Environmental Legacy of U.S. Nuclear Weapons Production Where is it Now?-Abstract #10313

Sondra D. Sarten

R S Construction and Fabrication, Inc.

Member; Oak Ridge Site Specific Board

ABSTRACT

As the world braced itself for war in the 1940"s the United States of America was on the forefront of this effort. Nuclear weapons production launched an enormous work force of building construction as well as a relatively new term called radiation. Workers in these days knew very little about what they were building, and even less about what they were creating. Scientist was hard at work developing a way to harness nuclear power thus, resulting in the nuclear fission process of uranium 235. On August 6, 1945 history was made when the first nuclear weapon was used in war. This would change the way we live forever.

INTRODUCTION

Nuclear weapons manufactured by the United States during World War II and the Cold War, left tons of hazardous nuclear and chemical waste in over 30 states and at over 100 locations. [1] In 1989, the United States Department of Energy (DOE) created the Environmental Management (EM) group with an annual budget averaging six to seven billion dollars to address the nuclear weapons legacy. With the expenditure of over $200 billion dollars, DOE estimates that it will take decades, a great amount of research and technology development, and hundreds of billions more to manage this legacy. Nuclear and chemical wastes will be left at some DOE sites for decades and some forever. The EM group as the primary responsible party for this waste, the DOE must build and maintain a working relationship with the residents who will live with this legacy. This requires finding out what the people who live near these sites are concerned about regarding the sites that is what do they fear the most. The DOE throughout the country have funded Advisory Boards, consisting of key stake holders, that seeks to understand public concerns, what steps that DOE can take to reduce waste and increase positive public perception, and what role the media and the local community advisory panels who represent the DOE play in the eyes of the public.

WHERE IS THE LEGACY NOW

A great deal of the nuclear weapon legacy will be managed and not eliminated. With over, 100 sites across the country, it is not practical, safe or cost affective to treat all the material or waste.

The uranium enrichment process at Oak Ridge, TN, Paducah, KY. And Portsmouth, OH, produced low-level solid and liquid wastes, other process liquids, and up to 200 kilograms of depleted uranium for every kilogram of HEU (Highly Enriched Uranium). There are approximately half a million metric tons of depleted uranium stored at several sites. Although, this material is not classified as waste, most of it has no disposition pathway.

In 2001 the Hanford Site Advisory Board reported, [2] that the plutonium production at the Hanford, WA site, generated approximately 450 billion gallons of buried radioactive waste and over 1.2 billion cubic meters of radioactive waste over 50 years of its operation. [3] Throughout the years some waste generated escaped into the environment and contaminated the area around the site.

At Oak Ridge, TN the separation of lithium for tritium production used on the order of 10,000 metric tons of mercury, of which about 900 metric tons is unaccounted. [4] The DOE estimates that about 110 metric tons was discharged into East Fork Popular Creek. A portion of this contamination has migrated offsite and into the Clinch River i.e. the Watts Bar Reservoir system that is used for recreation and municipal water supply. The inorganic mercury compounds in this waste are not thought to be toxic, but they can pose a hazard to human beings if transformed to methyl mercury by soil and water microorganisms.

According to information provided by the National Technical Information Services, US Department of Commerce and the US Department of Energy, [5] [6] the Savanna River Site have twelve of the 48 underground store tanks that have leaked. This has contaminated the site with high levels of radioactive materials.

In the past management of these materials and the waste generated was poor at best compared to today's standards. But, in the defense of those who worked at these sites during these times, they were trying to protect the country. The Manhattan Project was created to defend America and this country's future when Europe and Asia hung in the balance of military power. During WWII and Cold War Era, national priority was given to weapons production at the expense of waste generation and management. The nation's sense of urgency and people being sworn to secrecy left a huge amount of waste materials to be dealt with at a later date. The US used enormous amounts of its natural recourses to maintain the war effort and develop the first atomic weapon that ultimately put an end to WWII. This military effort caused a shortage of available materials. Storage of waste in drums that in some cases where dumped in pits, trenches, etc. have caused today's concerns with ground water contamination.

WHAT IS BEING DONE NOW

Site cleanup and remediations are terms used that describe the activities at DOE sites. In actually, only a small portion is removed for waste processing. The cleanup programs refer to surveillance and maintenance. When most of the 100 sites are remediated, it is expected that a large percentage, especially at the larger sites, will only reduce the volume of the amount of waste and stabilize the hazards, or be shipped to another location for burial.

Other processes exist like the down blending of high level weapons material to be used for power generation. Companies like Energy Solutions, USEC, URS and Nuclear Fuel Services are making major accomplishments in waste and material processing. Through

DOE contracting, efforts and the cutting edge technology being developed DOE contractors; great head way is being made to reprocess the highly enriched weapons materials for power plant fuel.

Currently, the design of a state of the art Uranium Processing Facility (UPF) at the Y-12 National Security Complex in Oak Ridge, TN is on the drawing board. This facility, along the newly completed High Enriched Uranium Manufacturing Facility (HEUMF) will replace several cold era buildings and related processes to house and manage weapon grade material in one facility. Completion of the UPF facility will not be complete until 2020. As you can see much is being done to control, manage and reduce the nuclear weapons legacy materials. [7] [8]

PUBLIC PERCEPTION

When the public is given clear and honest information, people tend to accept what they sometimes don't understand or even like. During the cold war era, secrecy was of the utmost importance. Most law makers and facility operations personal were not concerned about how they were viewed by the public. Today it's different. With watch dog organizations and advisory boards funded by the DOE, the public is involved in the decision making process. This creates an open and honest consciences that the government and the DOE is doing what they can to control nuclear materials and waste. Long term stewardship and educating the public plays a major role in public perception.

As a private citizen and volunteer member of the Oak Ridge Site Specific Advisory Board, I see that the public is concerned, as they should be, about legacy weapons material and waste. Education the public of the material and waste management policy goes a long way in how the public views the DOE and the Federal Government to insure confidence that the right thing is being done. The public perception is gaining ground, stakeholders are common citizens who join in on the decision making process on how, what and when the legacy material will be dealt with.

CONCLUSION

We have discussed where the legacy materials came from, how they were handled and stored, what is being done now, and how the public views these actions being taken. This paper has only touched on a few sited and different processes throughout the United States. We have not discussed all the different types of disposal, reprocessing and management of the materials in the US and throughout the world. It seems that we are smarter now about how we manage these materials. Who knows, in 50 to 75 years, we may have created another legacy that we have not confronted yet. We can be assured that over the next several decades these legacy materials will still be here for our children's children to look back and say, "What of earth were they thinking?, Why didn't they just ship this stuff to the moon?"

It is important that we as citizens get involved and stay involved. We should be going to these meetings, sending information to the schools, and making sure we do our part to ask enough questions so that we in the general public can understand where waste areas are located and what is being done to remediate these sites. Groups like the Site

Specific Advisory Board help us do that.

REFERENCE

1. Wikipedia free Encyclopedia (*Various publications)*
2. Hanford Site Advisory Board Reports *2001*
3. DOE Office of Waste Processing. (*Technical Exchange 98-08)*
4. Best Management Practices Plan, Lower East Fork Poplar Creek, Oak Ridge. (*Lockheed Martin December 20,1996)*
5. National Technical Information Services, US Department of Commerce. (*Various Publications)*
6. Waste Disposal Position Project DOE EM Savanna River (*May 19, 2009)*
7. Knoxville News Sentinel. (*August 22, 2009)*
8. The Oak Ridger News. (*November 30, 2009, September 29,2008)*