ESH | Environment, Safety & Health SECTION

June 2002

HEY CULLIGAN MAN !!??

Written by: Elaine Marshall

Edited by: Mary Logue

DI Bottles at CUB

The Laboratory has a number of deionization bottles throughout the site and uses them to purify water in the Low Conductivity Water (LCW) system. The deionization process removes the ions from the water decreasing its conductivity. The bottles contain a resin chosen to remove contaminates picked up while cooling various equipment. These bottles are also used to remove dissolved mineral salts present in the water used to replenish the LCW system. Sounds like a water softener, doesn't it?

Several weeks ago, it came to the attention of FESS Operations and FESS ES&H personnel that a Laboratory deionization bottle had been installed on a building humidification system. In this case, the building personnel had done the research to determine that the resin in the Fermilab bottles was the same as the resin contained in the bottles they had been receiving under outside contract. They felt that they could save the Laboratory money by canceling their contract and use an in-house bottle. However, the problem lies in the contaminants of the LCW system.

The contaminants present in the LCW system consist of very low-level radioactive inorganic materials. Once the resin has been spent, or becomes ineffective in removing the ions from the recirculating water, the bottles are removed from the LCW system. As soon as the contact dose rate is less than 1 mR/hr, the bottles are taken to the Central Utility Building for regeneration or "recharging". The bottles are collected until there are enough to perform batch regeneration. During the regeneration process, the inorganic materials, or sludge at this point, are collected and removed from the system.

Sludge Press. Sludge, or the residual solid materials in the bottles, is removed from the process tanks and then put through the press and the dryer to remove water. After being dried, the sludge is handled as mixed waste.

The regeneration process results in the generation of a mixed waste as defined by the State of Washington, where Fermilab transports its radioactive waste. The Fermilab Radiological Control Manual requires us all to minimize radioactive waste, especially mixed waste volumes. Using a Laboratory deionization bottle for a purpose other than to purify the LCW system would add to the volume of waste materials generated by increasing the inorganic materials collected through the regeneration process.

Another concern is that the bottles themselves may contain low-levels of radioactive materials. The regeneration process is not 100% efficient, so in spite of our best efforts, some of the radioactive inorganic materials remain on the resin. Good management practice segregates radioactive material/systems/processes from non-radioactive ones. This practice helps us to minimize the number of areas posted for radiological purposes. It helps to reduce volumes of radioactive waste. And the list goes on…

Spent resin bottles awaiting regeneration at the CUB. Bottles can be either big or small.

For these reasons, please remember that the Fermilab deionization bottles should only be used for the LCW system. If you have a need for purified water, you can contact FESS Operations. FESS Operations can provide consultation services to determine which would be the most appropriate way for you to satisfy this need.

This message should be delivered to all employees via delivery of unaddressed copies to Fermilab mail stations.
Suggestions for ES&H Update topics should be directed to Mary Logue at grace@fnal.gov or X6329.