

Licensee Report on

INCIDENT NUMBER 53011

Broadscope License 11-27380-01, Docket 030-32-2322

13 November 2017

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Introduction

As per the instructions of USNRC Region IV personnel in the Division of Nuclear Safety, the United States Nuclear Regulatory Commission (USNRC) Operations Center was notified at 15:46 eastern, on 13 October 2017 under incident number 53011, that a 1-gram Pu NAD source (serial number AP-237 a material type 50 Pu with nominally 61 mCi of Pu-239 activity¹) on the Idaho State University (ISU) NMMSS inventory could not be accounted for by the institution. The following report details the events leading to this notification and all efforts undertaken to understand this event and the disposition of this source.

Precursors to Notification

While performing normal source inventory on about 05 October 2017, an ISU employee noticed a discrepancy between the ISU inventory record and the Nuclear Materials Management and Safeguards System (NMMSS) data base record he was reviewing. The NMMSS database indicated that ISU had 14 grams of Pu-239. This was associated with 14 individual, 1-gram nuclear accident dosimeter (NAD) sources that had been loaned to ISU from the Idaho National Laboratory (INL) in 1991. ISU's radioactive material inventory indicated that the university had 13 such sources not 14. This was brought to the attention of the ISU RSO under broadscope license 11-27380-01, Docket 030-32-2322.

It was understood, based on the history with these sources that one of these had an integrity issue in about 2003 and was taken out of service (Appendix A). It was reported to the ISU Radiation Safety Committee that this source would be taken out of service and returned to the Idaho National Laboratory (Appendix B See Section III. E. 2.). Staff from INL found one document, an email communication, indicating the source was leaking and that there was interested in returning it to the INEEL. All individuals whose names were noted in hand writing on a printed page of this email were contacted and none had a recollection of this event (Appendix C). Appendix A, B, and C had given indication of the intention that the source was to have been returned to INL. During a 2011 investigation of a different incident involving the NAD sources there appears to have been a uniform agreement based upon these documents the source had been returned to INL (Appendix D see page 4). However, the NMMSS discrepancy prompted a further investigation, since the NMMSS data base did not show the source to have been returned to the INL. Initially it appeared that paperwork associated with transferring the source had not been handled appropriately. ISU Environmental Health and Safety (EH&S) staff were asked to review the files to determine when the source had been transferred. This record search and review was begun the week of 9 October 2017. The intention was to identify what had happened to the source and file a 741 form thus updating the NMMSS record.

No records of transfer for AP-237 were found in the ISU EH&S files. ISU EH&S staff contacted INL safeguards personnel (Michelle D. Wilkinson d.wilkinson@INL.gov) on 9 October, 2017 and asked if they had any record of a NAD source transfer from ISU. INL staff provided a NMMSS report detailing all

¹ Series 50 sources are actually more complicated than the nominal Pu-239 activity. Other radionuclides present include: Pu-238 9.4E-4 Ci, Pu-240 1.27E-2 Ci, Pu-241 3.83E-2 Ci, and Am-241 1.22E-2 Ci based on 2007 isotopic ratios. Current activity is less for Pu-238 and Pu-241 and greater for Am-241 because of decay and ingrowth.

nuclear material transactions at ISU from 1967 to present. There was no record of Pu-239 being returned to INL in the report (Appendix E).

One ISU document dated 23 November 2004 from the RSO (Thomas Gesell) to Dr. Jonathan Lawson (the Vice President of the university at the time) mentioned some issue with INL not taking the source at the time but suggesting the ISU dispose of it as waste (Appendix F see item 12).

Current ISU staff contacted previous Radiation Safety Officers and other former institutional personnel who may have been familiar with the source AP-237 and what was done with it in the time frame of 2003 or 2004 and since that date. Appendix G provides the names and contact information of those individuals who were asked about the source both during the week of 9 October and afterward. Generally, there was either no or just vague recollection of the source which had lost “integrity” some 15-years previously. There was no definitive statement about what had been done with AP-237. One individual was questioned by two different individuals on three different occasions. At one time, to paraphrase the individual questioned reported -it was placed in a waste barrel, another time it was said to have been transferred to the TSO²-, on a third occasion he said: -the INL refused to take it and he did not know what happened to the source, nor did he complete any paper work relative to this source-. This series of staff interviews did not produce any solid verifiable information.

ISU staff (the RSO and senior health physics personnel) on 11 October reviewed in detail the inventory of all waste on campus, going through the details of documented materials in each drum, and in some cases, physically examining the contents of the drums. Subsequently, the source, AP-237 was verified to not be in any current waste container at ISU. These individuals also went through each waste manifests from prior to 2003 through the present, looking for some indication of AP-237. No indication that any such source was listed on a manifest was identified. The RSO contacted Thomas Gray and Associates, the waste broker engaged by the university over the entire time from 2003 through the present, asking if any additional manifest, perhaps not in ISU records, existed. ISU had the same set of manifest as held by the waste broker. There was no evidence that AP-237 was listed on a manifest. Any Pu-239 disposed of was associated with additional information that could exclude that Pu-239 from being associated with AP-237.

The RSO, Chair of the Radiation Safety Committee, and senior health physicists in three independent efforts verified that AP-237 was not part of the current ISU NAD source inventory (Appendix H). The RSO and senior health physicists searched through all EH&S source storage locations looking for the source AP-237. That source was not found among other sources in inventory.

The RSO informed the Vice President for Research of the situation late on 12 October 2017 and recommend that the NRC be contacted for directions on how to proceed. With administration concurrence, the Region IV office of the USNRC was contacted and informed of the situation 13 October 2017. Region IV Personnel instructed the licensee to contact the NRC Operations Center and this was accomplished by 15:46 Eastern.

² The TSO or Technical Safety Office was the name of the group responsible for radiation safety up until July of 2017 when the mission was expanded to improve the Safety Culture of the University and the name of the organization changed to Environmental Health and Safety (EH&S)

Post Notification

Monday 16 October 2017 the RSO briefed the University President, General Counsel, the Vice President for Advancement and the Vice President for Research. As recommended by the RSO and Vice President for Research, it was decided that ISU would return all Pu-239 NAD source to the Department of Energy at its first opportunity along with a more recently acquired Pu-241 SADZ source obtained from Lawrence Livermore National Laboratory (LLNL). Since this time, ISU has been pursuing options to return these Pu sources to the Department of Energy. Appendix I is the Engineering design file for NAD sources.

From that point in time forward, ISU has continued to pursue any and all additional information concerning the source AP-237. This has included pursuing more information on the original discussion with INL personnel to determine if there is any other documentation available concerning AP-237 and asking INL to check their own inventory for the potential of having AP-237 in their possession. To date no additional documentation has been found.

Final Condition

Given the documented evidence, and the lack of conclusive information, ISU has no basis on which to make conclusions on the final deposition of AP-237.