'Hot' water cleanup begins at TMI

More than two years after the accident at the Three Mile Island nuclear powerplant, a demineralizer system has started to decontaminate the 2.5 million liters of radioactive water left in the reactor containment building.

Kenneth J. Hofstetter, radiochemistry supervisor for GPU Nuclear, which runs the facility at Three Mile Island, reported last week that so far almost one-tenth of the contaminated water has been successfully treated. He spoke at the Analytical Chemistry in Nuclear Technology conference in Gatlinburg, Tenn. Based on the performance of the system to date, plant officials estimate they should complete processing the radioactive water within nine months.

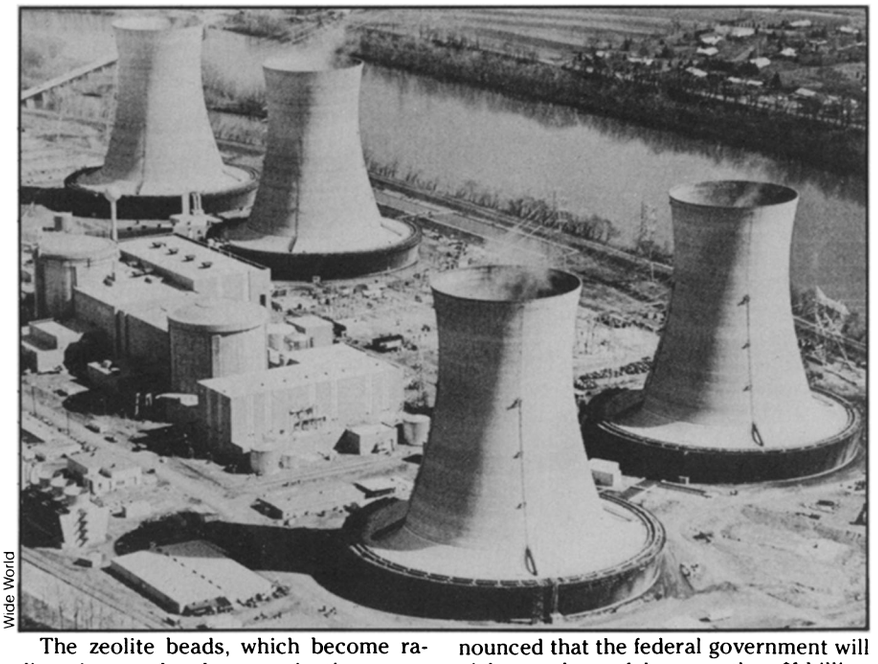
The $10 million demineralizer system, specially developed for the cleanup, lies underwater in two spent-fuel pools. A pump within the containment building forces water through a filter system into four shielded, temporary storage tanks. The filtering snares particles that could clog the demineralizer. The filtered water then passes in batches through four 300-liter columns packed with a material that removes the bulk of the principal radioactive isotopes, Cs-137, Cs-134 and Sr-90, found in the water.

The sorbent material, in the form of sandlike particles, is a mixture of minerals called zeolites (hydrated aluminum silicate compounds). This material was chosen because it has a high resistance to radiation, and its sorptive capacity is not affected by sodium ions or boric acid, which are also found in the contaminated water.

The entire process is closely monitored. Shielded glove boxes installed at strategic points permit sampling of the various process streams. A temporary laboratory established at poolside can perform tests on the samples quickly.

The treated water is then "polished" to remove remaining trace quantities of the three major isotopes and minor nuclides such as Sb-125, Ce-144 and Ru-106. The polishing is done with organic ion exchange resins, which can survive the much lower radioactivity of the pretreated water.

The processed water, which still contains tritium, is held in onsite storage tanks, awaiting other uses within the plant and final disposal, perhaps in 1983. David Osterhout, a spokesman for GPU Nuclear at Three Mile Island, says the water may be used for hosing down the reactor building. "Also, once the radioactive water is drained from the reactor building, we plan to put some treated water back inside to act as shielding because there'll be a kind of 'radioactive ring around the tub,'" he says.



Wide World

The zeolite beads, which become radioactive as the decontamination process continues, are dried and placed in shipping canisters. "We've made arrangements through the Department of Energy to remove the filled canisters for testing, research and, ultimately, disposal," says Osterhout.

After decontaminating the water, within nine months or less, the next logical step is decontamination of the reactor building itself, says Osterhout. "Decisions on that will depend upon funding availability."

Last week, David A. Stockman, Office of Management and Budget director, announced that the federal government will pick up a share of the more than $1 billion cleanup cost at the TMI powerplant. About $37 million is available in the Department of Energy's 1982 budget for this purpose. Stockman indicated the government will spend more than $100 million over the next four years.

The federal government's contribution will be used to cover the cost of removing the contaminated reactor core and disposing of the radioactive materials. DOE plans to use some of the material in its research programs on the management of nuclear wastes. □

Radon in California: Watching the detectors

Levels of radon gas regularly measured in Southern California soil are receiving greater scrutiny than usual following a recent report that levels of that gas are increasing. A rise in levels of radon, a radioactive, inert gas with a short half-life, has been found to be a possible precursor of seismic activity in China, in the Soviet Union, and in California's Imperial Valley. The high concentrations may indicate increasing compression deep in the earth, which forces to the surface gases containing higher levels of radon (SN: 3/4/78, p. 136).

Scientists at the California Institute of Technology (Caltech) and the United States Geological Survey (USGS) stress, however, that the measurements do not allow them to predict a quake. While a quake could occur in Southern California, it also could occur hundreds of miles from the radon sensors.

Two USGS scientists, Thomas H. Heaton and Carl E. Johnson, sent a memo recently to the main USGS office in Reston, Va., notifying their superiors that anomalies in radon levels and in levels of groundwater, another suspected sign of seismic activity, had been noted. "Despite our present confusion about the significance of these recently reported geophysical anomalies, it seems clear that if a large earthquake were to occur in the near future, then many would claim that there were abundant examples of precursory phenomena," they wrote.

Caltech physics professor Thomas Tombrello reports that concentrations of radon in monitored wells near Glendora and Lancaster rose significantly early in August, peaked, subsided, and peaked again five days later. Arthur Sylvester of the University of California at Santa Barbara also reported radon anomalies in the soil around Santa Barbara. In some parts of Southern California, groundwater levels rose as much as 30 feet within a few days.

Scientists will discuss the anomalies at a meeting at Caltech November 4. Such meetings to evaluate data occur periodically, says Walter Hays of the USGS office of earthquake studies in Reston. Although the "unusual" radon levels persist, he says, the number of instruments currently in place in Southern California is "probably adequate." □