SAVANNAH RIVER SITE RADIOLOGICAL TECHNOLOGY CENTER'S EFFORTS SUPPORTING WASTE MINIMIZATION

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ABSTRACT

This paper describes the efforts of the newly formed Radiological Technology Center (RTC) at the Department of Energy's Savannah River Site (SRS) to support waste minimization. The formation of the RTC was based upon the highly successful ALARA Center at the DOE Hanford Site. The RTC is tasked with evaluation and dissemination of new technologies and techniques for radiological hazard reduction and waste minimization. Initial waste minimization efforts have focused on the promotion of SRS containment fabrication capabilities, new personal protective equipment and use of recyclable versus disposable materials.

INTRODUCTION

SRS formed the Radiological Operations Support Center (ROSC) in May of 2002. The ROSC consists of two unique, but mutually supporting, work groups. The Containment Fabrication Facility builds custom containment huts, glovebags, tarps, enclosures and catch containments for both radiological and non-radiological work. The RTC is concerned with the transfer of new technologies and methods to operating facilities to reduce the volume of waste generated, overall radiological hazards and ultimately costs. The RTC has focused its initial waste minimization efforts in three general areas: promotion and improvement of the capabilities of the Containment Fabrication Facility, use of new personal protective equipment and promotion of the use of recyclable versus disposable materials.

CONTAINMENT FABRICATION FACILITY (CFF)

Operation of the CFF began in 1999 in a small building in a production area at SRS. The use of custom containment devices immediately proved invaluable to radiological hazard reduction and resulted in tremendous waste minimization over existing practices (1). The facility production demands soon outgrew the capabilities of the existing building. During the spring of 2002, an existing warehouse was refurbished to house both the CFF and the RTC with SRS waste minimization program funding. In addition to the building physical upgrades, new equipment such as additional radiofrequency sealing machines, additional sewing machines and air tables were purchased to accommodate the increased production demands. The facility currently occupies 1020 square meters of floor space and has a staff of one first line manager, 1 shop foreman, 9 operators and 3 work designers/planners.

The CFF has the capabilities to construct a wide variety of unique and innovative containments, including huts and glovebags, to support the widely diverse and specific needs of operating facilities. Containments may be designed to limit the spread of not only surface and airborne contamination but also contaminated liquids. The use of custom containments significantly

reduces low level radioactive and TRU waste generation due to containment at the source and the associated reduction in the use of personal protective equipment. Since October of 2000, they have constructed over 80 huts, 400 glovebags, 400 liquid catch containments, 180 tarps/covers, 800 transfer sleeves and 500 other containment devices.

Fig. 1. Partial View of CFF and Specialized Containment Device.

After the formation and co-location of the RTC in May of 2002, the RTC began efforts to promote and assist the CFF. Based on the primary RTC mission of disseminating information to all SRS work groups and off-site contacts, promotion of the CFF was a significant goal. The RTC hosts numerous tours and information exchanges allowing for concurrent tours and discussions on the capabilities of the CFF. Allowing work groups to see the shop in action is invaluable to promotion of containment fabrication products. A second goal is to provide engineering support and advice to the CFF.

One area of interest at SRS is the development of improved methods for ventilation of glovebags. SRS has used ventilated glovebags infrequently and development of good engineered features and general user guidance information will greatly improve the quality of the program. The RTC is presently evaluating issues associated with ventilated glovebags including proper flowrates based on glovebag size and necessary containment capabilities, optimum inlet HEPA filtration based on flowrates and CFF sealing capabilities and optimum flowpaths for air movement. The use of well-designed and installed ventilated glovebags will improve the overall quality of the SRS glovebag program.

Another area of cooperation between the RTC and CFF is on improved containment applications. A recent example is a containment cap for tritium contaminated piping. Initial operations were to tape pieces of roll plastic to the end of the 1.07 meter diameter pipe that resulted in potentially poor seals and a spread of contamination. The RTC was contacted for advice and worked with the CFF to deliver a prototype sealed cover in a few hours of the initial call. Figure 2 shows the initial plastic cover on the right and the new cap covering the plastic on the left. The new cap provided for quick installation and improved containment. This type of teamwork is proving to be a valuable resource for waste minimization and radiological hazard reduction at SRS.

Fig. 2. Pipe Containment Cap.

PERSONAL PROTECTIVE EQUIPMENT

The RTC is also actively supporting personal protection equipment improvements that directly support waste minimization. Two specific items are The Eliminator™ Personal Cooling/Heating System (2) and improvements in the SRS air-supplied respiratory protection hood. The Eliminator vest is a thermal system that can be worn under anti-contamination clothing to help maintain worker comfort level in both hot and cold environments. It can significantly increase work time without breaks for industrial hygiene concerns and thus reduces waste generation, increases productivity and creates a safer work environment. The vest is basically a water-filled bladder sandwiched between a vest material constructed of a special material which will retain the thermal properties of the water (cold or hot) circulated through the bladder. The vest is filled and recharged via a quick disconnect system between the vest and any of a number of sized water containers. The recharge time is approximately 20-30 seconds and the time between recharges can vary between 30 minutes and a few hours depending on the environmental and work conditions involved. For jobs involving a very hot environment and restrictive anti-contamination clothing and respiratory protection equipment, SRS has sleeved a supply hose to allow a continuous circulation of ice water to the vests during work evolutions.

Fig. 3. The Eliminator™ Personal Cooling/Heating System.

The SRS respirator protection hood historically consisted of a plastic hood and an integral 15.24 or 30.48 meter airline. Therefore, disposal of the hood as radioactive waste also involved the disposal of a significant volume of airline. SRS has redesigned the hood with a short "pigtail" airline versus the integrated airline. The 0.61 meter line is thus the only portion disposed of if

the hood is contaminated. The secondary airline between the pigtail and the air supply system can be sleeved such that it does not need to be disposed of as radioactive waste following use. The use of the new hoods has resulted in a significant reduction in radioactive waste from the use of the SRS hood.

Fig. 4. SRS hood with pigtail airline.

RECYCLABLE VERSUS DISPOSABLE MATERIALS

SRS has used a significant amount of disposable materials such as Kraft paper, plastic and even shoe covers in the conduct of radiological work. RTC efforts have focused on the promotion of reusable and launderable materials for work involving low levels of radioactive contamination. SRS has embraced the use of launderable shoe covers instead of single use plastic covers. The use of launderable shoe covers has resulted in an estimated 15 cubic meter reduction in low level waste. While most facilities have transitioned to the new shoe covers, the RTC is promoting their use to any facilities that have not changed over.

A second item is the promotion of the use of launderable tarps in place of single use paper or plastic. The SRS radiological laundry vendor can process tarps up to 9.29 square meters. The tarps are provided with either Velcro or grommet edges to allow for the connection of multiple tarps of various sizes to accommodate specific needs. The RTC is coordinating with the CFF for their manufacturing of custom tarps for individual facility needs. One example is the CFF modification of a standard 3.048 meter by 3.048 meter tarp for obtaining liquid radioactive waste samples in the SRS Tank Farms. The tarp was modified to have a hole and collar to fit specific size port openings in the tank tops used to take liquid dip samples. The modification allows for easy installation and removal of the tarp under potential high dose rate conditions.

CONCLUSIONS

In conclusion, one of the significant missions of the newly formed SRS RTC is to support waste minimization. Initial efforts in promoting the CFF, new personal protective equipment and recyclable versus disposable materials are proving to be successful efforts which will yield benefits not only in waste reduction but also in improved safety and cost-effective operations.

REFERENCES

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