

efficiency bulletin

Dec. 18, 2017

Efficiency Bulletin: 17–21

Weekly Source Checks of Portable Radiation Protection Instrumentation

Reduce the source check frequency from daily to weekly.

Addressees: Chief nuclear officers, NEI APCs and INPO APCs

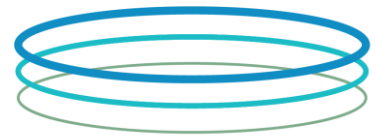
Issue: RP-08, Weekly Source Checks of Portable Radiation Protection Instruments

Summary of Efficiency Opportunity

- Desired end-state—portable radiation protection instrumentation is source checked on a weekly, rather than daily, frequency.
- Value proposition (vision of excellence)—Reduce radiation protection (RP) technician time and resources devoted to conducting instrument source checks. This initiative will enable RP technicians to focus on higher priority tasks.
- Why it is important?—Based on studies conducted by the Electric Power Research Institute (EPRI), changing to a weekly source check has the potential to save each plant approximately 386 hours of RP technician time/year for every 10 instruments in service.
- Industry Benchmarking values—Based on EPRI studies, a sampling of the industry's source check failure rate is less than 1 percent; therefore, the change to a weekly frequency is not expected to impact radiological safety.
- The measure of effectiveness (METRIC)—The instrument source check failure rate will be assessed periodically as described in EPRI Guidance Document 2 referenced below.

Color Code: BLUE
Due: April 2018

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Relevant Standards

- ANSI N323AB-2013, American National Standard for Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments. June 20, 2014.
- ANSI N42.17C-1989, American National Standard Performance Specifications for Health Physics Instrumentation – Portable Instrumentation for Use in Extreme Environmental Conditions. September 7, 1989.
- ANSI N42.17A-2003, American National Standard Performance Specifications for Health Physics Instrumentation – Portable Instrumentation for Use in Normal Environmental Conditions, April 29, 2004.
- National Council on Radiation Protection Report 112, Calibration of Survey Instruments Used in Radiation Protection for the Assessment of Ionizing Radiation Fields and Radioactive Surface Contamination. December 1991.

Relevant Regulatory Requirements

- Potential station-specific regulatory commitments that require daily source-checks of portable survey instruments

Guidance

- INPO 05-008, Radiological Protection at Nuclear Power Stations, Rev 3, February 2017.
- Electric Power Research Institute, Report 3002010642: Optimizing the Frequency of Portable Radiation Survey Instrument Performance Source Checks, June 2017.

Background

Portable radiation survey instruments are currently tested daily, typically on all scales or ranges with a radioactive check source to verify instruments respond appropriately prior to field use. This industry practice is based on American National Standards Institute (ANSI) N323AB-2013, "*American National Standard for Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments*", Section 3.3.2. However, a recent technical study conducted by EPRI on instrument source-check frequency revealed no appreciable risk to the quality and accuracy of radiation and contamination measurements with the frequency extended from daily to weekly. The results of EPRI's research included in Guidance document 2 (above) shows that the implementation of weekly performance source checks of radiation survey instruments will enhance the efficiency of nuclear power plant operations while maintaining the health and safety of workers and the public.

Recommended Industry Actions

- Prior to extending the frequency of portable radiation survey instrument source-checks, each utility should conduct an analysis of their instrument inventory to determine if weekly (versus daily) full-range source checking is appropriate. The analysis should include the following for each instrument (make/model) considered for weekly source-checks:

Key to Color Codes:

Red: NSIAC initiative – full participation required for viability

Blue: Action expected at all sites, but is not needed for broad industry viability

Green: Utility discretion to implement, consistent with its business environment

- Review of Historical Performance:
 - Verify as-found calibration source-check data reveals a 95% or greater pass rate (for all scales) based on $\pm 20\%$ full-scale acceptance criteria.
 - Verify daily performance source-check data reveals a 98% or greater pass rate. (Source-check data for each detector must be assessed for instruments capable of supporting multiple detectors)
- Evaluate for instrument technological weaknesses that would preclude consideration for weekly performance source checking, such as vintage instruments with inherent operating limitations.
- Instruments determined as acceptable for weekly source-check frequency:
 - Perform weekly performance source checks on all scales using $\pm 20\%$ full-scale acceptance criteria. (Note: For microprocessor-based instruments that have been proven linear through type testing and/or acceptance testing, only one point on each scale or decade is required, the actions and recommendations should be adjusted accordingly.)
 - Track and trend source-check failures for each specific instrument model to support the identification and resolution of adverse performance issues. This trended information will also support the annual instrument performance assessment referenced in the Guiderail section below.

Note: Reference EPRI Guidance document 2 for specific performance criteria, and trending and analysis guidance.

Other Actions to Consider

- Perform a radiation source response-check on one scale in addition to normal functional tests prior to using the instrument.

Change Management Considerations

Industry Activities

- Prior to industry implementation, conduct an industry webinar to provide background for initiative, facilitate INPO discussion, and provide an open forum to clarify expectations and ask questions.
- Discuss at regional RPM meetings and routine industry conference calls.
- Criteria, actions and benefits associated with this initiative were discussed at the August 2017 NEI RP Manager Forum and November 2017 RP Manager meeting at INPO.

Company Actions

- Review FSAR and other licensing documents for regulatory commitments, including commitments to ANSI Standards that are relevant to daily source-checks of portable survey instruments.

Guidrails:

- At least annually, perform and document an instrument as-found calibration and source check performance review (for each make/model) to determine if weekly source-check frequencies remain acceptable and appropriate for the instruments. See Appendix A of EPRI Guidance Document 2 for criteria

- Prior to performing the following activities, perform a source check on all scales or use two independent instruments:
 - Survey of materials for release for unrestricted use
 - Surveys conducted for shipping of radioactive materials over public roads and highways
- Perform daily instrument source response checks (minimum of one scale) in addition to routine functional tests for the following conditions:
 - During instrument high-duty periods—such as refueling and maintenance outages
 - Prior to conducting surveys/job coverage in locked high-radiation areas
- Prior to continued use, source check instruments that have been subjected to mechanical shock, extreme environmental stress such as heat, moisture, etc., or any other condition that has the potential to compromise instrument operability or accuracy.

Report Your Site's Results

Please report your company's implementation of this improvement opportunity, including the date of completion. Send this information along with your company point of contact to EfficiencyBulletin@NEI.org.

Industry Contacts


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