

A Short Primer on the Effects of Aging on Plutonium

While explaining the need for a new “Modern Pit Facility” DOE NNSA spokesman Wilkes said: “We know that plutonium pits have a limited lifetime.” Without replacing the bombs, “we could wake up and find out half our stockpile is gone to waste.” The Las Vegas Sun, September 27, 2002

Plutonium pits are the triggers for modern nuclear weapons. The National Nuclear Security Administration (NNSA) is the aggressive, semi-autonomous nuclear weapons agency within the DOE. While seeking to advance the argument for building a “Modern Pit Facility” (MPF) capable of producing pits at close to Cold War rates the NNSA spokesman disingenuously raises the boogiemans of pits turning into mush overnight. Carried to an extreme, this would then lead to *de facto* U.S. nuclear disarmament in a cruel and dangerous world. This is certainly not the case. The MPF’s official notice itself states that “Although no such [plutonium pit aging] problems have been identified, the potential for such problems increases as pits age.” While this statement seems intuitively logical at first, it cries for careful examination as 100’s of billions of dollars and the true nature of the U.S.’s nuclear weapons programs ride on the answer. **Is plutonium aging so fast that a new super pit production facility is needed? No!**

Unfortunately the NNSA controls the debate on what plutonium aging effects might be. However, the following is publicly available from DOE documents and other sources indicating that plutonium-239 (the isotope used in nuclear weapons) is stable over many decades. First, it was declared in 1996 that “The [nuclear weapons] stockpile is currently judged to be safe and reliable by DOE.” In all subsequent years the directors of the Los Alamos, Sandia and Lawrence Livermore National Laboratories have certified that the stockpile has remained safe and reliable. Potential future problems in nuclear weapons safety and reliability can be then divided into problems between nuclear and nonnuclear components. However, potential problems with nonnuclear components can be ruled out as not being important to the core debate. For example, DOE has formally stated that “Over time, high confidence in the safety and reliability of nonnuclear components and subsystems can be established [through lab tests].”

Concerning the critical nuclear part, the plutonium pit, DOE also stated in 1996 that “historical pit surveillance data and pit life studies do not predict a near-term problem.” The Department went on to say “Most nuclear weapons in the stockpile were designed for a minimum lifetime of 20 years. However, experience indicates that weapons can remain in the stockpile well beyond their minimum design lifetime. Two nuclear weapon systems remained in the stockpile for more than 30 years.” DOE further stated that “No age related problem has been observed in pits up to 30 years in age...” Additionally, with respect to the effects of radioactive decay impairing pit performance, DOE said that it “does not currently believe this will become a problem in less than 50 years.”

In December 2000 Raymond Jeanios (professor of geophysics at UC Berkeley) published an article entitled “Science-Based Stockpile Stewardship” in *Physics Today*. Some relevant quotes are: “Perhaps the most important result from measurements is that Pu [plutonium] exhibits good crystalline order even after decades of aging... Pu samples not only retain long-range order but actually get closer to the ideal crystal structure with increasing age... The high explosive used in US weapons has been found to improve systematically with age in key measures of performance... Indeed, there is now consensus among specialists that the Pu pits in the US stockpile are stable over periods of at least 50-60 years, with the most recent studies suggesting a far longer period.”

The reason that plutonium-239 does not age quickly is inherent to that isotope. J. Carson Mark, former head of Los Alamos National Laboratory’s Theoretical Division (and an ardent arms control advocate later in life) stated that the lab had the foresight some four decades ago to set aside weapons-grade plutonium-239 for the express purpose of studying aging effects. While pointing to its long half-life (approximately 24,000 years), he said that the big news was “no news,” that is there were no appreciable aging effects. By way of explanation, an isotope with a shorter half-life would be more intensely radioactive and thus decay or “age” faster (for example, plutonium-238 with a half-life of 87.7 years). A request by Nuclear Watch of New Mexico for information on these “set aside” experiments was denied on the basis of classification.

The ultimate point of this primer is that any attempt to use the specter of near-term aging effects on plutonium-239 as justification for the Modern Pit Facility is false and misleading. One has to look elsewhere for the true reasons why the NNSA wants the MPF. We believe that the answer lies in the major refurbishments, alterations and possible new designs for nuclear weapons that the NNSA is implementing under the regressive policies of the new Nuclear Posture Review (for more please see our *NPR Special Bulletin* at www.nukewatch.org/facts).

10/02