

RADIATION CENTER



OREGON STATE UNIVERSITY

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Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Oregon State University TRIGA Reactor (OSTR), License No. R-106, Docket No. 50-243; written report filed by the OSTR as a follow-up to telephone conversations with USNRC staff.

Gentlemen:

On April 8, 1991, A. G. Johnson, Director of the OSU Radiation Center, telephoned Mr. Al Adams, OSTR Project Manager at U.S. Nuclear Regulatory Commission (NRC) headquarters to discuss an event involving the shipment of a small quantity of radioactive material, which occurred on January 16, 1991. In addition, on April 5, 1991, Dr. Brian Dodd, Reactor Administrator at the OSTR, contacted Mr. Wendell Carriker, Research and Special Programs Administration, US Department of Transportation, Washington, D.C. to report the event to the USDOT. Relative to reporting, it should also be noted that on April 5 A. G. Johnson attempted to contact Mr. Adams at NRC headquarters, and Mr. Phil Qualls and Mr. Leroy Norderhaug who are the OSTR contact personnel in the NRC's Region 5 office. None of these individuals were available on April 5 and thus the first NRC telephone contact was made with Mr. Adams on April 8, 1991.

The purpose of the telephone calls to the DOT and the NRC was first to describe the event to the agencies and then to determine whether or not there were formal reporting requirements for labeling and shipping paper discrepancies which were detected after-the-fact for a shipment of 140 μ Ci of radioactive material which went from the OSTR to another licensee. The DOT representative indicated that their regulations had no clear reporting requirements for the event described, and Mr. Adams telephoned A.G. Johnson on April 8 to report that there did not appear to be any applicable NRC reporting requirements for such an event. However, in keeping with the OSTR policy of open communication with the NRC on matters which we believe to be of mutual interest, we have decided that it would be appropriate to submit a report of the event.

In addition to verbal notification of NRC headquarters, telephone calls were also completed to the NRC's Region V Office, to the Oregon Department of Energy, to the Oregon Radiation Control Section, to the carrier (Federal Express) and to the recipient of the shipment, Rensselaer Polytechnic Institute (RPI). In the latter case, the notification

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was made to the RPI Radiation Safety Officer, which is where the package was shipped. Notifications to the specified organizations were made on April 8 and April 10, 1991.

A description of the event itself, including our analysis of its cause; corrective actions and measures implemented or planned to prevent or reduce the possibility of reoccurrence; lessons learned; and specific conclusions regarding the event are all included as part of this report. Furthermore, the information submitted in this report, including the corrective/preventative actions, has been reviewed and approved by a quorum of the OSTR Reactor Operations Committee (ROC).

BACKGROUND INFORMATION

The Oregon State University Radiation Center routinely ships small quantities of radioactive material to other licensed users on the OSU campus and to users at other locations throughout the country. All shipments are made in full accordance with applicable regulations of the US Department of Transportation and the State of Oregon. Normally, the quantities of radioactive material shipped are in the microcurie range and fall into the DOT "Limited Quantity" category. The remainder of the shipments are USDOT "Type A Quantities" and normally require a White-I or a Yellow-II radioactive material label. Upon very rare occasion, the Radiation Center may ship a package requiring a Yellow-III radioactive material label.

As part of the Radiation Center's program for shipping radioactive material, training sessions are conducted for each individual authorized to make such shipments. Upon completion of the training, individuals have their name entered on a list of certified radioactive material shippers. To retain this certification, individuals must participate in an annual retraining program.

Another part of the shipping program includes quarterly audits of all shipments. One such audit is performed by the OSU Radiation Safety Officer, while a separate quarterly audit of shipments from the OSTR is performed by the ROC.

The Radiation Center also has several different types of containers which have been tested to meet USDOT container Specification 7A. Records of these container tests are maintained permanently on file at the Radiation Center.

Detailed written procedures for packaging and shipping radioactive material are also part of the Radiation Center's shipping program. These procedures are available to all individuals authorized to make such shipments and are reviewed for accuracy at least annually by the OSTR Reactor Operations Committee.

DESCRIPTION OF OCCURRENCE AND POSSIBLE CAUSES

As noted previously, part of the Radiation Center's program for shipping radioactive material includes a quarterly audit which is performed by the OSU Radiation Safety Officer. On Friday, March 29 the OSU Radiation Safety Officer performed the routine quarterly

audit of shipments made during the first quarter of 1991 and identified a discrepancy in a radioactive material shipment made on January 16, 1991. The discrepancy is described below:

On January 16, 1991, the Radiation Center's Radiation Protection Technologist packaged a shipment containing 140 μ Ci of iron-59 (Fe-59) for shipment to Rensselaer Polytechnic Institute (RPI). The radioactive material was contained in thin geologic samples which had been irradiated in the OSTR thermal column, and the majority of the radioactivity at the time of shipment is believed to have been due to flux monitors present with the samples. The shipment was made from OSTR License R-106 to RPI's New York State License NYS-1035. The 140 μ Ci of radioactivity was well within the DOT limit for a Limited Quantity shipment, but the material was actually packaged in a container meeting USDOT Specification 7A, which qualifies the container to carry a Type A Quantity of radioactive material. The maximum radiation level in contact with the package was 4 mrem/hr, while the radiation level at 1 meter (i.e., the transport index) was 0 mrem/hr. The package was distinctly labeled Radioactive Material, Limited Quantity n.o.s., UN 2910, which was consistent with the quantity of radioactive material being shipped, but was not consistent with the maximum radiation level at contact with the package. Considering the 4 mrem/hr present on the package surface, the package should have been labeled with a Radioactive Yellow-II label and classified as Radioactive Material, n.o.s., UN 2982. In addition, the shipping papers which accompanied the package reflected the fact that the package was classified and labeled as a Limited Quantity, and consistent with this labeling the papers indicated that the package was industrial, strong and tight rather than Specification 7A. As a reminder, a USDOT Specification 7A package was actually used to make the shipment, but the shipment was not being considered a Type A Quantity. All other DOT requirements applicable to the shipment were met, and after the package was prepared it was transferred to Federal Express for shipment to RPI. The shipment arrived without incident at its intended destination.

The individual who prepared this shipment for the OSTR was certified to ship radioactive material and is a very capable and conscientious member of the Radiation Center's staff. There are no indications that the discrepancies occurred due to carelessness on the part of the individual involved. The person making the shipment had successfully shipped a large number of radioactive material packages from the Radiation Center, and after discussing the matter with the individual, we can only conclude that the mistake was due simply to human error. We have every confidence that this employee will recognize the significance of this occurrence and will benefit from the additional training and other follow-up activities associated with this event.

CORRECTIVE ACTIONS AND MEASURES TAKEN TO PREVENT THE REOCCURRENCE OF SUCH AN EVENT

The Center's program for shipping radioactive material is very much a part of our day to day operation and we believe that it must be carried out in a safe and professional manner. As indicated previously, the Radiation Center conducts a formal training program associated with the authority to ship radioactive materials. The training involves many different topics including the written shipping procedures, practical shipping exercises, and other factors designed to assure full compliance with all USDOT and State of Oregon requirements. However, in view of the event described in this report, the Center has implemented two additional actions which we believe will significantly help to prevent the reoccurrence of any further discrepancy during the shipment of radioactive material. The two corrective measures are as follows:

1. The Radiation Center procedure for transfer, packaging, and transport of radioactive material has been revised to require an independent review by a second individual of all packages and shipping papers before they are offered for shipment. The review will be conducted by an individual certified to ship radioactive material, but the reviewer will not be the same individual who packaged the shipment and prepared the shipping papers.
2. All Radiation Center staff members certified to package and ship radioactive material participated in a special retraining program conducted on April 9, 1991. During this training session the event being reported was reviewed along with the new requirement for a secondary review of shipping papers and packages. Other aspects involved in the shipping of radioactive material were also reviewed.

LESSONS LEARNED

The concept of performing a second independent review of logs and checklists is common throughout the research reactor community. Based on this event, it would appear that an independent review of radioactive material packages and shipping papers prior to actual shipment would be a wise addition to all shipping procedures which do not currently require such a review.

CONCLUSIONS

The quantity of radioactive material involved in this event was quite small and the associated radiation levels were very low. Consequently, the discrepancies identified are primarily regulatory in nature. Furthermore, safety was not an issue in this occurrence. Nevertheless, the OSTR staff regrets that this event took place and wishes to assure the NRC, the DOT and the State of Oregon that safety and compliance with regulatory requirements are of the utmost importance in all aspects of our program. We also wish to make it clear that we are fully committed to implementing the previously identified corrective actions in order to prevent a reoccurrence of this event.

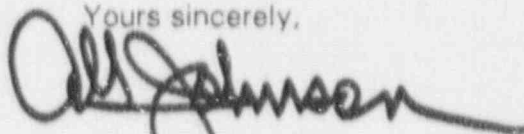
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In conclusion, we would like to summarize for your consideration several key factors relating to our report.

1. The amount of radioactive material shipped (140 μ Ci) was well within the DOT's curie limit for a "Limited Quantity" shipment.
2. The radioactive material was packaged in a container meeting USDOT container Specification 7A, which was a fully appropriate container for the radioactive material shipped.
3. The primary discrepancies were in the labeling of the package and in the previously identified errors on the accompanying shipping papers; however, these latter errors were consistent with the labeling discrepancy.
4. The maximum radiation level at the package surface was only 4 mrem/hr and at 1 meter was 0 mrem/hr. Thus, there were no radiation safety issues associated with handling or transport of the package.
5. All other USDOT regulatory requirements applicable to this shipment were complied with in full.
6. There does not appear to be any clear requirement for reporting this type of event. However, this report is being submitted to maintain open communications with the NRC and other regulatory agencies which have jurisdiction over our program.

Should there be questions regarding the information in this report or should you require more information, please let me know. It is our intent that this report be as complete and helpful as possible.

Yours sincerely,



A. G. Johnson
Director

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cc: NRC-Region V
NRC-Al Adams
ODOE-David Stewart-Smith
State of OR, Radiation Control Section-
Martha Dibblee

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