

6. CRACKED GOULD SHAWMUT AND BUSMAN FUSES

10/7/93

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On October 7, 1993, personnel at the High Flux Isotope Reactor reported that, since January 1993, three Gould Shawmut fuses with cracked end caps (ferrules) were discovered during receipt inspection. In addition to the cracked fuses found at receipt, they detected other cracked fuses in the circuits of pressurizer pumps, diesel generators, and spares in the electrical building. These fuses were manufactured by

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the Gould Shawmut Company and the Busman Fuse Company. Cracked ferrules could cause fuse (and circuit) failure without a design fault and may adversely effect fuse/circuit breaker coordination.

Gould Shawmut Company personnel confirmed that the cracked end caps are a result of stress corrosion cracking, the principal factors being stress, environment, time, and the internal structure of the base metal. These factors interact on each other, one accelerating the action of the other. They suspect that the brass plain-end ferrules crack due to the stresses induced into the ferrules during manufacturing, such as crimping of the ferrules near the last step of the manufacturing process. The cracking does not occur immediately but occurs some time after they leave the manufacturer. Gould Shawmut further reported that copper ferrules do not undergo cracking, and they are committed to change to this material. According to Bussmann personnel, Bussmann recognized this problem in their product approximately ten years ago. They concluded that a material with a higher copper content would eliminate the issue and made the appropriate changes in their product. The cracked Bussmann fuses found in service at the High Flux Isotope Reactor are believed to be fuses manufactured prior to the material change. Facility personnel are continuing to discuss this incident with various fuse manufacturers, and they will implement corrective actions as warranted. If any other facility has experienced similar problems with cracked fuses, please contact Ken Houbre, Martin Marietta Energy Systems, Research Reactors Division, Materials and Procurement Manager at 615-574-9074 or Jim Kilgore, Martin Marietta Energy Systems, Research Reactors Division, Electrical Engineer at 615-574-4271. Further updates on this event, including cause of failure and lessons learned, will be provided in future OE Weekly Summaries as information becomes available. (ORPS Report ORO--MMES-X10HFIR-1993-0031)

7. RADIOACTIVE LEAD SHIPPED TO SMELTING COMPANY

On October 4, 1993, personnel at the Argonne National Laboratory - East (ANLE) discovered that approximately 250,000 pounds of scrap lead was shipped to a commercial smelting company without a Health Physics review. Health Physics personnel performed a survey of the remaining material at the lead storage facility and identified lead bricks with activation levels as high as 1×10^{-10} curies/gram. Facility personnel report that this is equal to a dose rate on contact of 0.02 mrem/hour. (Natural background levels at ANLE are 0.01 to 0.02 mrem/hour). Health Physics personnel did not find any smearable contamination on the remaining material. Approximately 40,000 pounds of the scrap shipped offsite has not been smelted, and it will be surveyed by Health Physics personnel prior to further processing. As a result of this event, facility personnel suspended all lead shipments, pending a review of procedures and past shipments. (ORPS Report CH-AA-ANLE-ANLESSD-1993-0001)

NS reported in OE Weekly Summary 93-40 on a similar event involving shipment of contaminated material offsite without detecting contamination prior to shipment. On September 27, 1993, Brookhaven National Laboratory (BNL) personnel discovered very low level contamination in nine notebooks and logbooks that were stored at a National Archives Records Administration (NARA) facility in Bayonne, New Jersey. The survey of BNL records at the Bayonne facility was part of a nation-wide effort initiated by NARA after radioactive articles were found among items transferred from ANLE to a NARA facility in Chicago. The radioactive articles discovered included a 200-gram uranium rod reading 8-to-10 mrem/hour on contact and a 545-gram