

Questions and Answers on Uranium-233 at Hanford
Overview of the Thorium-to-Uranium-233 Program at Hanford

Q. What are the chief findings of this report?

A. The chief findings:

- o Sixty percent of the Hanford Reach riverbed of the Columbia River is contaminated with solid, radioactive waste from Hanford's thorium-to-uranium-233 production campaign.

- o The contamination probably resulted from disposal of solid radioactive waste directly into the Columbia River. This dumping occurred just upstream of the D-Reactor outfall. At that location, there are remains of an old river crossing, which might have served as a radioactive waste disposal system.

- o Hanford secrecy still exists, and is extending into the public domain of the Hanford Reach National Monument riverbed.

- o Salmon spawn in the contaminated Hanford Reach and are threatened by the radioactive waste that was dumped in connection with the thorium-to-uranium 233 production.

Q. Who is Norm Buske, and what are his credentials?

A. Norm Buske has a Masters degree in physics from the University of Connecticut and in Oceanography from the Johns Hopkins University. Norm holds three patents. He has been a member of the American Association for Advancement of Science, American Physical Society, the American Society for Testing and Materials, American Society of Mechanical Engineers, American Society of Professional Engineers, Institute of Electrical and Electronics Engineers, and National Fire Protection Association. Norm has quit his professional memberships in order to be completely free to act as an independent critic of USDOE's nuclear facilities. Norm received a Certificate of Honor Award from the Alliance for Nuclear Accountability in 2001 for his "scientific and technical investigations of the environmental consequences of nuclear weapons production in the United States and Russia."

After being arrested in the course of his work for the Government Accountability Project on the shore of the Hanford Reach in 1999, GAP negotiated a unique agreement with Hanford for Norm's access to the Hanford site to conduct independent radiological studies. Norm is a member of the Amchitka Technical Advisory Group (ATAG), an alternate member of the Hanford Advisory Board (HAB). Norm has been a member of the HAB's Hanford Scenarios Task Force concluded that Hanford cleanup should address the riverbed and the salmon alevin as an indicator population.

Q. What are Buske's findings based upon?

A. Sediment, mulberry leaves, and algal sampling were taken along the Hanford Reach riverbed in order to evaluate the scope and character of radiological contamination. The results were tabulated and a pattern of increase contamination downstream of certain landmarks, such as reactors, was evident. In fact, three main patterns were revealed:

1. Strontium-90 contamination increases at N-Springs and continues downstream for a few tenths of a mile on the Reactor side of the river.
2. Europium-152 contamination, an indicator of thorium dumping, began at D-Island. (Interruptions in this pattern at rapid stretches of the river could be due to erosion scouring away, or being deposited over sediments containing Hanford contaminants.)
3. An indistinct pattern of relatively high thorium, relatively high Eu 152, and positive "Pb 212 Excess" on both sides of the river at Hanford River Mile (HRM) 25.
4. The remains of the Wahluke Ferry crossing were found at the point suspected as a dumping site. The Ferry structure might have been used for dispose of the radioactive waste.

Q. What does the Department of Energy say about this report?

A. While the Department of Health and the Nez Perce Tribe have been quick to comment on the draft of this study, the DOE has remained conspicuously silent. In fact, on August 29, 2001 Buske asked "How does USDOE want to relate to what is being discovered in the riverbed?" To this day, USDOE has yet to respond to this question.

Regarding the evidence of dumping at the old Wahluke Ferry site, site managers at Hanford also continue to deny any dumping.

Q. Has the Department of Energy conducted any sampling on this issue?

A. In August 2001, the DOE sent a letter to Tom Carpenter of GAP, stating that DOE's Hanford Environmental Monitoring Program has done sampling of vegetation, soil, riverbank springs, Columbia River water, and river sediments. There was no indication from these samplings that thorium was in excess of background levels. They also state that the Department of Health has taken samples and found Thorium only at background levels.

DOE promised to include thorium analysis of the river and environments adjacent to the 300 Area as part of a special study to be conducted in summer of 2001.

Q. Is there any mention of U-233 in the official history of Hanford?

A. On the official Hanford History, found at <http://www.hanford.gov>, U-233 production

is not mentioned under "History of Hanford Operations." Any discussion of U-233 is tucked away under "Brief History of the Purex and UO₃ Facilities" or under "300 Area History."

Under "Brief History of the Purex and UO₃ Facilities", there are only three statements made about U-233 production, these are:

- On page 6 of 37: During 1965-1966, the PUREX facility processed powdered thorium oxide fuel targets that had been irradiated for the production of uranium-233 (U-233), an isotope desired for its potential use in weaponry and because it could be made from plentiful, natural thorium. However, the processing campaign caused plugging and other equipment and contamination problems within PUREX. A more successful campaign in 1970 processed pelletized thorium oxide targets. Shortly afterward, for reasons unrelated to PUREX, thorium oxide fuel was ruled out for large scale development at HW.
- On page 9 of 37: The following year, a tantalum-lined concentrator and a titanium receiver tank were installed in N-Cell for the U-233 processing campaign. The new equipment was smaller and had a different configuration to meet the more stringent criticality safety requirements for U-233, and to reduce metallic impurity contamination of the product by vessel corrosion.
- On page 18 of 37: During 1965-1966, an experimental processing of commercial thorium nitrate into thorium oxide powder was carried out in the UO₃ Plant, using the old electric pots. The goal of this work was to produce thorium oxide powder suitable for fabrication into reactor target elements for U-233 production. However, for reasons unrelated to the UO₃ Plant, the use of thorium oxide powder was abandoned at HW, in favor of experiments with thorium wafer targets.

Under "300 Area History" in section Subsequent 321 Building Missions, it states that this building housed "Thorex" programs to produce U-233 from irradiated thorium oxide (ThO₂) in the 1960s."

Under "300 Area History" in section 3722 Area Shops (A and B), it states that this area was "[a]lso used for the fabrication of ThO₂ fuel target wafers for U-233 production in single-pass reactors (1968-1970) and for the "recycling" of used ThO₂ wafers after separation processing in Purex."

Under "300 Area History" in section 3732 Process Equipment Development Laboratory, it states that "[e]ngineering pilot plant for experimental fuels production produced thorium-oxide (ThO₂) powdered fuel targets for U-233 production (1965-1967), sintering of powders produced ThO₂ particulates and fines, after U-233 program switched to the use of ThO₂ wafers (manufactured in 3722 Building) in 1968, 3732 Building still "canned" these wafers through 1970."

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