
INSPECTION PROCEDURE 88030

RADIATION PROTECTION

PROGRAM APPLICABILITY: 2600

88030-01 INSPECTION OBJECTIVES

Determine that the licensee's¹ performance is in accordance with the requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 20 with focus on the following regulatory requirements and compliance with the licensee² requirements.

The scope of the review should cover activities performed and records created since the last time the attachment was performed.

88030-02 INSPECTION REQUIREMENTS AND GUIDANCE

The inspection requirements and guidance are provided in Attachment A and B.

88030-03 RESOURCE ESTIMATE

The resource estimate to perform this inspection procedure is estimated to be 64 hours every two years. This estimate includes the completion of both of the annual Attachments (approximately 32 hours each) in the two year timeframe. Attachment A should be performed in years ending with an even number and Attachment B in odd years.

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.

¹ The term, 'licensee,' as used in this Inspection Procedure (IP) also applies to certificate holders.

² The term, 'license,' as used in this IP also applies to certificates.

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 2. November 2005.

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 1-R. May 1977.

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 biennial procedure is complete when the inspection requirements in both Attachment A and B are completed.

END

Appendix:

- A. Program, Monitoring, and Controls
- B. Exposure Controls and Dose Analyses

Attachment:

- 1. Revision History for IP 88030

Appendix A

Program, Monitoring, And Controls

To Be Performed Every Even Calendar Year

88030A-02 INSPECTION REQUIREMENTS AND GUIDANCE

02.01 Radiation Protection Program Implementation.

a. Inspection Requirements.

1. Verify that the performance of the radiation protection program is being documented in accordance with 10 CFR 20.1101(a) and implemented in accordance with the license requirements.
2. Verify the radiation protection functions and responsibilities are independent from operations as specified by the license application. Determine if the program is in compliance with the license requirements.
3. Evaluate if a change occurred in the radiation protection program organization that is applicable to the position-specific requirements of the license. If applicable, verify that the new manager meets the criteria of the license requirements.

Verify that any changes to the organizational structure in the area of radiation protection are in compliance with license requirements, if applicable.

b. Inspection Guidance.

1. By discussions with radiation protection management and by review of documents, determine whether the radiation protection safety functions are in accordance with the license application, if applicable, regarding:
 - (a) Radiation protection safety functions maintain familiarity with plant activities;
 - (b) Radiation protection safety functions participate in inspections and audits; and
 - (c) The radiation protection safety functions provide input to training.

The radiation protection functions are expected to:

- (a) Review changes to procedures created by other functions;
- (b) Maintain familiarity with operations within the facility requiring radiation protection controls;

- (c) Exercise their stop-work authority when necessary to protect the radiological safety of employees even when challenged by production or operational concerns;
- (d) Utilize the licensee's 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 safety practices; and
- (f) Report their findings to plant management.

These activities should be influenced by priorities established by operations, but should not be controlled by operations.

- 2. Through discussions with staff and management and/or review of documentation, determine whether the licensee's organizational structure is in accordance with the license. Verify that the radiation safety function reports to senior management outside 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.

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

Examine changes in organization and organizational structure regarding changes in personnel, qualifications of personnel, functions, responsibilities, and/or authorities.

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

02.02 Radiation 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 self assessments in the area of radiation protection and is in compliance with license requirements, if applicable.

3. Determine whether the licensee is identifying issues in the area of radiation protection at an appropriate threshold and entering them into the corrective action program, if required by license requirements. Verify that the licensee is appropriately addressing and correcting safety-significant condition reports.
 4. Verify that the licensee has maintained records pertaining to the radiation protection program, including audits and 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 self assessments, as applicable. Determine if attention was given to methods to lower internal and external exposure in regards to ALARA in the audits and program reviews conducted.
 2. Determine if the licensee is required to conduct audits or self assessments. Select internal or contracted audits performed since the previous inspection of this attachment, and examine the records documenting selected audits to determine whether there was a written plan for the audit, the audit adequately reviewed the audited area, appropriate corrective actions were taken whenever deficiencies were found, and whether there was a check of the effectiveness of the corrective action.

Interview the licensee and determine that the licensee ensures the effectiveness of audits. Verify if the assessments use a secondary (or follow-up) audit system on a periodic basis, are conducted by a member of management or a senior technician not directly responsible for the system audited, and/or use contractor audits.

Determine if safety-significant audit findings are being tracked through completion by the corrective action program, if required.
 3. Perform a screening review of items entered into the corrective action program. Identify 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.

Review of the licensee's corrective action program, Health Physics (HP) log book, or file on HP problems may be useful to identify 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.
 4. No guidance provided.

02.03 Radiation Protection Procedures.

a. Inspection Requirements.

1. Verify that safety-significant changes to procedures in the area of radiation protection are in compliance with regulatory and license requirements.
2. Verify that safety-significant changes were made in accordance with the licensee's procedure revision process, if required by the license.

b. Inspection Guidance.

1. Review substantive changes to procedures which have been implemented. Determine that limits, precautions, and controls, as specified in the procedures are consistent with regulations and license requirements. 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.
2. By reviewing a sample of recently changed or new radiation protection procedures, determine whether the licensee system for approving procedures complies with license requirements, if applicable. Verify that the licensee has followed their change control process program in accordance with approved procedures, if applicable.

Determine whether safety-significant procedure changes are:

- (a) Reviewed and approved as required by the license;
- (b) Personnel affected by a procedure are adequately and timely informed of changes in the procedures; and
- (c) Only approved and current procedures are used.

Determine whether the licensee reviewed and updated safety-significant procedures at the frequency specified by the license or procedure. Determine whether revision and update of procedures is performed on a timely basis as a result of procedural deficiencies found, 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 area of radiation protection and evaluate if training is in compliance with license requirements.

b. Inspection Guidance.

1. Verify through staff interviews and/or review of records that individuals, who in the course of employment, are 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 the licensee an observed condition which may lead to or cause a violation of NRC regulations and license, 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 in 10 CFR 70.62(f). Verify that the training includes risk awareness for accidents involving licensed activities, as determined by the Integrated Safety Analysis.

2. Review training applicable to radiation protection topics such as general employee training or RadWorker training. Verify that the refresher or requalification training occurs at the required frequency, if applicable.

If time permits, discuss and observe training with selected staff in a variety of positions, to determine whether the training is adequate. Interview a sample of workers (consistent with the size of the program) to determine if workers understand radiation protection as it relates to their jobs and if they have opportunities to discuss radiological safety concerns with the radiation protection staff. Discuss procedural expectations with staff to determine whether the staff can effectively implement procedures.

02.05 Safety-Significant Events.

- a. Inspection Requirements. Determine whether the licensee has implemented a program of reviews that evaluates safety-significant events in the area of radiation protection and meets license requirements. Review events involving special nuclear material (SNM) that occurred since the last 88030 Attachment B inspection.
 1. Determine if the events affected worker health and safety or occurred as a result of a deficiency in the radiation protection program. Determine if the event condition resulted in a violation of an applicable regulatory requirement. Evaluate the significance of the event.
 2. 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 2202(b));
 - (b) incidents and exposures (10 CFR 20.2202 and 2203);
 - (c) overexposures (10 CFR 20.2202(a) and 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;
 - (f) 10 CFR 76.120 reporting requirements, if applicable; and
 - (g) License requirements; if applicable.
- b. Inspection Guidance. Review Event Notifications and reports, the NRR-maintained events database, and/or RPS during office inspection preparation. Review events involving SNM through document reviews, staff and management interviews, and/or plant condition or equipment observations. Determine if events occurred which were not reported through discussions with management, operating personnel, maintenance, and/or health physics personnel and through the review of log books, corrective action program, and/ or other data, as applicable, during the course of the inspection.
 1. If a safety-significant event involving SNM impacted worker health and safety or the radiation protection program, 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 identified 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.

2. No guidance provided.

02.06 Radiation Work Permits.

- a. Inspection Requirements. Verify that the licensee is in compliance with the license requirements.
- b. Inspection Guidance. Review a selection of radiation work permits (RWPs) on file and those currently in effect.

Observe temporary work being performed under an RWP, if available. Observe the radiation technician 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. Verify that instruments and equipment used for quantitative radiation measurements are calibrated periodically in accordance with 10 CFR 20.1501(b).
- b. Inspection Guidance. Determine that the licensee has a system (i.e. a schedule, card file, computer program, etc.) which identifies instruments and when they are due for calibration or functional testing.

Review the most recent calibration records of the instruments selected for inspection to ensure that the calibration and surveillance program for these instruments are being accomplished in accordance with license requirements or licensee procedures.

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 to allow the licensee to remove them 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, if applicable, and detailed stepwise instructions. Evaluate

if the licensee utilizes sources that are NIST traceable and periodically verifies, as appropriate, to not have significantly degraded and accurately reflects the assayed activity.

If the licensee utilizes the services of an offsite vendor or company to provide calibration services, determine if the licensee has provisions to audit or evaluate the performance of the company. 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.** Determine that the performance of radiation protection instruments and equipment is in accordance with license requirements and licensee procedures.

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 the potential radiological hazards as required by 10 CFR 20.1501(a).

- b. **Inspection Guidance.** Select instruments of each major type and examine them to determine operability and proper alarm settings, if alarm settings are 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.

Verify that Personnel Contamination Monitors (PCMs) or personnel monitoring stations are set to alarm at the set points specified in the licensee procedures. Consider whether source response checks, including activity level and physical size of sources utilized to perform functional checks on PCMs are appropriate for their intended use. Check sources should be sufficient in size and have an activity level comparable to the release limit specified in procedures.

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.

- a. **Inspection Requirements.** Determine if the licensee has posted areas in the facility in accordance with 10 CFR 20.1902 and 20.1903. Determine if the licensee is in compliance with other posting requirements specified in the license and/or licensee procedures.

- b. **Inspection Guidance.** Inspect representative areas to determine compliance; pay particular attention to temporary work areas that may be required for maintenance activity, newly-established work areas, etc. Inspect a sampling of work or storage areas.

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.

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 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.

- a. **Inspection Requirements.** Determine if the licensee is labeling packages and containers that contain radioactive material in accordance with 10 CFR 20.1904 and 20.1905. Determine if the licensee is in compliance with other labeling requirements specified in the license or licensee procedures.
- b. **Inspection Guidance.** During office preparation, verify if the licensee maintains labeling exemptions in the license. Inspect areas of the facility that store radioactive material; including temporary storage locations. Inspect a sample of containers in the 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. Verify that labels have been removed from empty containers. Consider if exemptions in 10 CFR 20.1905 are applicable to unlabelled containers.

02.11 Posting of Notices.

- a. **Inspection Requirements.** Determine if the licensee is posting Notices in accordance with 10 CFR 19.11.
- b. **Inspection Guidance.** Inspect bulletin boards or other places where NRC Form 3, Notice to Employees, are posted.

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.

Omit this section at facilities with a resident inspection program.

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, audible and visible alarm test results) and inspect work areas to determine if the licensee's controls ensure the safety of workers and members of the public.

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 or activities and the facility is located in an Agreement State, verify that the area is properly posted and controlled, but do not inspect in depth.

2. No guidance provided.

02.13 Licensed Material Control.

- a. Inspection Requirements. 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.

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. 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 supports the 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. Determine that radiation surveys are conducted using approved procedures. Review a selection of survey records to verify that surveys were performed according to schedules. Determine that the survey results are reviewed by appropriate supervision.

If available, observe external radiation surveys in progress by licensee personnel. Determine the adequacy of the technician'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. Determine that corrective actions are taken, as appropriate.

2. No guidance provided.
3. No guidance provided.

02.15 Contamination Control.

- a. Inspection Requirements. Verify that the licensee is in compliance with contamination control and/or contamination surveys as required in the license.

- b. Inspection Guidance. Determine that the licensee has established schedules for periodic contamination surveys of work areas of the facility. Determine that contamination surveys are conducted using approved procedures. Review a selection of contamination survey records and verify that surveys were performed according to schedules. Determine that the survey results are reviewed by appropriate supervision.

If available, observe contamination surveys in progress by licensee personnel. Determine the adequacy of the technician's knowledge in contamination survey techniques. Verify that the technician checked the instrument used for detection of the smear surveys for proper operation with a dedicated check source. Determine that corrective actions are taken, as appropriate.

02.16 Sealed Sources.

a. Inspection Requirements.

1. Determine if the licensee performs the leak test surveys of radioactive sealed sources in accordance with license requirements.
2. Verify that the storage of the sealed sources are in accordance with 10 CFR 20.1903(c).

b. Inspection Guidance.

1. Determine if any sealed sources are included in the NRC license. If not, omit section. Inspect a selection of records of leak tests of radioactive sealed sources required since the last inspection of this attachment.

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.

2. No guidance provided.

02.17 Occupational Dose Results.

- a. Inspection Requirements. 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. Review the occupational dose results in the previous calendar year to determine compliance with dose limits. Compare the highest Total Effective Dose Equivalent results with the regulatory limits. Compare the highest Shallow Dose Equivalent and Lens Dose Equivalent with the regulatory limits.

If minors have been permitted to work in restricted areas, verify that the results are less than the limit in 10 CFR 20.1207. Compare the highest fetal dose result to the regulatory limit in 10 CFR 20.1208.

Verify that 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.

Appendix B

Exposure Controls And Dose Analyses

To Be Performed Every Odd Calendar Year

88030B-02 INSPECTION REQUIREMENTS AND GUIDANCE

02.01 Exposure Controls.

a. Inspection Requirements.

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

b. Inspection Guidance.

1. By observation, discussions, and review of documentation, determine that engineering controls are considered and used to the extent practicable. Evaluation of process and engineering controls incorporated as part of the facility or equipment as licensed will be performed in the licensing process; the inspection program will evaluate the use of other engineering controls.

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.

02.02 Air Sampling Program.

a. Inspection Requirements.

1. Determine that the air sampling program, if applicable, is in compliance with the license requirements.
2. Verify that Airborne Radioactivity Areas are posted in accordance with 10 CFR 20.1902(d).

3. Verify that the licensee air sampling records are maintained in accordance with 10 CFR 20.2103(b).
- b. Inspection Guidance.
1. Verify that a program is maintained to monitor air concentrations, if applicable, for inclusion in internal dose calculations. Verify that the licensee appropriately addresses solubility class, mixtures, and aerosol size, as appropriate. Determine if schedule and procedural requirements for airborne concentration surveys demonstrate compliance with the license requirements. Review selected air sampling records. Observe the collection and detection of air samples, if time permits, and observe the technician's collection technique and the operability of air sampling equipment. Verify that the activity is in accordance with procedures. Discuss the tracking of air concentrations and the amount of time an operator spends in the relevant areas, if applicable.
 2. Verify that a program is maintained to identify and post areas as an Airborne Radioactivity Area. An airborne radioactivity area is defined as a room, enclosure, or area in which airborne radioactive materials exists in concentrations in excess of the DAC or to a degree in which an individual, if present without respiratory protective equipment, during a work week, could have an intake of 0.6 percent of the ALI (12 DAC-hours) per 10 CFR 20.1003.
 3. No guidance provided.

02.03 Ventilation Program.

- a. Inspection Requirements. Determine if the ventilation program, if applicable, is in compliance with the license requirements.
- b. Inspection Guidance. During inspection planning, determine if the ventilation system is an item relied on for safety and if additional requirements apply. Review pertinent documentation and discuss with technicians to confirm that the licensee is in compliance with procedures and license requirements.

02.04 Respiratory Protection.

- a. Inspection Requirements. For facilities with a respiratory protection program, determine if licensee's performance is in accordance with 10 CFR 20.1703 and license requirements.
- b. Inspection Guidance. Determine through discussions and a review of records that a maintenance and training program for respiratory protection equipment is administered and conducted in accordance with written procedures. Determine by review of documentation, discussions, and observations that respirator users are individually fitted for respirators and that respiratory equipment is operationally tested prior to each use.

Determine that the equipment is certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration or otherwise approved by the U.S. Nuclear Regulatory Commission (NRC). Determine proper selection of equipment for the hazard.

Select a sample of tasks that require the use of respiratory protection equipment and determine compliance with regulatory requirements and licensee procedures by review of documentation, discussions, or observations.

Verify that the licensee requires a medical exam and fit testing prior to use in the field. Verify that no materials or substances, such as facial hair, interfere with the seal between the face and face piece. Verify fit factors are appropriate for the respirator type being authorized and consistent with licensee procedures.

Verify that the licensee requires a fit test for Power Air Purifying Respirators (PAPR) for equipment with a face-seal. Fit tests for Power Air Purifying Hoods (PAPH) with loose-fitting hoods are not required. Verify that personnel using PAPR and PAPH have received a medical physical and doctor's approval prior to use.

Verify that standby rescue workers are required during use of one-piece atmosphere-supplying suits, for work involving entry into a confined work area, or a combination of supplied air respirators and personnel protective equipment which prevent the quick removal of respiratory protective equipment in the event of personal discomfort or equipment malfunction.

Determine what criterion is considered in selecting respirators. In taking credit for the protection provided by the use of respiratory protective equipment, 10 CFR 20.1703 requires that the protection factor be greater than the multiple by which peak concentrations are expected to exceed the values of Table 1, Appendix B, Column 3 of 10 CFR Part 20, unless ALARA considerations indicate otherwise. The licensee may consider safety factors other than radiological factors in the determination of respirator use. [10 CFR 20.1702(b)]

02.05 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. Review selected bioassay records.

If the licensee utilizes the services of an offsite vendor or company to process and analyze bioassay samples determine if the licensee has provisions to audit or evaluate the performance of the firm. 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. Determine if the vendor program includes measures (e.g., independent or blind quality control checks) to periodically confirm the accuracy of bioassay results.

2. No guidance provided.

02.06 Whole Body Counting.

- a. Inspection Requirements. Determine if the whole body counting program is in compliance with the license requirements, if applicable.
- b. Inspection Guidance. Determine if whole body counting results are utilized in the occupational dose analyses. Walk down whole body counting facilities, if available, and review selected whole body counting records.

02.07 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) levels.
 2. Determine that personnel dosimeter processors maintain accreditation from National Voluntary Laboratory Accreditation Program (NVLAP) in accordance with 10 CFR 20.1501(c).
- 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, thermoluminescent dosimeter, Optically Stimulated Luminescence, and/ or film badge dosimeters. Review reports of exposure summaries to determine that the licensee's performance is in accordance with regulatory requirements.

Evaluate the adequacy of the licensee's procedures or system for evaluating and using personnel monitoring data to control and minimize exposures. The licensee should account for occupational radiation doses to personnel resulting from exposures to licensed material.

Determine if the licensee utilizes pocket dosimeters or electronic personal dosimeters. Verify how the licensee incorporated the results into their dose calcula

tions. If applicable, determine when pocket dosimeters are read and recharged, the number used, and review the calibration record.

During a plant walk down, verify that operators and technicians have their dosimetry accessible.

2. Determine who the dosimeter supplier is. Determine the reasons for change if the service had recently been changed. Determine that the personnel dosimetry processor is accredited by NVLAP. If applicable to the facility being inspected, determine that the processor is Department of Energy Laboratory Accreditation Program accredited.

02.08 Dose Assessment Programmatic Review.

a. Inspection Requirements.

1. Verify that the licensee correctly calculated the dose to workers since the last inspection of this attachment. Verify that the dose calculations are calculated using conservative assumptions and meet the intent of the regulations.
2. Verify that the dose results include the Total Effective Dose Equivalent (TEDE), the lens dose equivalent (LDE), and the shallow dose equivalent (SDE) as required by 10 CFR 20.1201.
3. Verify that the internal dose results were determined in accordance with 10 CFR 10 CFR 20.1204. Verify that internal dose was monitored in accordance with 10 CFR 20.1502(b).
4. Determine if the summation of external and internal doses is in accordance with 10 CFR 20.1202.
5. 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.
6. Determine if minors are employed at the plant and if their dose equivalents are less than the limit provided in 10 CFR 20.1207.
7. Determine if notifications and dose reports provided to individuals were in accordance with 10 CFR 19.13.
8. Determine if the licensee is maintaining records of dose in accordance with 10 CFR 20.2106, at least annually, and is utilizing the 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 focusing on the accuracy of the dose of record. Compare the TEDE results with the regulatory limits. Compare the SDE and LDE with the regulatory limits.
3. For some licensees, internal exposure may comprise the majority of the annual collective dose received at the facility. Review procedures, documentation, calibration and performance checks of analytical equipment and processes used to evaluate internal exposures. Verify that maximum organ exposure assumptions are accurate.
4. No guidance provided.
5. No guidance provided.
6. Determine, by discussion with management, if minors have been permitted to work in restricted areas and, if so, determine that the licensee is in compliance with 10 CFR 20.1207 by review of exposure records.
7. 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.
8. For licensees who are required to monitor in accordance with 10 CFR 20.1502, review a sample of NRC Form 5s. For licensees who are 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 Forms 5 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.

02.09 Individual Dose Assessments.

- a. Inspection Requirements. Review calculations performed by the licensee for workers identified as having an intake during an event or for workers who exceeded bioassay action limits.
- b. Inspection Guidance. Review documentation of evaluations performed as the result of unplanned exposures. Determine the appropriateness of preventive measures instituted following an unplanned exposure. Verify that the assumptions used in the calculations were conservative and meet the intent of the regulations.

For unplanned events involving soluble forms of uranium, ensure that an analysis was completed and that the intake of uranium was not in excess of the chemical toxicity regulatory limits of 10 CFR 20.1201(e).

02.10 Fetal Dose Assessment.

- a. Inspection Requirements. Verify that the declared pregnant worker is being monitored for external and internal exposure as required by 10 CFR 20.1502. Verify that the fetal dose equivalent is less than the regulatory limit in 10 CFR 20.1208.
- b. Inspection Guidance. Review calculations performed by the licensee for the fetus of Declared Pregnant Workers. Verify that the assumptions used in the calculations were conservative and meet the intent of the regulations.

02.11 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 is in accordance with the license requirements.
 2. Determine whether the ALARA Committee and/or other plant safety committee are conducted in accordance with the license application.
- b. Inspection Guidance.
 1. The depth of the ALARA programs will depend on the quantities of radioactive materials possessed and used, and whether the potential for radiation exposures can be significant.

If the licensee has a documented commitment to ALARA, implementation of the program should be discussed with management. Determine that the ALARA goals are adequate and realistic.

Ascertain that the radiation protection staffs have authority to implement ALARA policies and that workers have been adequately trained to understand the ALARA philosophy and how it should be implemented at their work places.

Determine whether modifications to equipment, facilities, and procedures have been made, where practicable, to significantly reduce exposures at a reasonable cost. 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. 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 identify situations where radiation exposures can be reduced.

Determine if the licensee's performance includes a program in which workers can make suggestions and give feedback on radiation protection.

2. Review changes to the membership, charter, and procedures for the ALARA Committee and/or plant safety committees to determine whether changes meet the license requirements. Determine whether meetings have been held at the required frequencies specified in the license. Examine the minutes of select meetings held by the plant safety committees to determine whether the committees' agenda items are in accordance with its charter.

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.

02.12 Safety-Significant Events.

- a. Inspection Requirements. Determine whether the licensee has implemented a program of reviews that evaluates safety-significant events in the area of Radiation Protection and meets license requirements. Review events involving special nuclear material (SNM) that occurred since the last 88030 Attachment A inspection.
 1. Determine if the events affected worker health and safety or occurred as a result of a deficiency in the radiation protection program. Determine if the event condition resulted in a violation of an applicable regulatory requirement. Evaluate the significance of the event.

2. 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 2202(b));
 - (b) incidents and exposures (10 CFR 20.2202 and 2203);
 - (c) overexposures (10 CFR 20.2202(a) and 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;
 - (f) 10 CFR 76.120 reporting requirements, if applicable; and
 - (g) License requirements; if applicable.

- b. Inspection Guidance. Review Event Notifications and reports, the NRR-maintained events database, and/ or RPS during office inspection preparation. Review events involving SNM through document reviews, staff and management interviews, and/or plant condition or equipment observations. Determine if events have occurred which were not reported through discussion with management, operating personnel, maintenance, and/or health physics personnel, and review of log books, corrective action program, and/ or other data, as applicable, during the course of the inspection.
 1. If a safety-significant event involving SNM impacted worker health and safety or the radiation protection program, 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 identified 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.

 2. No guidance provided.

Attachment 3

Revision History Sheet for IP 88030

RADIATION PROTECTION

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
N/A	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"> • Format to IMC 040 • Delete reference to Special Planned Exposure • Delete reference of Dose to Public now included in 88045 • Add chemical toxicity of uranium • Add Stop Work Authority • Added Exempt Quantity reference in sealed source section. • Delete reference to reporting requirements in 10 CFR 30-39 & 72 and added reporting requirements in Part 76. • Added PAPR and PAPH interpretation for transparency and consistency. 	None	ML13347A931

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
		<ul style="list-style-type: none"> • Added ventilation and whole body counting sections. • Added applicable sections from IP 88005 (management organization). • Added section regarding 19.12 from IP 88010 (operator training) • Added Reference section. • Deleted reference to 20.1203 as fuel facilities do not have the correct source material to have an external dose exposure from airborne particulates. <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>		