RADIATION SOLUTIONS

Routine vs. Non-Routine Maintenance

Nuclear Gauge Maintenance Categories

ROUTINE MAINTENANCE

- May be performed by in-house personnel
- Limited to very low or no risk of radiation exposure type activities
- Onsite training sufficient

NON-ROUTINE MAINTENANCE

- Must be performed by specially trained outside specialists, like Radiation Solutions.
- Activities include those where risk of high exposures are possible or where special technical skill is required as defined by the manufacturer

Categorizing maintenance activities is not always perfectly clear.

RADIATION SOLUTIONS

Routine Maintenance

Routine maintenance includes general cleaning and operational checks as described by the gauge manufacturer or distributor as allowed by the operator.

Maintenance technicians must:

1. Be trained in accordance with the gauge manufacturer or distributor instructions
2. Follow good radiation safety practices in accordance with ALARA
3. Ensure the gauge functions as designed and source integrity is not compromised

Routine: Allowed Activities

- Cleaning the Gauge Housing
- Leak Testing
- Shutter Operational Checks
- External Lubrication of Shutter Mechanism
- Calibration
- Electronic Repairs
- Follow-up Radiation Surveys
- Gauge Mounting

Non-Routine Maintenance

1. Non-routine activities include any maintenance or repair where a risk exists for being exposed to the radiation's primary beam that could result in an over exposure.
2. Specific authorization by the NRC or an Agreement State is required to perform non-routine maintenance and repair of gauges.
3. Licensed personnel are required to have specialized training and follow appropriate procedures consistent with the manufacturer's or distributor's instructions and recommendations.
4. They must also employ proper radiation safety practices in accordance with ALARA, and be equipped with a radiation survey meter, a shielded container for the source, and personal dosimetry wherever required.
5. Licenses for non-routine maintenance activities on nuclear gauges are usually not granted to gauge operators.

Non-Routine: Activities

- Gauge Installation: (*see Gauge Mounting vs. Gauge Installation section below*)
- Initial Survey
- Maintenance and repair of radiological safety components which include:
  - The source
  - Source holder
  - Source drive mechanism
  - Shutter
  - Shutter control
  - Shielding
- Relocating Gauges
- Removal of a gauge from service
- Beam Alignment
- Source Reloading
- Disposal of Sealed Sources
- Dismantling
- Decommissioning
- Any activity where a potential for any portion of the body can come into contact with the primary radiation beam
- Any activity that would result in excessive dose or a dose exceeding NRC limits

Gauge Mounting vs. Gauge Installation

- Mounting a gauge is permitted as a routine maintenance activity only if the gauges' SSD registration explicitly permits it.
- Mounting is defined by the NRC as unpacking, uncrating the gauge and fastening or hanging it into position before using.
- Mounting does not include electrical connection, activation, or operation of the gauge.
- Installation of a gauge is a non-routine maintenance activity and is defined as mounting, electrical connection, activation, and first use of the device.

Conclusion

Video Clip

Regulatory References

10 CFR 20.1101

(a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this part. (See § 20.2102 for recordkeeping requirements relating to these programs.)
(b) The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).
(c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.
(d) To implement the ALARA requirements of § 20.1101 (b), and notwithstanding the requirements in § 20.1301 of this part, a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees other than those subject to § 50.34a, such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.

Regulatory References

10 CFR 30.34 (e)

(e) The Commission may incorporate, in any license issued pursuant to the regulations in this part and parts 31 through 36 and 39, at the time of issuance, or thereafter by appropriate rule, regulation or order, such additional requirements and conditions with respect to the licensee's receipt, possession, use and transfer of byproduct material as it deems appropriate or necessary in order to:

(1) Promote the common defense and security;

(2) Protect health or to minimize danger to life or property;

(3) Protect restricted data;

(4) Require such reports and the keeping of such records, and to provide for such inspections of activities under the license as may be necessary or appropriate to effectuate the purposes of the Act and regulations thereunder.