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Idaho State University

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U.S. Nuclear Regulatory Commissioin
ATTN: Document Control Desk
Washington, DC 20555-0001

Cc: Director, Division of Nuclear Materials Safety,
U.S. Nuclear Regulatory Commission Region IV,
1600 East Lamar Boulevard, Arlington, Texas 76011

Cc: R4Enforcement@nrc.gov

Subject: Reply to Notice of Violation: EA-20-134

In accordance with guidance from NRC Information Notice 96-28, ISU's Radiation Safety Officer, John Longley, Radiation Safety Committee Chairman, Jon Stoner and Reactor Supervisor, Dr. Mary-Lou Dunzik-Gougar reviewed available information pertaining to Notice of Violation, EA-20-134 resulting from an NRC inspection conducted onsite from March 9-23, 2020, with offsite reviews through March 29, 2021. ISU hereby responds to the following specific violations:

From paragraph 3 of "A" Enclosure 1: " licensee failed to store licensed material in a locked steel storage container in the designated room of the Lillibridge Engineering Laboratory building."

From paragraph 5 of "B" Enclosure 1: "the licensee failed to perform calibration of instruments in accordance with the guidance in NUREG-1556, Volume 11, Revision 1, dated February 2017, Appendix H, Section "Model Radiation Survey Instrument Calibration Program.

From paragraph 2 of "C: Enclosure 1: " the licensee failed to ensure that each container of licensed material bore a durable, clearly visible label that provided sufficient information (such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures."

Please find attached our evaluation of the reason for violation, the corrective steps taken to date and results/and corrective steps to be taken and the date of full compliance.

Sincerely,

Donna Lybecker

Dr. Donna Lybecker
Acting Vice President for Research
Idaho State University
(208)282-3331

Attachment

Idaho State University

Reply to Notice of Violation EA-20-134 Public

In addition to the specific corrective actions specified below, ISU is evaluating methods to improve training to ensure similar recurring events do not occur. ISU will keep the NRC apprised of those actions.

A. EA-20-134 Enclosure 1, Page 1

Violation:
"License Condition 9 of NRC Special Nuclear Material (SNM) License No. 1373 (SNM-1373), Amendment No. 5, dated February 27, 2019, states, in part, that licensed SNM is authorized for use in accordance with the statements, representations, and conditions specified in the licensee's application supplement dated February 14, 2011.

License application supplement dated February 14, 2011, Section 3, "The Place and Plan for Carrying Out the Activity," states, in part, that the licensed material will be stored in a locked steel storage container in a designated room of the Lillibridge Engineering Laboratory building.

Contrary to the above, on March 12, 2020, the licensee failed to store licensed material in a locked steel storage container in the designated room of the Lillibridge Engineering Laboratory building. Specifically, a uranium-235 fission counter authorized by SNM-1373, Item 6.B - 8.B, was not stored in the locked steel storage container in the designated room of the Lillibridge Engineering Laboratory building."

Reason:
ISU personnel incorrectly believed the fission counter could be stored in the source storage vault another controlled access area in the reactor laboratory.

Corrective steps taken and results achieved:
The fission counter ( ) was moved into the locked steel storage cabinet in the designated room of the Lillibridge Engineering Laboratory. All items were verified in the inventory conducted on March 15, 2021.

Full compliance date:
Full compliance was verified on March 15, 2021.

B. EA-20-134 Enclosure 1 Pages 1-2.Severity Level IV violation.

Violation:
"The ISU Radiation Safety Manual, Revision 13, dated December 5, 2019, Section 16.1, "Portable Survey Instruments," requires, in part, that calibration of instruments shall be done using NUREG-1556, Volume 11, Revision 1, dated February 2017, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Licenses of Broad Scope," Appendix H, "Radiation Monitoring Instrument Specifications and Model Radiation Survey Instrument and Air Sampler Calibration Program."

NUREG-1556, Volume 11, Revision 1, dated February 2017, Appendix H, Section "Model Radiation Survey Instrument Calibration Program," states, in part, that: (1) the calibration source should be well-collimated, and the calibration area should be designed to minimize scatter of radiation, which could affect the calibration process; (2) routine maintenance of radiation measurement instruments should be performed as recommended by the manufacturer; (3) calibration fields from gamma sources should be known with an accuracy when compared to secondary or primary national standards of 5 percent for dose rates greater than or equal to 0.1 millirad/hour (mrad/h) and 10 percent for dose rates less than 0.1 mrad/h; (4) for linear readout instruments, instrument readings should be within ±x of the conventionally true value for the following ranges: Background to 1.0 mrad/h; ±x = ±30 percent, 1.0 mrad/h to 100 mrad/h; ±x = ±20 percent, 100 mrad/h to 1,000 Rad/h; ±x = ±10 percent.

Contrary to the above, from December 5, 2019, through March 9, 2020, the licensee failed to perform calibration of instruments in accordance with the guidance in NUREG-1556, Volume 11, Revision 1, dated February 2017, Appendix H, Section "Model Radiation Survey Instrument Calibration Program."

Specifically, (1) in the calibration area, calibration sources and calibration apparatus were placed adjacent to a concrete wall that was not designed to minimize scatter of radiation, and instrument calibrations did not account for scatter produced by the wall; (2) routine maintenance of Ludlum Model 9-3 ion chamber radiation measurement instruments were not performed as recommended by the manufacturer, including the failure to check and replace desiccants inside the instrument; (3) calibration fields from gamma sources was not known by the licensee with an accuracy within the accuracies described in NUREG-1556, Volume 11, Revision 1, Appendix H, and its calibration apparatus had changed since the gamma sources were last compared to secondary national standards in 1996; and (4) for the linear readout instruments that were calibrated during this time period, the instrument readings for the 100 mrad/h to 1,000 Rad/h were not within ±10 percent of the conventionally true value."

Reasons:
1) ISU radiation safety personnel are relatively new to the process and believed the calibration facility had been adequately evaluated for scatter based on a long history of use.

2) ISU overlooked the desiccant replacement requirement in the Ludlum calibration instructions.

3) ISU believed the NIST traceable calibration of the sources was adequate to establish the radiation field. However, these calibrations were performed many years ago in 1984 and 1996 for the two sources and should be re-evaluated. In addition, one of the sources was not evaluated in the ISU calibration facility.

4) ISU incorrectly implemented the guidance of NUREG-1556, Volume 11, Rev. 1 regarding accuracy for instrument ranges. ISU staff did not perform sufficient review of calibration records.

Corrective steps taken and results achieved:
1) ISU performed a shadow shield experiment to quantify the contribution of scattered photons to calibrations performed in the ISU calibration laboratory. The experimental results yielded a scatter contribution of 4% for both the high and low range Shepherd sources. According to ISO 4037-1:1996(E), the percentage of scattered exposure from a gamma source capsule used for calibrations should be less than 5%.

2) ISU revised procedure, RS-12, Calibrations to include a check of dose rate instruments containing desiccant and to replace as necessary. The radiation safety calibration technician was trained to this revision of the procedure. Revision 1 of Procedure RS-12, Calibrations, was approved by the Radiation Safety Committee on October 2, 2020.

4) ISU revised the RS-12 procedure to include the tolerances specified NUREG-1556, Vol. 11, Appendix H for each scale of the linear readout instruments. The radiation safety calibration technician was trained to this revision of the procedure. Radiation safety department staff members review all instrument calibrations to ensure instruments meet appropriate tolerances.

Corrective steps that will be taken:
1-4) ISU will perform all calibration of gamma dose rate instruments using a qualified vendor.

Full compliance date:
Full compliance is expected on June 1, 2021 when gamma dose rate instruments are taken to the qualified vendor.

In the future, ISU may re-establish the gamma dose rate calibration process in a facility that meets the requirements of NUREG 1556 for minimizing scattered radiation. If this action is completed, the facility will be evaluated by the Radiation Safety Committee. In addition, ISU will notify the NRC because the change affects the corrective actions for this violation.

C. EA-20-134 Enclosure 1 Page 2.Severity Level IV violation.

Violation:
"10 CFR 20.1904(a) requires, in part, that the licensee shall ensure that each container of licensed material bears a durable, clearly visible label that must provide sufficient information (such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

Contrary to the above, from March 9-13, 2020, the licensee failed to ensure that each container of licensed material bore a durable, clearly visible label that provided sufficient information (such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

Specifically, (1) the SADZ container which contained an approximately 27 curie plutonium-241 source, (2) a metal paint can which contained 74 uranium-235 fission foils, and (3) a metal cabinet which contained uranium-235 reactor fuel rodlets did not have durable, clearly visible labels that provided sufficient information (such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures."

Reason:
ISU missed labeling these items because they are infrequently accessed.

Corrective steps taken and actions completed:
1) The SADZ capsule was placed in a 5-gallon steel drum. The steel container is labeled with radionuclides, activity, and radiation levels. In addition, the cabinet is labeled caution radioactive material, with the primary radionuclides present and with dose rate information. Activity was not posted on the exterior of the cabinet to increase security of the material. All labeling was completed on or before April 26, 2021

2) The metal cabinet that stores material on the R-110 reactor license was labeled with caution radioactive material, general radionuclide information, and dose rate information. Amount was not posted on the exterior of the cabinet to increase security of the material. All labeling was completed in April 2020.

3) The metal paint can housing 74 fission foils was labeled caution radioactive material and labeled with radionuclide information. The exterior of the cabinet housing the paint can is labeled with dose rate information. All labeling was completed on or before April 20, 2021.

Corrective steps that will be taken:
The RSO sent an email to all authorized users directing them to verify that all radioactive materials are labeled in accordance with Procedure EHS-09-16 and that storage cabinets are labeled with radionuclide and dose rate information. The RSO will direct the authorized users verify that all items and cabinets are properly labeled in the June 2021 inventory of all radioactive material.

Full compliance date:
Full compliance will be achieved on June 30, 2021.