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- Sunday, Jan 20
- Thursday, Jan 17
- Tuesday, Jan 15
- Monday, Jan 14

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Nuclear 'treasure' causes security, safety headaches for ORNL

By Frank Munger News-Sentinel senior writer

picture

Oak Ridge National Laboratory's stockpile of uranium-233 is perceived as a treasure. Its nuclear decay products, notably bismuth-213, have shown great promise in treatments for acute myologenous leukemia and possibly other forms of cancer.

In truth, however, the U-233 housed in a building near the heart of ORNL's research campus has become a nuisance -- and an expensive one at that -- in recent years.

The lab spends millions of dollars annually to provide surveillance because the U-233 and its associated radioisotopes are stored in an old facility that doesn't meet current-day standards. The money also goes for security because, if stolen, the fissile material could be converted into nuclear weapons, and that's more of a concern now than ever before.

The U.S. Department of Energy created hope and excitement when it announced many months ago that it planned to hire a company to process and dispose of the dangerously radioactive material. The idea was to extract the valuable isotopes from the stockpile and then relocate the remainder of nuclear cache to a safe site for long-term storage.

But DOE's release of a "request for proposals" was put on hold late last year, and it's still not clear when the process of selecting a contractor will begin.

Meanwhile, ORNL has launched a program to evaluate the condition of the storage containers, some of which have not been checked for decades.

The inspection effort is in direct response to concerns raised by the Defense Nuclear Facilities Safety Board, which insisted there's no way to assess the safety conditions in Building 3019 -- not far from the ORNL cafeteria -- until those containers are tested.

"So far, everything is looking in good condition," Jim Rushton, who's heading the inspection program, said recently. "We went through an operational readiness review and got the green light in October to begin inspections."

The uranium-233 is a legacy from the 1950s and '60s, when the Atomic Energy Commission sanctioned a series of experiments to evaluate the potential use of U-233 as reactor fuel.

There are more than 1,000 containers of uranium housed in the ORNL facility, and more than 50 different types of packages, some of them resembling the tin cans found on the shelves of your local grocery story. The lab's tin cans, however, have a sealed outer shell made of stainless steel.

Rushton said individual containers are removed from storage and taken initially to a shielded inspection chamber, where a visual check is conducted to make sure there's no leaking. If that passes muster, the container is moved to "hot cell," where additional tests -- including gamma-ray imaging -- can be done to evaluate the condition of the nuclear material.

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In conjunction with the inspections, the laboratory is opening some packages and processing the uranium stock to extract quantities of throrium-229. The thorium will decay to form the bismuth-213 needed for cancer treatments.

These milligram quantities should help ease the demand for the medical isotopes until a full-fledged processing program is approved by the government, Rushton said.

Also, it's hoped that the inspection program will verify that the containers of uranium are in a safe condition at ORNL, making that "a non-issue" when the new contractor arrives to begin that project, he said.

The inspections should be completed sometime in 2003.

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