide the inspections that are planned, the activity or program area being inspected, the procedure(s) that will be used to conduct the inspections, and the approximate time frame for when the inspection is expected to occur. Some factors to be considered while developing and implementing a MIP include:

- unique or challenging approaches and procedures or hydrological conditions such as diversion of the radiological effluent stream, excavation of contaminated soils from below a water table, or dredging of soils from outfalls or intakes
- licensee performance
- staffing changes
- Congressional or public interest
- transportation of radioactive materials
- effectiveness of management oversight and contractor control
- decommissioning funding
- timing and scheduling of significant decommissioning activities

07.12 Periodic Management Visits to Meet with Licensee Representatives

Headquarters and regional management might consider visiting the facility to understand the licensee's construction, operations, or decommissioning progress. Licensee programs for the control and handling of radioactive materials, licensee staffing, public interest, experience and expertise, and the MIP are possible topics of discussion.

As site activities progress, additional management site visits may be held periodically or prior to major changes in the status of the site to gain licensee management insights and perspectives. The intent of these visits is to understand licensee plans and schedules, and the controls implemented to provide quality, cost management, and safety. Performance elements involving radiation dose, curie-level activity production or removal and transportation, scheduler accuracy, and radiological safety could be discussed to ascertain the licensee's assessment of their own performance. Discussions could include the dissemination of press and public information; status of site radiation protection programs, problems associated with staffing and contractors; and storage and/or transportation of radioactive material.

07.13 Security and Control of Contaminated Material

Assess licensee security and control of contaminated material using active measures (use of locks), passive administrative measures (posting, labeling or establishment of temporary barriers) or a combination thereof. Verify that contaminated material at licensed sites under construction, in operations or undergoing decommissioning is secured and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," posted in accordance with 10 CFR 20.1902, "Posting Requirements," and labeled in accordance with 10 CFR 20.1904, "Labeling Containers," and 20.1905, "Exemptions to Labeling Requirements."

Contaminated materials in buildings shall be secured and controlled by locking buildings, rooms, or areas. Contaminated materials in outside areas shall be secured and controlled by fencing or soil covers. Eight-foot cyclone-type fencing is generally acceptable. Other fencing types, such as barbed wire fences, may be sufficient in low population, rural areas. Three- to four-foot-thick soil covers over contaminated soil, slag, or tailing piles are also generally acceptable. Access to buildings, rooms, or indoor and outdoor areas having contaminated materials shall be limited only to individuals having the licensee's or responsible party's requirements for access.

Normally, uranium recovery activities will not involve large enough quantities of radioactive materials to subject to the physical protection requirements of

10 CFR Part 37, “Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material.” For sites that possess sufficient quantities of radioactive material to be subject to Title 10 CFR Part 37, the physical control inspections should be incorporated into the decommissioning inspections as needed. For additional information associated the physical protection requirements with 10 CFR Part 37, see IP 87137, “10 CFR Part 37 Materials Security Programs.”

07.14 Inspection Coordination

Prior to performing inspections at a uranium recovery site, the regional inspector should coordinate inspection activities, as appropriate, with the following personnel and organizations:

- a. Inform the cognizant DUWP-PM who has responsibility for the site of the inspection. Offer the PM an opportunity to accompany the inspector during inspection.
- b. Contact the licensee and discuss inspection plans (unless the inspection is unannounced).
- c. If the inspection is conducted in an Agreement state, the inspector shall make a courtesy notification to the Agreement state director prior to the inspection. Inform any other governmental agency that may have an interest in the site. For example, notify DOE staff for a site that may eventually be managed under the general license requirements of 10 CFR 40.27 and 40.28.

07.15 Scope of Inspections – General

The inspection starts with the planning of inspections in the MIP, as described in Section 07.11. Implementation of the MIP also includes the coordination of site visits and inspections to promote regulatory efficiency and effectiveness and to reduce regulatory burden on the licensee. The basic inspection process entails:

- a. Preparing for the inspection by reviewing appropriate background material (e.g., license, license file, past inspection reports, allegations, and other pertinent information).
- b. Preparing an inspection plan describing the scope and major areas of emphasis that will be reviewed, evaluated, or assessed. This plan should be reviewed by the lead inspector’s BC.
- c. Obtaining appropriate and calibrated radiation detection instrumentation or any other equipment to verify licensee activities, if applicable for the inspection. In situ measurements with licensee personnel can be beneficial in future determinations as to the scope of confirmatory surveys required for the facility.
- d. Conducting an entrance meeting with the licensee. Discuss the inspection scope with licensee management and identify any open items that will be reviewed. Verify that the licensee understands that the inspection involves the observation of facility operations, interviews with staff, document reviews, and/or radiation surveys to obtain independent and confirmatory data. Any change or potential change to the onsite inspection plan should be communicated with appropriate NRC staff (regional BC and NRC PM for the site).

- e. In cases where unique situations or unclear configurations may be identified and considered potentially adverse to the conduct of safe site activities or public health and safety, discern whether the licensee is aware of the situation and is taking appropriate action, as necessary, to correct and preclude recurrence. Such cases or problems involving NRC requirements and licensee commitments should be raised to the NRC PM for the site and NRC management (regional and program as appropriate). Equally important, determine if the situation is beyond the scope of the inspector's expertise and if so, promptly inform NRC management and make recommendations, that allow management to determine the urgency of the request for assistance, what type of expertise is required, and what extent of effort is required.

An exit meeting shall be conducted with licensee management at the conclusion of the inspection. The inspection scope and applicable findings shall be presented emphasizing their impact on safety. Inspectors should ensure the licensee understands that the inspection findings are preliminary and subject to management review. If management review changes the findings, the inspector will need to re-exit with the licensee.

- f. Upon return to the regional office, the appropriate supervisory personnel should be briefed on the inspection findings and conclusions.
- g. Inspection findings, open items, follow-up items, and conclusions shall be documented in accordance with IMC 0610, "Nuclear Material Safety and Safeguards Inspection Reports," and other relevant regional instructions. Inspections resulting from allegations will be documented and dispositioned in accordance with Management Directive 8.8, "Licensee Oversight Programs – Management of Allegations."

It is recommended that all significant activities of a uranium recovery or 11e.(2) byproduct material inspection be identified and inspected. Major efforts in the inspection program should focus on the RMs identified in this IMC.

- h. In some cases, an inspector may identify a concern that results in an unresolved licensing basis question, which may take staff considerable effort to resolve. Inspectors can use the Very Low Safety Significance Issue Resolution (VLSSIR) process to discontinue inspection of an issue involving an unresolved licensing basis question in which the resolution of the question cannot be resolved without considerable staff effort and the issue would be of no greater than severity level (SL) IV, if determined to be a violation. Appendix D provides further details about the VLSSIR process.
- i. Observation of uranium recovery activities is an important program element for inspectors. Observation of activities such as decontamination and release surveys for materials and equipment, radiation work practices, or environmental sampling allows the inspector to identify potential concerns and verify licensee performance is appropriate for the situation and site conditions. Prior to observation of licensee activities, NRC staff should review reference documents such as radiation work permits, procedures, and activity hazard assessments to understand the work controls implemented or planned by the licensee.

Occupational radiation protection programs should be detailed in a written Radiation Protection Plan and implementing procedures. Inspectors should familiarize themselves with this plan and its procedures to understand the controls and measures that the

licensee will take to protect employees from unnecessary radiation dose and to monitor the dose to occupational workers, contractors, and visitors while onsite.

Sites are usually required by license condition to implement and maintain an environmental monitoring program, determine public dose, and monitor/document effluent releases. NRC staff should review these license conditions and supporting documentation including any required reporting to the State or the NRC as part of their licensing or inspection work for the licensee.

The inspectors will review management organization and control activities to identify if the appropriate level of support is provided to the radiation safety officer and radiation safety staff to ensure that the radiation protection program has the necessary resources to complete their job of protecting workers, the public and the environment from hazards associated with the uranium recovery and 11e.(2) byproduct material licensee activities onsite. NRC staff needs to review and understand the processes used for generation of waste, reduction of waste streams, storage of waste and plans for waste transportation and disposition. These elements are usually considered as part of the development of an Environmental Assessment or Environmental Impact Statement if site activities fall under the National Environmental Policy Act.

NRC inspectors may observe industrial safety and health hazards or receive complaints from employees that are within OSHA's authority and responsibility. In such instances, the NRC will bring the matter to the attention of licensee management. In the case of employee complaints, NRC will withhold the identity of the employee from the licensee. If the licensee does not effectively address serious industrial safety or health hazards that are identified, the NRC regional office will inform the nearest OSHA regional office. [Refer to additional guidance provided in IMC 1007 or the MOU (ML11354A432) for additional information].

07.16 Inspection During Construction and Preoperational Phases

Construction activities vary depending on the type of facility being inspected. For a conventional uranium mill, construction would include erection of the mill, construction of the tailings disposal cell foundation, installation of groundwater monitoring wells and header houses, and collection of environmental monitoring data to establish background conditions. For ISR sites, construction would include erection of the central processing plant and satellite facilities; development of wellfields; drilling of production, monitoring, and excursion wells; construction of evaporation ponds; and collection of environmental data. Construction of heap leach piles include construction of the base of the pile, drip and collection lines, and ion exchange equipment. Finally, construction of an 11e.(2) byproduct material disposal cell includes construction of the base of the cell, installation of monitoring wells, and collection of background environmental monitoring data.

Regulations allow certain site preparation activities to occur prior to commencement of NRC-licensed construction activities. The NRC may conduct inspections or site visits during pre-construction activities to observe the site, observe onsite activities, or ensure that the licensee has not started NRC-regulated construction activities prior to issuance of the license. The list of authorized pre-construction activities is provided in 10 CFR 40.4. NRC-regulated construction activities, as defined in 10 CFR 40.4, cannot begin until the NRC has issued the associated license.

Construction inspections are conducted to verify that construction activities are implemented in accordance with regulatory and license requirements. Typically, details of planned construction activities are provided in the license application. The license may also include special conditions, such as requirements for environmental monitoring, that must be implemented prior to operations. Construction inspections may require the use of inspectors with special expertise for activities such as drilling of wells or installation of the disposal cell base. Regional staff should request program office support as needed based on site activities.

The timing of construction inspections will depend on site activities. The NRC may also choose to conduct a construction inspection during or immediately following major plant modifications at a facility in operation. Critical activities, such as construction of the disposal cell base, may warrant multiple inspections to ensure that the licensee's staff and contractors are conducting the work in accordance with license or application requirements. During construction inspections, independent radiological confirmatory surveys may not be necessary, unless there is a need to verify background information. The inspectors should review records that are important to safety such as disposal cell quality controls tests and well installation records.

Some ISR facilities are constructed in phases. Wellfields, satellite buildings, and header houses are commonly constructed, operated, and decommissioned in phases. Construction and preoperational inspections should be conducted at all new wellfields until the NRC staff has confidence in the licensee's demonstrated ability to implement construction and operational requirements as specified in regulations and the license.

Preoperational inspections typically occur between construction and operations. Some licenses include a requirement that operations cannot commence until the NRC has conducted the preoperational inspection. The purposes of the preoperational inspection are to ensure that the licensee has the staff, programs, procedures, and facilities to commence with licensed operations. Depending on the status of the site, the licensee may not be in possession of licensed material at that time. The goal of the preoperational inspection is to ensure that the licensee is prepared for operations involving radioactive material.

Historically, more than one preoperational inspection has been necessary at newly constructed facilities before the NRC authorizes operations. The first inspection may identify the program areas or other weaknesses that need licensee management attention. Subsequent inspections would then concentrate on these previously identified areas or weaknesses to ensure that these areas have been completed or corrected by the licensee. Once the NRC authorizes operations, the preoperational inspection program has been completed for that portion of the facility. Future plant expansions may warrant additional preoperational inspection efforts.

Preoperational inspections should be conducted at conventional mills and ISR sites that have been in standby for extended periods of time and have decided to restart site operations. The goals of these inspections include verification of equipment operability, re-staffing efforts, and program implementation.

The core and discretionary IPs for construction and preoperational inspections are provided in Appendix A. The core inspection procedures were selected to ensure that risk-significant activities are addressed. Based on site-specific conditions, inspectors have the discretion to implement other IPs as needed.

07.17 Inspections During Operational Phase

Depending on the type of facility, the operational inspection program begins after completion of construction or preoperational activities, when the license is issued, or restart of operations following an extended standby. The operational phase ends when the facility, or a portion of the facility, permanently ceases operations.

As noted earlier, the operational inspection program should be implemented with a risk-informed, performance-based approach. As such, the inspector should concentrate on activities with a higher level of risk, such as dryer operations, with less emphasis on low-risk activities such as routine documentation requirements. The inspection should also be performance-based, with more emphasis on observation of the licensee's implementation and execution of its licensed program.

The inspectors should conduct independent confirmatory radiological surveys as part of the inspection. Ideally, the equipment or areas surveyed should be rotated over time, to avoid surveying the same areas or equipment during successive inspections.

Some facilities, or portions of facilities, may suspend operations for extended periods of time. These facilities are considered to be operational since they have not permanently ceased operations. Facilities in standby do not pose the same level of risk as operating facilities. For these facilities, implementation of all core procedures may be unnecessary. However, certain activities such as groundwater monitoring and the groundwater corrective action program should continue to be inspected while the facility remains in standby. The inspection program should be adjusted for facilities in standby and changes documented in the Master Inspection Plan and/or memoranda to the docket file. Depending on the circumstances, the licensee may have to submit, for NRC approval, an alternate schedule for completion of decommissioning, in accordance with 10 CFR 40.42, if no principal activities are conducted for a period of 24 months.

The core and discretionary procedures for the operational phase are provided in Appendix B. The inspection program can be adjusted as needed based on site-specific conditions. These changes should be documented in the associated Master Inspection Plan.

07.18 Documentation of Inspections

The inspection staff shall document the inspection in accordance with the requirements of IMC 0610, "Nuclear Materials Safety and Safeguards Inspection Reports."

Inspectors should be certain to document the results of the inspection activities related to the security and control of radioactive materials and reviews of environmental data (airborne and liquid effluent releases and groundwater sampling data). The discussion of site security should be in general terms, unless details are needed based on the scope of the inspection. In these situations, the inspection reports should be marked as appropriate based on the content of the report (Security-related, Safeguards, etc.).

07.19 Applicability of Very Low Safety Significance Issue Resolution Process

In some cases, an inspector may identify an issue that results in an unresolved licensing basis question which may take staff considerable effort to resolve. In the context of VLSSIR, the term "licensing basis" refers to all regulations, license conditions, and

requirements applicable to a facility or licensee, including, but not limited to, the licensee's written commitments for ensuring compliance. In determining how to proceed, the inspector should consider the significance of the issue. The inspector should refer to the guidance available in IMC 0610, Appendix G, "Screening and Documentation of Very Low Safety Significance Issue Resolution Process," to determine if the issue is no greater than severity level (SL) IV if determined to be a non-compliance. If the issue is no greater than SL IV, further evaluation of the issue can be discontinued using the VLSSIR process. If further inspection of the issue cannot be discontinued using the VLSSIR process, then resolution of the issue should be continued following existing processes, including the identification of an unresolved issue and/or use of the headquarters technical support for regional activities, e.g., Technical Assistance Request (TAR) process.

Although the definition for VLSSIR refers to "safety significance," the VLSSIR process applies to a broad range of regulated areas related to safety, including security, emergency planning and preparedness, documentation control, and reporting. Note that the VLSSIR process cannot be used to resolve known compliance issues, issues where there is a clear indication that a noncompliance occurred but certain details concerning the issue have not been finalized (e.g., specific date, time, location), nor should it be used to establish a staff position.

If inspection of an issue is discontinued using the VLSSIR process, no further staff effort to resolve the issue is necessary. Document the issue in accordance with IMC 0610, Appendix G as appropriate, and the documentation should provide an appropriate level of inspection closure, knowledge management, and transparency. Once a VLSSIR finding is documented, the staff should generally refrain from spending additional inspection resources on the issue.

07.20 Management Reviews

At least once per year, or at intervals established by NRC regional management, the inspection program should be reviewed to ensure that the various licensees are being inspected at the appropriate frequencies and with the proper level of inspection oversight. The assessment should include input from both the inspection and program office staff.

Regional management will establish a format for these reviews. The format may include site summary, site information, site activities, inspection results, enforcement history, items of interest, planned inspections for the next physical year and observations/comments. The assessment may include both qualitative and quantitative information. The information to be considered may include enforcement history, performance history, event assessment, number of allegations, significant program changes, management staff changes and licensee management commitments to safety. The goal of the management review is to ensure that the inspection program has been implemented in a manner that is commensurate with program requirements and to provide recommendations for the adjustments to future inspections.

2801-08 REFERENCES

IMC 0610, "Nuclear Material Safety and Safeguards Inspection Reports," May 18, 2004

IMC 0610, Appendix G, "Screening and Documentation of Very Low Safety Significance Issue Resolution Process," April 11, 2024, ML23291A357

IMC 0620, "Inspection Documents and Records," July 23, 2020

IMC 1007, "Interfacing Activities Between Regional Office of NRC and OSHA," September 1, 2022, ML22131A374

IMC 1248, "Qualification Programs for Federal and State Materials and Environmental Management Programs," April 19, 2013

IMC 1301, "Response to Radioactive Material Incidents That Do Not Require Activation of the NRC Incident Response Plan," October 20, 2000

IMC 2602, "Decommissioning Oversight and Inspection Program for Fuel Cycle Facilities and Materials Licensees," July 29, 2008

IP 87103, "Inspection of Material Licensees Involved in an Incident or Bankruptcy Filing," November 3, 2000

NRC Memorandum dated June 22, 2012, "Verification of Additional Protocol Reporting at Uranium Recovery Facilities," ML12171A355

NRC Memorandum dated September 7, 2012, "Division of Waste Management and Environmental Protection Actions to Address Recommendation 2 of the Office of the Inspector General Audit of the Uranium Recovery Decommissioning Program," ML12213A418

NUREG-2150, "A Proposed Risk Management Regulatory Framework," April 2012

NUREG-CR/6733, "A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees," September 2001

NUREG/KM-0016, "*Be riskSMART*: Guidance for Integrating Risk Insights into NRC Decisions," March 2021

Staff Requirements SECY-98-144, "White Paper on Risk-informed and Performance-based Regulation," March 1, 1999

END

Appendices:

Appendix A: Core and Discretionary Inspection Procedures for Construction and Preoperational Inspections

Appendix B: Core and Discretionary Inspection Procedures for Operational Inspections

Appendix C: Inspection Program Modifications During Pandemics, Epidemics and Other Widespread Illnesses or Diseases

Attachments:

Attachment 1: Revision History for IMC 2801

Appendix A: Core and Discretionary Inspection Procedures for
Construction and Preoperational Inspections

2801A-01 Table A-1: Core Procedures for Construction and Preoperational Inspections

IP 89010	Disposal Cell Construction at Uranium Recovery and 11e.(2) Byproduct Material Facilities	8 to 16 hours
IP 89015	Construction and Preoperational Inspection Program at Uranium Recovery and 11e.(2) Byproduct Material Facilities	32 to 72 hours

2801A-02 Table A-2: Discretionary Procedures for Construction and Preoperational Inspections

IP 89005	Management Organization and Controls at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89020	Groundwater and Water Management at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89025	Assessment of Dryer and Yellowcake Packaging Operations
IP 89030	Radiation Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89035	Radioactive Waste Management and Transportation at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89045	Effluent Control and Environmental Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89050	Emergency Preparedness and Fire Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 92701	Follow-up
IP 92703	Follow-up of Confirmatory Action Letters or Orders

Appendix B: Core and Discretionary Inspection
Procedures for Operational Inspections

2801B-01 Table B-1: Core Procedures for Operational Inspections

IP 89020	Groundwater and Water Management at Uranium Recovery and 11e.(2) Byproduct Material Facilities	8 to 32 hours
IP 89025	Assessment of Dryer and Yellowcake Packaging Operations	4 to 8 hours
IP 89030	Radiation Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities	4 to 8 hours
IP 89035	Radioactive Waste Management and Transportation at Uranium Recovery and 11e.(2) Byproduct Material Facilities	5 to 9 hours
IP 89045	Effluent Control and Environmental Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities	Around 8 hours
IP 89050	Emergency Preparedness and Fire Protection at Uranium Recovery and 11e.(2) Byproduct Material Facilities	4 to 5 hours

2801B-002: Table B-2: Discretionary Procedures for Operations Inspections

IP 87102	Maintaining Effluents from Materials Facilities As Low As Is Reasonably Achievable (ALARA)
IP 87103	Inspection of Material Licensees Involved in an Incident or Bankruptcy Filing
IP 89005	Management Organization and Controls at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 89010	Disposal Cell Construction at Uranium Recovery and 11e.(2) Byproduct Material Facilities
IP 92701	Follow-up
IP 92703	Follow-up of Confirmatory Action Letters or Orders

Appendix C: Inspection Program Modifications During Pandemics, Epidemics, or Other Widespread Illnesses or Diseases

2801C-01 PURPOSE

Pandemics, epidemics, or other widespread illnesses or diseases primarily affect people and develop more gradually, spread more widely, and could persist longer than other natural phenomena. During these times, the U.S. Nuclear Regulatory Commission's (NRC's) inspection implementation strategy should be agile and allow for flexibility in the completion of the uranium recovery inspection program while maintaining reasonable assurance that licensees are in compliance with their licenses, plans and procedures, and applicable regulations. Licensees have the ultimate responsibility to safely operate their facilities and/or perform their authorized activities in accordance with their licenses and supporting documents.

During the time of a pandemic, epidemic, or other widespread illness or disease, the NRC will may use a graded approach to meet the objectives of the oversight program. A graded approach allows for deferring/rescheduling planned inspections, changing the inspection periodicity, adjusting inspection levels (number of completed inspection activities), conducting inspections leveraging remote means, or a combination of these actions, while seeking to maintain as much of the normal inspection program as possible and provide reasonable assurance of adequate protection of the public health and safety. This is based on the conditions being experienced and information and guidance from Federal, State, Tribal, and local government agencies, keeping in full view the health and safety of the personnel involved.

NRC chose to manage part of the Agency response to the COVID-19 pandemic by reducing the likelihood of staff exposures and issued a series of memorandum to staff, supporting increased telework (March 13, 2021), and mandatory telework (March 29, 2020). On June 1, 2020, the Office of Nuclear Material Safety and Safeguards (NMSS) issued a memorandum entitled "Inspection Guidance During Transition from COVID-19 Mandatory Telework for the Nuclear Materials and Waste Safety Programs" under the ADAMS Accession No. ML20143A281. This appendix formalizes the guidance provided by the memorandum and provides specific guidance as it relates to operational and decommissioning inspection programs for fuel cycle, uranium recovery, and materials.

2801C-02 OBJECTIVES

To provide direction for modifying the uranium recovery and 11e.(2) byproduct material inspection program in the event of a pandemic, epidemic, or other widespread illness or disease.

2801C-03 APPLICABILITY

Inspection Manual Chapter (IMC) 2801, "Uranium Recovery and 11e.(2) Byproduct Material Inspection Program."

NMSS or the regional offices may supplement, alter, or suspend the provisions of this guidance by memorandum as the situation warrants. The Director of DUWP and the Branch Chief (BC) of the Uranium Recovery and Materials Decommissioning Branch (URMDB) should be consulted

for 11e.(2) byproduct material and uranium recovery facilities when conditions requiring additional guidance is warranted.

2801C-04 RESPONSIBILITIES AND AUTHORITIES

See IMC 2801, Section 2801-05, Responsibilities and Authorities

2801C-05 REQUIREMENTS

NRC management will provide specific instructions to NRC staff based on the circumstances in event of a future pandemic, epidemic, or other widespread illness or disease.

2801C-06 GUIDANCE

In the event of a pandemic, epidemic, or other widespread illness or disease, the following considerations are expected to be in effect:

- a. The regions and headquarters are expected to make a reasonable effort to complete the inspection program. However, the Regional Administrator or Director of DUWP, with concurrence from the Director of NMSS can suspend implementation of the inspection program should conditions warrant. If this should occur, the primary function of inspectors and the implementing office would be to maintain situational awareness and the ability to respond to emergency situations.
- b. Regions should continue to adequately evaluate and respond to events at a facility during a pandemic, epidemic, or other widespread illness or disease. If onsite response by NRC personnel is not possible, then the regions should collect information on the event remotely.
- c. Inspectors should coordinate oversight activities of uranium recovery and 11e.(2) byproduct material inspections. Regional inspectors shall follow guidance provided in this appendix.
- d. Inspectors should verify that the licensees have sufficient staffing levels in key positions (e.g., operations, radiation safety) to ensure that the facilities are operated safely and that licensee activities do not pose an undue risk to public health and safety. Additionally, the inspectors should evaluate deferred maintenance and other activities, use of overtime, and the need for licensing or other regional support. The licensee's operational status may be an additional consideration when determining modifications to the inspection program and any necessary site coverage.
- e. The inspectors should discuss with their licensees the need to maintain situational awareness of the licensees' ability to cope with the challenges associated with a pandemic. They should use Regulatory Issue Summary (RIS) 2010-04, "Monitoring the Status of Regulated Activities during a Pandemic," dated May 25, 2010, and other appropriate guidance as a resource.

The RIS includes several questions that inspectors should consider during routine business contacts with licensees. The information obtained will enable the NRC to effectively respond to licensees with potential challenges. Inspectors should recognize

that during a pandemic, epidemic, other widespread illness or disease, licensees' resources may be strained. Therefore, inspectors should work with licensees to obtain the best information possible given the circumstances.

- f. Inspectors should be cautious when accessing licensee facilities during a pandemic, epidemic, or other widespread illness or disease using conservative good judgment so as not to unnecessarily risk the health of licensee employees. A graded approach based on the current licensee response posture should be considered for determining inspector site access.

In order to minimize the spread of infections, NRC staff members at or visiting sites should strive to follow any licensee plans in place. Additionally, inspectors should follow any applicable Federal, State, Tribal, or local health screening guidance in effect to determine if it is appropriate to enter a site and interact with licensee personnel.

If licensees are conducting health screenings to permit site access, inspectors should generally comply with those requests similar to their adherence to Occupational Safety and Health Administration or other industrial safety requirements. Inspectors should contact their management if the licensee implements changes to normal access to the site and coordinate with management if unfettered site access is denied or restricted.

- g. During the pandemic, epidemic, or other widespread illness or disease, the regions and headquarters should consider modifications to the inspections as follows:

1. Local implementation of limited social distancing (e.g., canceling after-school activities, limiting public gatherings, or advising nonessential workers to remain home)

- Assess the potential to postpone or reschedule onsite inspections
- Evaluate inspection frequency-based inspection activities may be postponed and still meet IMC 2801 requirements
- Evaluate whether inspections may be performed remotely or with a hybrid remote team with a single onsite team member
- Assess the potential to perform inspection activities through remote or virtual means
- Identify opportunities to leverage technology to inspect remotely

2. Local or national state of emergency or widespread implementation of aggressive social distancing (e.g., closure of schools, public parks, and nonessential businesses; requiring nonessential workers to remain home)

- Consider deferring/postponing all onsite inspection activities
- Assess inspection procedure objectives and licensee personnel support to determine whether procedures can be performed remotely

3. Implementation of the Agency Pandemic Plan

Implement site coverage, facility status monitoring, and emergency response in accordance with the NRC Memoranda and the Agency Pandemic Plan.

- h. Open communications and coordination between DUWP and Regional Offices is important during a declared pandemic, epidemic, or other widespread illness or disease.

The DUWP BC should coordinate communications with the responsible regional BC for oversight activities to ensure a consistent approach to inspections.

The NRC should consider the threshold at which onsite response is needed for an event. For example, the NRC may be able to perform some level of remote monitoring depending on the accessibility of the licensee's network. If direct onsite response is appropriate, the regions could consider limiting the response, such as having a single inspector respond to the emergency response facility or technical support center only.

2801C-07 REFERENCE

RIS 2010-04, "Monitoring the Status of Regulated Activities during a Pandemic"

Attachment 1: Revision History for IMC 2801

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional Non-Public Information)
n/a	04/15/94	Initial issuance		
n/a	ML20212A074 CN 97-013 09/02/97	Periodic update		
n/a	ML003753600 CN 00-014 08/25/00	Periodic update		
n/a	ML21202A302 10/08/21 CN 21-034	<p>IMC 2801 is being updated to implement a risk-informed, performance-based inspection program; IMC 2801 is being combined with IMC 2641.</p> <p>This is a major programmatic revision that combines the operating uranium recovery inspection program as currently described in IMC 2801 and IMC 2641. The uranium recovery decommissioning inspection program will eventually be moved to IMC 2602. IMC 2641 and the previous revision of IMC 2801 will remain available as guidance for uranium recovery decommissioning inspections until IMC 2602 has been updated and reissued. Once IMC 2602 has been reissued, the uranium recovery decommissioning program currently provided in the previous revision of IMC 2801 and IMC 2641 will be deleted.</p>	n/a	ML21202A300

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional Non-Public Information)
n/a	ML24124A203 07/26/24 CN 24-022	IMC 2801 is being updated to align with NMSS program changes and documented in IMCs 2800, 2600 and 2602 and to add inspection procedure IP 89025 for yellowcake dryer and packaging operations.	n/a	