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## INSPECTION PROCEDURE 88030

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### RADIATION PROTECTION

Effective Date: 01/01/2021

PROGRAM APPLICABILITY: IMC 2600 App B, 2694 App A, 2696 App A

#### 88030-01 INSPECTION OBJECTIVES

Determine that the **licensee's** performance is in accordance with the requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 20 **and Part 61**. **Focus will be on compliance with** regulatory requirements and **license** requirements.

The scope of the review should cover activities performed and records created since the last **inspection**.

#### 88030-02 INSPECTION REQUIREMENTS AND GUIDANCE

##### 02.01 Radiation Protection Program Implementation.

###### a. Inspection Requirements.

1. Verify the performance of the radiation protection **and radioactive waste programs are** being documented in accordance with 10 CFR 20.1101(a) and implemented in accordance with the license requirements.
2. Verify the functions and responsibilities **of the radiation protection and radioactive waste programs** are independent from operations as specified by the license application. Determine if the **programs are** in compliance with the license requirements.
3. Evaluate **any change that** occurred in the radiation protection **and radioactive waste programs' organizations**. **If applicable, verify that the new personnel satisfy** the position-specific requirements **outlined** in the **license application**.

###### b. Inspection Guidance.

1. By discussions with radiation protection management and by **a** review of documents, determine whether the radiation protection **and radioactive waste** safety functions are in accordance with the license application, **as** applicable, regarding:
  - (a) Radiation protection **and radioactive waste** safety functions **are up to date with** plant activities **so that no impact results to these programs' routine functions**;

- (b) Radiation protection and radioactive waste safety functions are included in assessments and/or audits; and
- (c) Radiation protection and radioactive waste safety are included as input to training.

Radiation protection and radioactive waste personnel:

- (a) Review changes to procedures created by other functions;
- (b) Maintain familiarity with operations within the facility requiring radiation protection and radioactive waste controls;
- (c) Exercise stop-work authority when necessary to protect the radiological safety of employees even when challenged by operational concerns (e.g., production);
- (d) Utilize the corrective action program to identify and correct radiological safety issues;
- (e) Examine reports of procedural violations and other deficiencies for possible improvement of radiation protection and radioactive waste safety practices; and
- (f) Report their findings to plant management.

These activities are allowed to be influenced by priorities established by operations, but shall not be controlled by operations.

- 2. Through discussions with staff and management and/or a review of documentation, determine whether the licensee's organizational structure is in accordance with the license application. Verify that the radiation safety function reports to senior management independently of operations.
- 3. By discussions with selected licensee managers who are new to their positions and, where appropriate, review of documentation, determine whether these managers meet the training and experience requirements for their positions as specified in the license application.

Focus on whether the qualifications of involved plant staff meet the requirements of the license application such as years of relevant experience, educational background, and/or training required for the newly assigned responsibilities.

If no significant changes have occurred in the organization since the previous inspection, then limit time spent on this section.

## 02.02 Radiation Protection Program Review.

- a. Inspection Requirements.

1. Determine that program performance is being reviewed, at least annually, for content and implementation in accordance with 10 CFR 20.1101(c).
2. Verify that the licensee has conducted audits or assessments in the **areas** of radiation protection and **radioactive waste**, and is in compliance with license requirements, **as** applicable.

Determine whether the licensee is identifying issues in the **areas** of radiation protection and **radioactive waste**, entering them into a corrective action program (CAP), and **correcting the condition as** required by license, procedure, and/or NRC requirements. **Licensees with an approved CAP will have their corrective action program inspected in accordance with IP 88161. Corrective actions as a result of violations will be inspected in accordance with IP 92702.**

3. Verify that the licensee has maintained records pertaining to the radiation protection **and radioactive waste programs**, including audits, **assessments**, and/or program content reviews, for three years after the record was made in accordance with 10 CFR 20.2102.

b. Inspection Guidance.

1. Review as low as reasonably achievable (ALARA) reports, audits, and assessments, as applicable. Determine if attention was given to methods to lower internal and external exposure **regarding** ALARA in the program reviews conducted.
2. Determine if the licensee is required to conduct audits **and/or** assessments. **If so**, select internal or contracted audits/**assessments** performed since the previous inspection and examine the records to determine whether there was a written plan for the audit, the audit **thoroughly** reviewed the audited/**assessed** area, corrective actions were taken whenever deficiencies were found, and whether there was a check of the effectiveness of the corrective action.
3. Interview the licensee and determine **if** the licensee ensures the effectiveness of audits/**assessments**.
4. Verify **the audits/assessments program**:
  - (a) **uses** a secondary (or follow-up) audit/**assessment** system on a periodic basis;
  - (b) **is** conducted by a member of management or a senior technician not directly responsible for the system audited/**assessed**; and/or
  - (c) **uses** **contracted auditors/assessors**.
5. Determine if safety-significant findings are being tracked through completion by the corrective action program, if required.
6. Perform a screening review of items entered into the corrective action program. Identify **if there are** safety-significant or repetitive failures that fall within the scope

of the inspection. In addition, be alert to conditions, such as repetitive equipment failures or human performance issues, that might indicate a trend or warrant additional follow-up.

7. A review of the licensee's corrective action program, Health Physics (HP) log book, or file on HP problems may be useful in identifying areas needing special attention. Particular attention should be directed toward identifying trends and ascertaining whether corrective actions were directed toward the cause and not merely the symptoms.

## 02.03 Radiation Protection and Radioactive Waste Procedures.

### a. Inspection Requirements.

1. Verify that safety-significant changes to procedures in the areas of radiation protection and radioactive waste were in compliance with regulatory and license requirements.
2. Verify that safety-significant changes were made in accordance with the procedure revision process, as applicable.

### b. Inspection Guidance.

1. Review substantive changes to procedures which have been implemented.
  - (a) Determine that limits, precautions, and controls, as specified in the procedures, are consistent with regulations and license requirements.
  - (b) Select a sample of procedures with safety-significant changes, if applicable, and verify that the changes were implemented in the field through direct observation or interview of technicians or operators.
2. By reviewing a sample of recently changed or new radiation protection and radioactive waste procedures, determine whether the licensee's system for approving procedures complies with license requirements, as applicable.
3. Verify that the licensee has followed their change control process in accordance with approved procedures, as applicable.

Determine whether safety-significant procedure changes are:

- (a) reviewed and approved in accordance with the license;
  - (b) personnel affected by a procedure are adequately and timely informed of changes in that procedure; and
  - (c) only approved and current procedures are used.
4. Determine whether the licensee reviewed and updated procedures at the frequency specified by the license or control procedure. Determine whether revision and update of procedures is performed on a timely basis as a result of

procedural deficiencies **identified**, regardless of the periodic review schedule.

#### 02.04 Training.

##### a. Inspection Requirements.

1. Review training records to verify compliance with 10 CFR 19.12, "Instructions to Workers." Verify that employees receive the training at the frequency specified in the license application, if applicable.
2. Review training in the **areas** of radiation protection **and radioactive waste**, and evaluate if training is in compliance with license requirements.

##### b. Inspection Guidance.

1. Verify through staff interviews and/or a review of records that **employees** likely to receive in a year an occupational dose in excess of 100 millirem (mrem) were instructed in 10 CFR 19.12 requirements, including:
  - (a) Kept informed of the storage, transfer, or use of radiation and/or radioactive material.
  - (b) Instructed in radiological protective measures associated with exposure to radiation and/or radioactive material including precautions or procedures to minimize exposure and in the purposes and functions of protective devices employed.
  - (c) Instructed in the applicable provisions of the NRC regulations for the protection of personnel from exposure to radiation and/or radioactive material.
  - (d) Informed of their responsibility to report promptly to **management** an observed condition which may lead to or cause a violation of NRC regulations, license **requirements**, or unnecessary exposure to radiation and/or radioactive material.
  - (e) Instructed in the appropriate response to warnings made in the event of an unusual occurrence or malfunction that may involve exposure to radiation and/or radioactive material.
  - (f) Advised as to the radiation exposure reports which workers may request pursuant to 10 CFR 19.13, "Notifications and Reports to Individuals."

If applicable, verify that licensee's training program includes the requirements **required by** 10 CFR 70.61(f)(2). Verify that the training includes risk awareness for accidents involving licensed activities as **per** the Integrated Safety Analysis.
2. Review training applicable to radiation protection **and radioactive waste** topics such as general employee training or RadWorker training. Verify that the refresher or requalification training occurs at the required frequency, if applicable.

3. If time permits, discuss and observe training with selected staff in a variety of positions to determine whether the training is **in compliance with the applicable license application chapters**. Interview a sample of workers (consistent with the size of the program) to determine if workers understand radiation protection **and radioactive waste** as **related** to their jobs and if these **workers** have opportunities to discuss radiological safety concerns with the radiation protection **and radioactive waste** staff. Discuss procedural expectations with staff to determine whether the staff implements **the** procedures.

## 02.05 Safety-Significant Events.

### a. Inspection Requirements.

1. Determine whether the licensee has implemented a **means to review and evaluate** safety-significant events in the **areas** of radiation protection and **radioactive waste as per** license requirements. Review events involving special nuclear material (SNM) that occurred since the last 88030 inspection.
2. Determine if the events affected worker health and safety or occurred as a result of a deficiency in the radiation protection **or radioactive waste programs**. Determine if the event condition(s) resulted in a violation of an applicable regulatory requirement. Evaluate the significance of the event.
3. Determine if the event met reportability requirements. Verify that the licensee complied with reportability requirements for:
  - (a) the loss of control or theft of material (10 CFR 20.2201 and **20.2202(b)**);
  - (b) incidents and exposures (10 CFR 20.2202 and **20.2203**);
  - (c) overexposures (10 CFR 20.2202(a) and **20.2203**);
  - (d) 10 CFR 40.60 reporting requirements, if applicable;
  - (e) 10 CFR 70.50, 70.52, 70.74, and Part 70 Appendix A reporting requirements, if applicable, **and**
  - (f) **license** requirements, **as** applicable.

### b. Inspection Guidance.

1. Review Event Notifications and reports, the NRR-maintained events database, **the NMSS-maintained operating experience database**, and/or **RRPS** during office inspection preparation.
2. Review events involving SNM through document reviews, staff and management interviews, and/or plant condition or equipment observations.
3. Determine if **unreported** events occurred through discussions with management, operating personnel, maintenance, and/or health physics personnel and through the review of log books, corrective action program **entries**, and/or other data, as

applicable.

4. If a safety-significant event involving SNM impacted worker health and safety, the radiation protection, or the radioactive waste programs, then evaluate the licensee evaluation of the event and subsequent corrective actions. If applicable, consider if the licensee actions were as stated below:
  - (a) The licensee reported the issue in a timely manner commensurate with its significance and ease of discovery.
  - (b) The licensee considered the extent of condition, generic implications, common cause, and/ or previous occurrences. The licensee identified the root and contributing causes of the problem, if applicable.
  - (c) The licensee properly classified and prioritized the resolution of the problem commensurate with its safety significance. The corrective actions were focused to correct the problem and prevent recurrence.

#### 02.06 Radiation Work Permits.

##### a. Inspection Requirements.

1. Verify the licensee is in compliance with the license requirements or procedures.

##### b. Inspection Guidance.

1. Review a selection of radiation work permits (RWPs) on file and those currently in effect.
2. Observe temporary work being performed under an RWP, if available. Observe the radiation technician(s) prepare temporary radiological work areas, provide radiological job coverage, and release radiological work areas upon completion of a task. Discuss the process associated with the review and approval of RWPs. Verify the positions with authority to make revisions after the RWP was issued.

#### 02.07 Instrument Calibration.

##### a. Inspection Requirements.

1. Verify that instruments and equipment used for quantitative radiation measurements are calibrated periodically in accordance with 10 CFR 20.1501(b).

##### b. Inspection Guidance.

1. Determine that the licensee has a system (e.g., a schedule, card file, computer program, etc.) which identifies instruments and when they are due for calibration or functional testing.
2. Review the most recent calibration records of the instruments selected for inspection to ensure that the calibration/surveillance program for these

instruments is being accomplished in accordance with license requirements and procedures.

3. Review whether the criticality accident alarm system detectors are maintained at the required level of operability by verifying:
  - (a) whether detectors are calibrated;
  - (b) whether all components (including detectors, wiring, and associated electronics) are functionally tested;
  - (c) whether the detectors promptly actuate the alarms upon the set points being met or exceeded; and
  - (d) whether access to detector setpoints is strictly controlled.

Specific operability criteria may be specified in the license, license application, ISA Summary, ANSI/ANS-8.3, internal procedures, or the vendor manual.

4. If applicable, interview staff regarding what the licensee response is to out-of-calibration notices.

Determine if the licensee evaluates whether out-of-calibration equipment is appropriately reviewed and addressed.

Determine if the licensee tracks individual instruments to determine if they are routinely unstable in order to allow the licensee to remove such instruments from service.

Determine that the procedures used to calibrate the instruments contain review and approval requirements, acceptance criteria (including values for trip settings that conform to license requirements, as applicable), and detailed stepwise instructions.

- (a) Evaluate if the licensee utilizes sources that are NIST traceable and periodically verifies, as appropriate, these sources have not significantly degraded and continue to accurately reflect the assayed activity.
- (b) If the licensee utilizes the services of an offsite vendor to provide calibration services, determine if the licensee has provisions to audit or evaluate the performance of the vendor.
- (c) Determine if the contract or purchase requisition includes appropriate acceptance criteria or specifications to ensure instruments are properly calibrated to meet the needs of the licensee.

## 02.08 Instruments and Equipment.

### a. Inspection Requirements.

1. Determine that the performance of radiation detection instruments and



equipment is in accordance with license requirements and procedures.

2. Determine that the survey equipment utilized is reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentrations or quantities of radioactive material, and any potential radiological hazards as required by 10 CFR 20.1501(a).

b. Inspection Guidance.

1. Select instruments for each major type of ionizing radiation (except x-rays) and examine them to determine operability and proper alarm response, if alarm response is applicable. These may include portable survey instruments, fixed monitoring equipment, constant air monitors, portable air samplers, pocket dosimeters, and alarming dosimeters. Determine that the licensee uses survey instruments that are appropriate for the type and intensity of radiation measured.
2. The inspectors should determine whether the licensee has a means to promptly assess the dose to potentially exposed individuals (following a criticality accident) and to aid in safe reentry and recovery and whether provisions are in place for the prompt decontamination and medical treatment of exposed individuals, as required by 10 CFR 70.24.
3. Verify that Personnel Contamination Monitors (PCMs) or personnel monitoring stations are set to alarm at the set points specified in the procedure(s). Consider whether source response checks, including activity level and physical size of sources utilized to perform functional checks, comply with procedures. Check sources should have an activity level comparable to the minimum detectable limit specified in the procedure(s).

Inspect PCMs for overall material condition, holes or defects in detector windows, proper gas flow to the detectors, and the presence of debris or material on the surface of detector windows that could impact the sensitivity of the detectors.

02.09 Posting.

NOTE: Omit this section for facilities with a resident inspector program.

a. Inspection Requirements.

1. Determine if the licensee has posted areas in the facility in accordance with 10 CFR 20.1902 and 10 CFR 20.1903.
2. Determine if the licensee is in compliance with other posting requirements specified in the license and/or procedures.

b. Inspection Guidance.

1. Inspect representative areas to determine compliance. Pay particular attention to temporary work areas that may be required for maintenance activities, newly established work areas, etc. Inspect a sampling of work or storage areas.

2. Verify that areas, packages, and/or vessels with external radiation levels are properly posted. As defined by 10 CFR 20.1003, a radiation area corresponds to a dose equivalent of 5 mrem in one hour at 30 cm from the radiation source or surface. A high radiation area corresponds to a dose equivalent of 100 mrem in one hour at 30 cm from the radiation source or surface. A very high radiation area corresponds to an absorbed dose greater or equal to 500 rad at one meter from the radiation source or surface.
3. Verify that areas or rooms in which licensed material is used or stored are appropriately posted with a Radioactive Material sign. Determine if the licensed material meets the activity requirements of 10 CFR 20.1902(e), 10 times the Part 20 Appendix C quantities, or meets the exception criteria in 10 CFR 20.1903. Determine if the licensee maintains an exemption in the license.

#### 02.10 Container Labeling.

**NOTE: Omit this section for facilities with a resident inspector program.**

##### a. Inspection Requirements.

1. Determine if the licensee is labeling packages and containers that contain **radioactive** material in accordance with 10 CFR 20.1904 and 20.1905.
2. Determine if the licensee is in compliance with other labeling requirements specified in the license or procedures.

##### b. Inspection Guidance.

1. During office preparation, verify if the licensee maintains labeling exemptions in the license.
2. Inspect areas of the facility that store radioactive material; including temporary storage locations.
3. Inspect a sample of containers in a work or storage area. Verify that the Radioactive Materials label also provides sufficient information such as the radionuclides present, an estimate of the quantity of radioactivity, the date activity was estimated, types of material, and estimated enrichment.
4. **Verify that labels have been removed from empty containers. Consider if exemptions in 10 CFR 20.1905 are applicable to unlabeled containers.**

#### 02.11 Posting of Notices.

**NOTE: Omit this section for facilities with a resident inspector program.**

##### a. Inspection Requirements.

Determine if the licensee is posting Notices in accordance with 10 CFR 19.11.

##### b. Inspection Guidance.

1. Inspect bulletin boards or other common places where NRC Form 3, "Notice to Employees," is posted.
2. Determine whether any Notices of Violation involving radiological working conditions, proposed impositions of civil penalties, or NRC orders are posted by the licensee within two working days of its receipt from NRC. Verify that licensee responses were posted within two working days of their submittal to the NRC. Verify that both documents remained posted for at least five days or until corrective action for the violation is complete; whichever is later.

#### 02.12 Access Control.

##### a. Inspection Requirements.

1. Determine if the licensee has maintained control of access to high and very high radiation areas, if applicable, in accordance with 10 CFR 20.1601 and 20.1602. Verify that the licensee is in compliance with license requirements and is following licensee procedures.
2. Verify that individuals entering a high or very high radiation area are monitored for occupational exposure in accordance with 10 CFR 20.1502(a)(4).

##### b. Inspection Guidance.

1. Select, if available, high radiation or very high radiation areas to determine that access is controlled in accordance with regulations or license requirements.

Review a selection of records (e.g., radiation level surveys, interlock tests, and audible and visible alarm test results) and inspect work areas to determine if the licensee's controls ensure the safety of workers.

Identify if high or very high radiation areas are created by state-licensed material or x-rays. If the areas are created by state-licensed material and the facility is located in an Agreement State or created by x-ray activities, verify that the area is properly posted and controlled, but do not inspect in depth.

#### 02.13 Licensed Material Control.

##### a. Inspection Requirements.

1. Determine that the licensee has secured licensed materials which are stored in controlled or unrestricted areas from unauthorized removal or access in accordance with 10 CFR 20.1801.
2. Determine that the licensee has controlled and maintained constant surveillance of licensed material that is in a controlled or unrestricted area, not in storage, in accordance with 10 CFR 20.1802.

##### b. Inspection Guidance.

1. Inspect areas where radioactive material is located or stored in an unrestricted area, if applicable. Determine if the licensee had unauthorized removal of licensed material. If none occurred, do not inspect in depth.

#### 02.14 Radiation Surveys.

##### a. Inspection Requirements.

1. Determine that the licensee performs radiation surveys in accordance with 10 CFR 20.1501(a) and (b) and the license requirements.
2. Verify that the radiation survey program **complies with** posting requirements in 10 CFR 20.1902.
3. Verify that the radiation survey records are maintained in accordance with 10 CFR 20.2103.

##### b. Inspection Guidance.

1. Determine that the licensee has established schedules for periodic radiation surveys of work areas of the facility.
  - (a) Determine that radiation surveys are conducted using **the latest procedure(s).**
  - (b) Review a selection of survey records to verify that surveys were performed according to **schedule(s).**
  - (c) Determine that the survey results are reviewed by appropriate supervision.
  - (d) If available, observe external radiation surveys in progress by licensee personnel. Determine the adequacy of the **worker's** knowledge in checking the survey instrument for proper operation with a dedicated check source and in the use of the instrument for conducting radiation surveys. Evaluate the survey techniques used by the technician.
  - (e) **Determine that corrective actions are taken, as appropriate.**

#### 02.15 Contamination Control.

##### a. Inspection Requirements.

1. Verify that the licensee is in compliance with contamination control and/or contamination surveys as required **by** the license.

##### b. Inspection Guidance.

1. Determine that the licensee has established schedules for periodic contamination surveys of work areas of the facility.

- (a) Determine that contamination surveys are conducted using **the latest** procedures.
- (b) Review a selection of contamination survey records and verify that surveys were performed according to **schedule(s) and/or procedure(s)**.
- (c) Determine that the survey results are reviewed by appropriate supervision.
- (d) If available, observe contamination surveys in progress by licensee personnel. Determine the adequacy of the **worker's** knowledge in contamination survey techniques. Verify that the technician **first** checked the instrument used for detection of the smear surveys for proper operation with a dedicated check source.
- (e) Determine that corrective actions are taken, as appropriate.

#### 02.16 Sealed Sources.

NOTE: Omit this section if no sealed sources are included in the NRC license.

##### a. Inspection Requirements.

- 1. Determine if the licensee **or a contractor** performs leak test surveys of radioactive sealed sources in accordance with license requirements.
- 2. Verify the storage of sealed sources **is** in accordance with 10 CFR 20.1903(c).

##### b. Inspection Guidance.

- 1. If any sealed sources are included in the NRC license, **inspect** a selection of records of leak tests of radioactive sealed sources required since the last inspection.

Guidance on exempt quantities and concentrations are listed in 10 CFR 30.15, 30.18, 30.70, and 30.71. License requirements applicable to sealed sources are not necessarily relevant to electroplated sources unless specifically addressed in the license.

#### 02.17 Occupational Dose Results.

##### a. Inspection Requirements.

- 1. Review dose assessment documentation and verify that the results are less than the limits in 10 CFR 20.1201, 20.1207, and 20.1208.

##### b. Inspection Guidance.

- 1. Review the occupational dose results in the previous calendar year to determine compliance with dose limits **in 10 CFR 20**.

- (a) Compare the highest total effective dose equivalent (TEDE) results with the regulatory limits.
  - (b) Compare the highest shallow dose equivalent (SDE) and lens dose equivalent (LDE) with the regulatory limits.
2. If minors have been permitted to work in restricted areas, verify that the results are less than the limit in 10 CFR 20.1207.
3. Compare the highest fetal dose result to the regulatory limit in 10 CFR 20.1208.
4. Verify the licensee limited the soluble uranium intake to less than the 10 CFR 20.1201(e) limit in consideration of chemical toxicity in the previous calendar year.

#### 02.18 Exposure Controls.

##### a. Inspection Requirements.

1. Verify that the licensee uses, to the extent practical, engineering controls to **get** occupational doses as low as reasonably **achievable** (ALARA) in accordance with 10 CFR 20.1101(b).
2. Verify that the licensee uses, to the extent practical, process or engineering controls to **keep** the concentration of airborne radioactive material in **compliance** with 10 CFR 20.1701.

##### b. Inspection Guidance.

1. By observation, discussions, and review of documentation, determine that engineering controls are **evaluated** and used to the extent practicable.  
  
Determine that personnel exposures are controlled in accordance with regulatory requirements with focus placed upon the major contributor to annual collective dose received at the facility.
2. For airborne concentrations higher than those defined by an airborne radioactivity area, in which process or engineering controls are not practical, verify that the licensee increased monitoring and limited intakes by controlling the access, limitation of exposure times, use of respiratory protection equipment, or other controls as described in 10 CFR 20.1702.

#### 02.19 Bioassay Program.

##### a. Inspection Requirements.

1. Determine if the bioassay program, if applicable, is in compliance with the license requirements.
2. Determine if record retention is in accordance **with 10** CFR 20.2103(b)(3).

b. **Inspection Guidance.**

1. Discuss with staff how the bioassay program is conducted.
2. Review selected bioassay records.
3. If the licensee utilizes the services of an offsite vendor to process and analyze bioassay samples, determine if the licensee has provisions to audit or evaluate the performance of the **vendor**.
  - (a) **Determine if the contract or purchase requisition includes appropriate acceptance criteria, including minimum detectable activity values and specifications to ensure that bioassay samples are analyzed for the proper radionuclides.**
  - (b) **Determine if the vendor program includes measures (e.g., independent or blind quality control checks) to periodically confirm the accuracy of bioassay results.**

02.20 **Whole Body Counting.**

a. **Inspection Requirements.**

1. Determine if the whole body counting program is in compliance with the license requirements, if applicable.

b. **Inspection Guidance.**

1. Determine if whole body counting results are utilized in the occupational dose analyses.
2. Walk down whole body counting facilities, if available, and review selected whole body counting records.

02.21 **Dosimetry.**

a. **Inspection Requirements.**

1. Verify that the licensee monitors employees for occupational exposure to radiation who are likely to receive, in one year, a dose in excess of the 10 CFR 20.1502(a) **limits**.
2. Determine that personnel dosimeter processors maintain accreditation from National Voluntary Laboratory Accreditation Program (NVLAP) in accordance with 10 CFR 20.1501(d).

b. **Inspection Guidance.**

1. Examine the type of monitoring devices used, the period of use or exchange period, and the number used to determine if these aspects are consistent with the monitoring program. Dosimeters may include, but are not limited to, **thermo-**

luminescent dosimeters, optically stimulated luminescence dosimeters, and/ or film badge dosimeters. Review reports of exposure summaries to determine that the licensee's performance is in accordance with regulatory requirements.

2. Review the licensee's procedures or system for evaluating and using personnel monitoring data to control and minimize exposures.
3. Determine if the licensee utilizes pocket dosimeters or electronic dosimeters.
  - (a) Verify how the licensee incorporated the results into their dose calculations.
  - (b) If applicable, determine when pocket dosimeters are read and recharged, the number used, and review the calibration record.
4. During a plant walk down, verify that operators and technicians wear their dosimetry-in accordance with procedures.
5. Determine the dosimeter supplier.
  - (a) Determine the reason(s) for a change in suppliers if there has recently been a change.
  - (b) Determine that the personnel dosimetry processor is accredited by NVLAP.
  - (c) If applicable, determine that the processor is Department of Energy Laboratory Accreditation Program accredited.

#### 02.22 Dose Assessment Programmatic Review.

##### a. Inspection Requirements.

1. Verify that the licensee correctly calculated the dose to workers since the last inspection. Verify that the dose calculations are calculated using conservative assumptions and meet the intent of the regulations.
2. Verify that the internal dose results were determined in accordance with 10 CFR 20.1204. Verify that internal dose was monitored in accordance with 10 CFR 20.1502(b).
3. Determine if the summation of external and internal doses is in accordance with 10 CFR 20.1202.
4. Verify that the licensee incorporated the occupational dose of an individual received during the current year at a different NRC-licensed facility in accordance with 10 CFR 20.2104.
5. Determine if the licensee is maintaining records of dose in accordance with 10 CFR 20.2106, at least annually, and is utilizing NRC Form 5 record keeping format.



b. Inspection Guidance.

1. Verify if any changes have been made to the program. Review the methodology and programmatic assumptions made by the licensee in the calculation of dose.
2. Review the dose to workers **with focus** on the accuracy of the dose of record.
3. For some licensees, internal exposure may comprise **most** of the annual collective dose received at the facility.
  - (a) Review procedures, documentation, calibration, and performance checks of analytical equipment and processes used to evaluate internal exposures.
  - (b) Verify that maximum organ exposure assumptions are accurate.
4. Determine by discussion with selected individuals (working in high dose areas) whether they were notified in accordance with 10 CFR 19.13. Annual reports are only required for workers who are required to be monitored under 10 CFR 20.1502.
5. For licensees required to monitor in accordance with 10 CFR 20.1502, review a sample of NRC Form 5s.
6. For licensees not required to monitor, due to the likelihood that a worker would not receive more than 500 mrem (5 millisieverts) in a year, review a sampling of NRC **Form 5s** generated as a result of voluntary monitoring. If a licensee is not required to monitor and chooses not to monitor worker exposures, the inspector should review the licensee's presumptive analysis of exposures and determine that the assumptions used in that analysis were adequate.

**02.23** As Low As Reasonably Achievable (ALARA).

a. Inspection Requirements.

1. Determine that the ALARA program is in compliance with 10 CFR 20.1101(b) and the license requirements.
2. Determine whether the ALARA Committee and/or other plant safety committee **meetings, if required**, are conducted in accordance with the license application.

b. Inspection Guidance.

1. The depth of ALARA programs **depends** on the quantities of radioactive materials possessed and used and the potential for **significant** radiation exposures.
  - (a) If the licensee has a documented commitment to ALARA, implementation of the program should be discussed with management. Determine that the ALARA goals are **established** and realistic.

- (b) Ascertain that the radiation protection staff **has** authority to implement ALARA policies and that workers have been trained to understand the ALARA philosophy and how it should be implemented at their work places.
2. Determine whether modifications, **where practicable**, to equipment, facilities, and procedures **were** made to significantly reduce exposures at a reasonable cost.
3. Determine if the licensee has considered the ALARA philosophy during the engineering phase for changes in facilities, equipment, or processes and whether an ALARA review was performed during initial implementation of changes.
4. If modifications have been made to facilities and equipment to reduce exposures, verify that ALARA measures did not disproportionately increase the risks from non-radiological hazards, such as industrial hazards.

Contributors to annual exposures at many fuel facilities typically involve numerous operations or activities without a specific activity comprising a significant percentage of the annual exposure. Under these circumstances an ALARA cost benefit analysis will seldom show a positive net benefit based solely on dose savings versus the cost of a modification. Notwithstanding, the licensee's ALARA program should include elements to identify and reduce exposures associated with routine activities. Determine if program elements exist to monitor, trend, and, where practical, address adverse exposure trends. Particular attention should be given to routine tasks requiring the use of respiratory protection equipment that could be addressed by relatively low-cost equipment or process changes (e.g., increasing the effectiveness of ventilation in glove boxes or enclosures).

If applicable, determine if the licensee's performance includes:

- (a) Identification of the origins of radiation exposures by location and job category. Determine if trends have been noted in the level of radiation at the locations.
  - (b) Consideration of ways to reduce exposures (from both external and internal sources) in those locations where exposure to personnel are significant.
  - (c) Periodically reviewing operating procedures that affect radiation safety and **identifying** situations where radiation exposures can be reduced.
5. Review changes to the membership, charter, and procedures for the ALARA Committee, **if required**, and/or plant safety committees to determine whether changes meet the license requirements.
6. **If the licensee has an ALARA committee**, determine whether meetings have been held at the required frequencies specified in the license **or procedure(s)**.
7. Examine the minutes of select meetings held by the **various** plant safety committees to determine whether the committees' agenda items are in accordance with its charter.

8. Examine committee records or other records on ALARA policies to determine whether source-term surveys have been conducted and actions taken to reduce significant exposures.

#### 88030-03 RESOURCE ESTIMATE

The resource estimate to perform this inspection procedure is **as specified in Table 1 of IMC 2600 Appendix B with a variance of  $\pm 10\%$ .**

#### 88030-04 REFERENCES

Inspection Manual Chapter 2600, Fuel Cycle Facility Operational Safety and Safeguards Inspection Program.

10 CFR 20, "Standards for Protection against Radiation."

10 CFR 19, "Notices, Instructions, and Reports to Workers: Inspection and Investigations."

NRC Regulatory Guide 8.24, "Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Facilities." Revision 2. June 2012.

NRC Regulatory Guide 8.21, "Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants." Revision 1. October 1979.

NRC Regulatory Guide 8.2, "Guide for Administrative Practices in Radiation Surveys and Monitoring." Revision 1. May 2011.

NUREG 1556, "Consolidated Guidance for Material Licenses." Volume 11, Appendix T, Model Leak Test Procedures." April 1999.

Regulatory Guide 8.25, "Air Sampling in the Workplace." Revision 1. June 1992.

Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection." Revision 1. October 1999.

NUREG/ CR-0041, "Manual of Respiratory Protection against Radioactive Material." Revision 1. January 2001.

29 CFR 1910.134, "Occupational Health and Safety Standards; Respiratory Protection."

Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program." Revision 1. July 1993.

NRC Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." Revision 3. June 1999.

NRC Regulatory Guide 8.36, "Radiation Dose to the Embryo/ Fetus." July 1992.

NRC Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses." July 1992.

NRC Regulatory Guide 8.40, "Methods for Measuring Effective Dose Equivalent from External Exposure." July 2010.

NRC Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure." Revision 1. February 1996.

NRC Regulatory Guide 8.7, "Instructions for Recording and Reporting Occupational Radiation Exposure Data." Revision 4. May 2018.

NRC Regulatory Guide 8.8, "Information Relevant to Ensuring the Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable." Revision 3. June 1978.

NRC Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable." Revision 2. August 2016.

#### 88030-05 PROCEDURE COMPLETION

Implementation of each applicable inspection requirement will constitute completion of this procedure. Individual inspection samples and breadth of review will be determined by the inspector based on requirement compliance, risk- significance of activity, and extent of the activity or records available. The procedure is complete when the inspection requirements are completed every two (2) years.

END

Attachment:

1. Revision History for IP 88030

Attachment 1

Revision History for IP 88030

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	ML061710070 07/28/06 CN 06-019	IP 88030 has been issued because of the need for a new Inspection Procedure for Radiation Protection.	None	ML061710084
	ML13311A692 03/06/14 CN 14-007	Signifanly revised to: <ul style="list-style-type: none"> <li>• Format to IMC 040</li> <li>• Delete reference to Special Planned Exposure</li> <li>• Delete reference of Dose to Public now included in 88045</li> <li>• Add chemical toxicity of uranium</li> <li>• Add Stop Work Authority</li> <li>• Added Exempt Quantity reference in sealed source section.</li> <li>• Delete reference to reporting requirements in 10 CFR 30-39 &amp; 72 and added reporting requirements in Part 76.</li> <li>• Added PAPR and PAPH interpretation for transparency and consistency.</li> </ul>	None	ML13347A931

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)
		<ul style="list-style-type: none"> <li>• Added ventilation and whole body counting sections.</li> <li>• Added applicable sections from IP 88005 (management organization).</li> <li>• Added section regarding 19.12 from IP 88010 (operator training)</li> <li>• Added Reference section.</li> <li>• Deleted reference to 20.1203 as fuel facilities do not have the correct source material to have an external dose exposure from airborne particulates.</li> </ul> <p>Changed the IP from being an annual inspection with 32 hours to two, rotating biennial inspections with 32 hours each or 64 hours total.</p>		
N/A	ML20328A118 01/29/21 CN 21-007	Revision to implement the recommendations from the Smarter Inspection Program (ML20077L247 and ML20073G659). Deleted Appendix A, "Program, Monitoring, and Controls: and Appendix B, "Exposure Controls and Dose Analyses" and moved applicable sections into the main body of the procedure.	Complete by January 2021	N/A