



Hanford Update

Tank 101-SY



Hanford workers connecting containment bellows at tank 101-SY during the "safe window" after a tank venting.

Flammable gases in radioactive waste tanks

Millions of gallons of radioactive chemical waste are stored in 177 large underground tanks near the center of the U.S. Department of Energy's Hanford Site. The waste was generated by chemical processes used during more than 40 years of plutonium production for the nation's nuclear defense program.

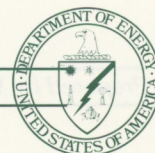
The safe storage and disposal of this tank waste represents the largest part of the massive environmental restoration under way at the Site. It will require the resolution of a number of safety questions.

The top-priority Hanford tank safety question involves the accumulation and release of potentially flammable gases in nearly two dozen tanks, particularly tank 241-SY-101 (commonly referred to as 101-SY).

What is different about tank 101-SY?

Gases generated by the chemical breakdown of the tank waste normally rise to the surface, and into the empty space in the top of a tank. There they are swept away by the tank's filtered ventilation system. But in tank 101-SY and some other tanks, Hanford scientists found the gases apparently collect within the waste instead of rising continuously to the surface.

Tank 101-SY, a double-shell tank built in the mid-1970s, has been nearly full of concentrated nuclear waste since late 1980. It is of particular concern because it shows the largest accumulation of gases. These collected gases include hydrogen and nitrous oxide and are potentially flammable. They are released about every 100 days through "ventings." Each venting is different in terms of duration and volume of gas released.



Experts at and outside Hanford agree there is very little chance the gases could ignite. They believe the worst credible accident caused by ignition of the gases might damage the inner steel wall of the tank, but not the outer steel wall or the reinforced concrete surrounding it.

Waste Tank Safety Team created

In March 1990, Westinghouse Hanford Company, which manages the major Hanford facilities for the Department of Energy, created a waste tank safety team to study the tank 101-SY situation. Scientists and engineers have worked after each of the eight gas ventings since then to gather more information about the cause of the gas buildup and find a remedy.

This work is governed by strict safety requirements. For example, all waste sampling and equipment installation in tank 101-SY is allowed only during a time "window" shortly after the tank vents, when the volume of collected gas is believed to be lowest. Many restrictions also have been taken to further reduce the already low risk of igniting gases inside tank 101-SY. For example, equipment that could cause sparks is not being used at the tank and lightning arresters are in place.

What progress has been made on tank 101-SY?

Progress has been steady. By November 1990, after extensive preparation and safety reviews, technicians

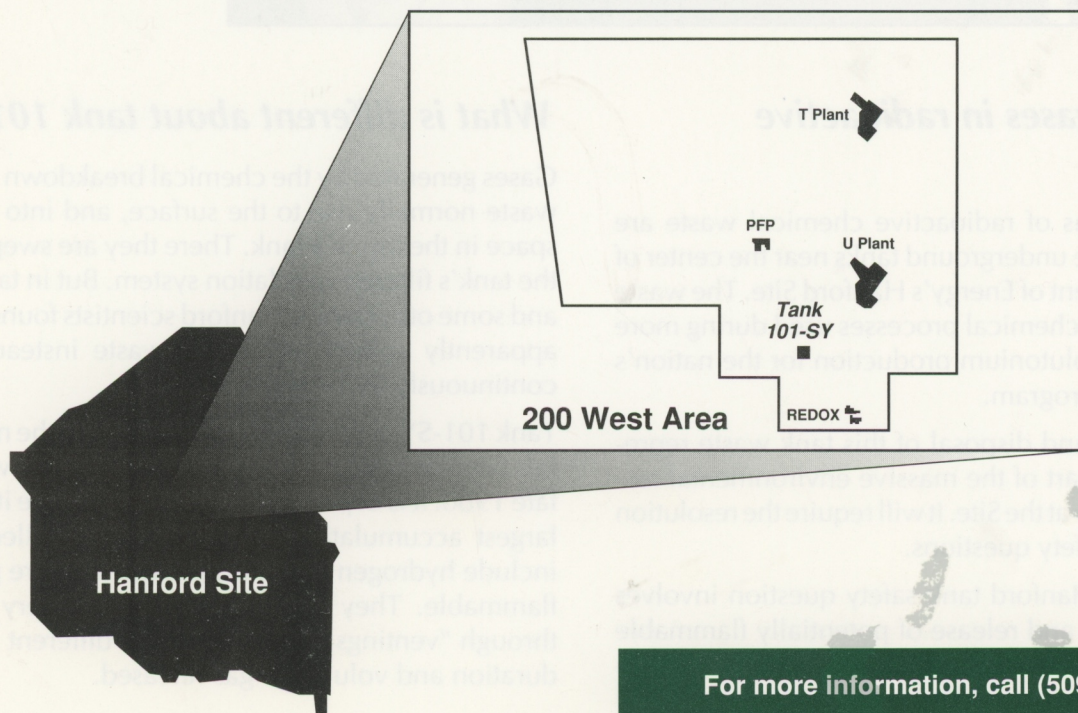
were able to take the first sample of the waste surface crust. A crucial step was taken after the May 1991 venting, when top-to-bottom "core" samples of the waste were taken and a special video camera was installed to allow viewing of the tank waste and gas ventings. A second set of core samples was taken following the December 1991 venting.

Better instruments have been installed during the post-venting windows, allowing Hanford scientists to monitor much more closely the conditions inside tank 101-SY, such as pressure, temperature and the level of the crust that has formed on the surface of the waste. They use these measurements to track the buildup of gases inside the tank and predict ventings.

The improved monitoring, chemical analysis of tank 101-SY waste samples and videotaped observations have given Westinghouse Hanford Company a much clearer understanding of the gas accumulation phenomenon. Company scientists and engineers, with help from outside experts, are now using that data to develop and test four possible remedies that could prevent future ventings from tank 101-SY.

Those methods include circulating the waste inside the tank and diluting it.

Tank 101-SY and 23 other tanks will remain on a "watch list" until the flammable gas safety question is resolved and efforts to prepare the tank waste for disposal are allowed to proceed.



For more information, call (509) 376-5101