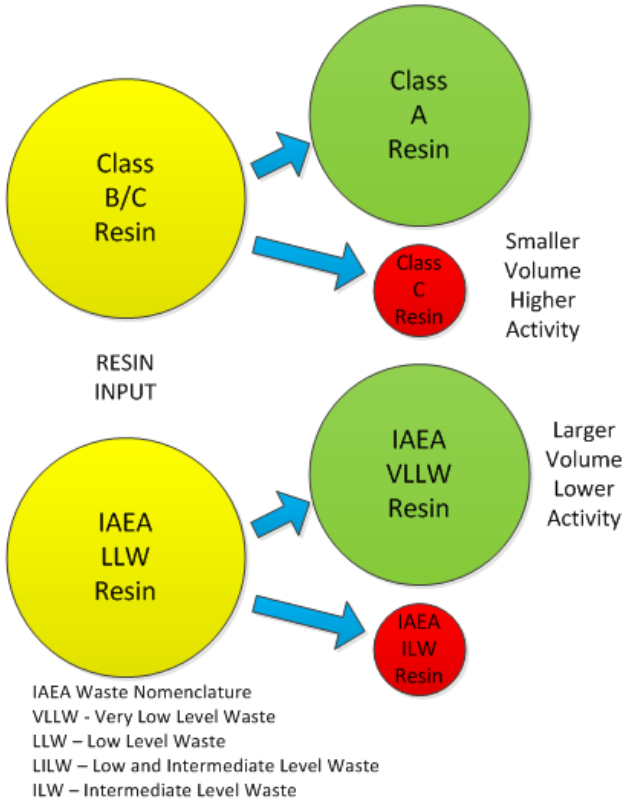
ELECTRIC POWER RESEARCH INSTITUTE

Patent-Pending Process Promises Volume Reduction for Spent Resins

A new resin separation technique and regeneration process could significantly reduce the volume of low-level waste subject to on-site storage and disposal.

Most nuclear plants generate spent ion exchange resins that require storage and disposal. These wastes – typically classified as Class B/C waste in the United States and as low and intermediate-level waste (LILW) outside the United States – are usually dealt with using solidification processes, which further increase the waste volume through the addition of binders. Life-cycle management of these wastes represents a long-term liability and entails significant capital costs for storage facility construction, operating and maintenance costs for the facility, and disposal costs that may exceed $4000 per cubic foot. U.S. pressurized water reactor plants generate about 120 cubic feet of Class B/C waste per year, which equates to nearly $50 million dollars in annual disposal costs.



EPRI is developing a new process designed to shift the radioactive burden from the spent ion exchange resin to a smaller volume. Laboratory testing indicates that a volume reduction of 90% is achievable, and that the remaining ion exchange resin could meet the specifications for Class A waste in the United States and possibly very low-level waste internationally.

The process divides the ion exchange resin waste into two waste streams:

- The original spent resin depleted of the majority of its radioactivity
- A significantly smaller volume of high activity waste that can be configured into one of several forms depending on the desired waste product.

This process would render the original waste eligible for low activity disposal and substantially reduce the volume of waste subject to on-site storage and future disposal.

The resin separation technique, regeneration process and precipitation process have been proven on a lab scale using non-radioactive resins and metals. Preliminary research results will be published in June in: *A Feasibility Study of a Process to Shift the Radioactive Burden in Spent Ion Exchange Resins to*

Smaller Volumes for Disposal (EPRI product 1025303). EPRI has applied for U.S. and international patents on this process. Work in 2012 is focused on lab-scale radioactive testing and bench-scale non-radioactive testing. Pilot-scale testing is planned for 2013.

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