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Oak Ridge Site Specific Advisory Board

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Environmental Management at Clinton Laboratories During WWII: Reflections and Introspective Questions

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A 1996 report, *Attitudes and Practices Regarding Disposal of Liquid Nuclear Waste at Clinton Laboratories in the Very Early Years: A Historical Analysis* (ORNL, ESD pub. 4508) reveals a compelling story, starting late 1942, about how senior laboratory management and Manhattan Project management sought advanced techniques to safely handle highly toxic radioactive waste from production and separation of plutonium at the Graphite Reactor and associated laboratory activities. This is a story previously unrevealed involving well-known names (Lyle Borst, George Boyd, Arthur Compton, Simeon Cantril, Richard Doan, Logan Emlet, Joseph Hamilton, Crawford Greenewalt, Warren Johnson, Miles Leverett, Karl Morgan, Herbert Parker, Glenn Seaborg, Robert Stone, Katherine Way, Martin Whitaker, Eugene Wigner) and dozens of lesser-recognized individuals. The report is based on hundreds of previously unknown documents in Central Files at Oak Ridge National Laboratory. Of course, Clinton Laboratories became ORNL in 1948 and was originally constructed in 1943 to serve as a temporary pilot plant for plutonium production at Hanford in Washington State.

By the end of 1943, the reactor had gone operational, separation of plutonium started, sophisticated process steps were defined for waste management (chemical treatment, volume reduction, settling ponds, etc.), release limits were established (at White Oak Dam and to the Clinch River), the importance of biological monitoring (fish, mice, rabbits) and sediment analysis was recognized and initiated, lines of authority were drawn, and responsibility for protection of human health and the environment were demarcated. This continued in following years, when new chemical research was initiated, monitoring was increased, release limits were refined, and individuals acknowledged missteps in handling wastes. All this, before the behavior of radionuclides, metals, and organics in the environment was even known; indeed, researchers did not know the identity of most of the nuclides, and detection devices were truly primitive. Yet they persisted. In no way was waste disposal given a subservient priority (relative to production of plutonium), as is generally felt by those unfamiliar with the new facts. These conclusions have been supported by conversations with Karl Morgan, Glenn Seaborg, and Alvin Weinberg prior to their deaths.

An obvious first question is why these individuals spent effort on management of the wastes, as there was essentially no professional reward for it. Such guidance is not prescribed anywhere in the annals of the Manhattan Project, and there was no federal (EPA, Atomic Energy Commission) or state (Tennessee Department of Environment and Conservation) agency in place at that time to regulate releases. There were no established release limits, no fines, and no jail sentences for illegal releases. Although dangers from radioactivity were recognized decades earlier, what prompted attention to these dangers in light of the urgency of building an atomic weapon? Today, professional excellence inherently includes honesty, responsibility, citizenship, respect, trust, and integrity. I contend all these qualities were demonstrated in the 1940s, and anything less would have been simply unacceptable to those who managed Clinton Labs.

A second question is why we have not known of this effort to address waste generated at Oak Ridge sooner, and why do we automatically presume things were done poorly, or ineffectually, in those early years? Most professionals left Clinton Labs as the war ended to take prestigious positions elsewhere, and the Atomic Energy Commission. (established in 1947) did little to emphasize proper waste disposal technology (at that time and perhaps in later years), so there was no thought given to documenting these “unglamorous” efforts made during war years. Because our technology and knowledge bases have advanced dramatically from those of the war years, and we have known nothing of earlier waste management efforts as we face the clean-up challenges resulting from those times, we just assume things must have been done poorly to have resulted in the problems we face today. Such “logic” is misguided and incorrect.

A third question, with no immediate answer, is what our descendants will think of today’s “highly advanced” technology for environmental management some 60 or 70 years hence, when so much more will be known than today. Will they automatically presume things were done poorly if today’s achievements do not satisfy future standards? Will critics look back to the early part of the 21st century and criticize us for what we strive to do well today? Perhaps not, for at least there will be a well-documented track record of what we undertake and how we reach decisions related to environmental management (compared to the previous lack of historical data from the early 1940s). Tune in for another editorial on this subject in 2075 to get the answer!

The bottom line is that just because we are faced with tremendous clean-up challenges from the war years, we must not assume irresponsibility of those who created our ‘problems.’ Standards evolve and change, as do priorities, knowledge bases, and technology applications; lack of full documentation helped obscure actual facts and professional excellence from previous times. Let us not forget these thoughts as we continue to learn from the past.

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