

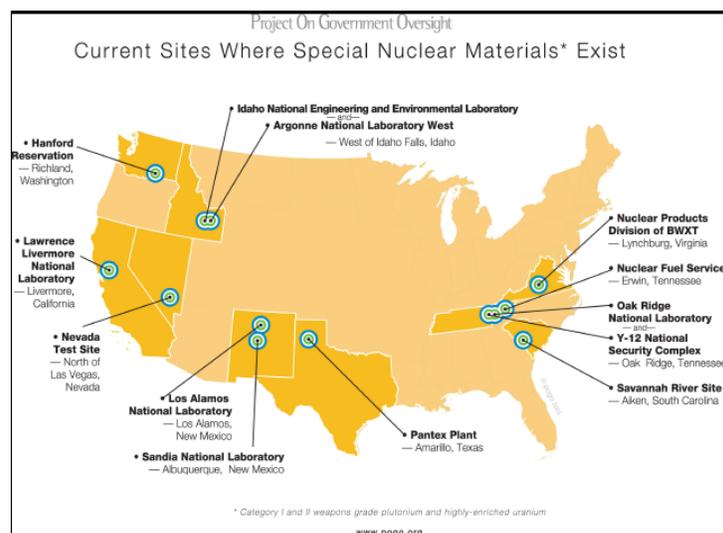
## ***Bombs in Our Front Yard: Savannah River Site's Key Role in US Nuclear Weapons - Tritium and Plutonium & Secret Facility in Columbia, SC Puts the Bang in the Weapons***

**A Brief, Draft Overview – June 3, 2017 – Comments Welcome**



Sign at entrance of SRS south of Jackson, South Carolina, on the western side of SRS, nearest to Augusta, Georgia. SRS employs about 11,000 people, down from 25,000 at the height of the Cold War. About 25% of employees live in Georgia.

The Savannah River Plant (SRP) was established in the early 1950s by the Atomic Energy Commission (AEC) as a location to produce nuclear materials for US nuclear weapons. A rural site near Aiken, South Carolina was chosen for the 310-square-mile facility and over 5000 people were removed from their farms and small towns before construction activities began. Other sites across the country were chosen for other missions connected to nuclear weapons.



The U.S. Department of Energy managing a vast nuclear weapons complex, still employing over 100,000 people. The sites are spread around for purposes of politics and geography.

In the late 1980s, the name of SRP – “fondly” called The Bomb Plant – was changed to the Savannah River Site (SRS). Administration of SRS and the other facilities in the nuclear weapons complex was transferred to the newly created US Department of Energy (DOE) in 1977. Contractors operate SRS for DOE, making a healthy profit off the deal.



The Savannah River Site is 310-square miles in size and is located entirely in South Carolina but across the Savannah River from Georgia. The city of Savannah, Georgia is over 100 miles downstream.

### **Plutonium: The Dark Heart of US Nuclear Weapons**

Five nuclear “production” reactors were constructed at SRS between 1953 and 1955. These reactors - designated R-, P-, K-, L-, and C-Reactor - were military in nature and were not constructed for the purposes of electricity generation. The reactors produced various nuclear materials but the main ones were plutonium and tritium for US nuclear weapons.

Plutonium is artificially produced by irradiating nuclear materials in a reactor and the five reactors produced approximately 36 metric tons (36,000 kilogram) of high-quality weapon-grade plutonium. (Commercial nuclear power reactor can also produce “weapon-usable” plutonium that is at a lower level of purity in the key isotope, plutonium -239.)

The US has declared about 60 metric tons of plutonium “surplus” to nuclear weapons “needs,” and about 13 metric tons of that weapon-grade plutonium is now stored in the old K-Reactor at SRS, awaiting disposal. (Disposal options include the failed plutonium fuel project, called MOX.)



13 MT of weapon-grade plutonium stored at SRS in the old K-Reactor – in drums containing a few kilograms each, planned storage life of the containers is 50 years



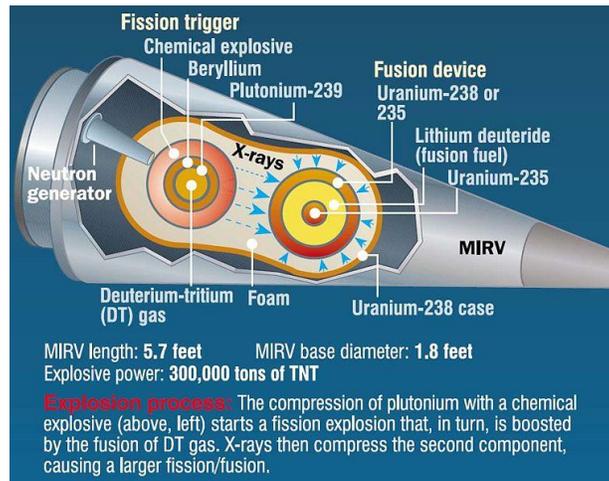
Plutonium-239, the main ingredient for nuclear weapons. Due to the form of radiation it emits, it can be handled with minimal shielding. Ingestions of plutonium can cause severe damage and cancer.

The Hanford site in Washington State was the other plutonium production site and produced about 68 metric tons of weapon-grade plutonium in nine nuclear reactors. All of the

production reaction at SRS and Hanford are now out of operation and, given the massive plutonium stockpile, the US is no longer producing plutonium for weapons.

Just a few kilograms of plutonium are sufficient for a nuclear weapon. Given a “half-life” of 24,000 years, the plutonium produced by the AEC, which later became the Department of Energy, will last for about 10 half-lives, or 240,000 years. The plutonium is milled into a core, or “pit,” that forms the core of the weapon. Those pits are now produced in limited numbers at DOE’s Los Alamos National Lab in New Mexico; the fight against a new pit facility continues.

“Fat Man,” the bomb that was dropped on Nagasaki, was a bomb made from plutonium produced at Hanford. The “Little Boy” Hiroshima bomb was made from the other main nuclear weapons material – highly enriched uranium (HEU) – produced at Oak Ridge. SRS has also processed HEU (and is still doing so in the H-Canyon reprocessing plant).



A typical US nuclear warhead, with plutonium and tritium and other components.

The plutonium production targets irradiated in the production reactors was separated in reprocessing plants. SRS had two reprocessing plants - F-Canyon (now closed) and H-Canyon. The by-product of plutonium processing resulted in tens of millions of gallons of liquid high-level waste. That deadly waste went into 51 million-gallon tanks at SRS, to be dealt with later. 43 of those tanks are still active and 8 tanks are now “closed” (emptied and filled with concrete). The most urgent work at SRS is dealing with the legacy HLW sitting in aging tanks.



H-Canyon reprocessing plant at SRS is turning 62 years old and is still operating, reprocessing research reactor spent fuel and producing plutonium oxide for disposal.

## Tritium: Boosts the Explosive Power of All Nuclear Weapons

The other key nuclear material produced in the SRS reactor was tritium. Tritium is a radioactive gas that it used to boost the explosive power of all US nuclear weapons.

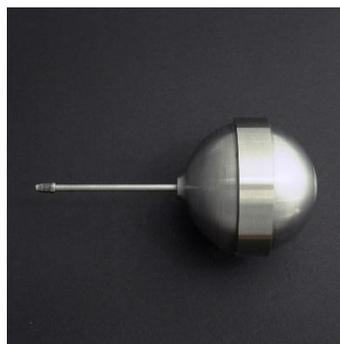
Tritium was produced via irradiation of special rods in the SRS reactors. That job is now done at a commercial reactor (Watts Bar) owned by the Tennessee Valley Authority. By producing a nuclear weapons material in a commercial nuclear power reactor the US is demonstrating to the world the connection between nuclear power and nuclear weapons and has thus established a very dangerous nuclear non-proliferation policy.

The tritium rods irradiated in TVA's Watts Bar unit 1 reactor are brought to SRS for processing in the Tritium Extraction Facility (TEF). The tritium is thus removed and stored and packaged for use in nuclear weapons. Once packaged into a tritium "reservoir," that reservoir can be inserted into a nuclear weapons and the gas inserted into the weapon at a precise moment to boost the size of the explosion. Tritium, radioactive hydrogen, poses an environmental risk and tritiated water can't be purified or remediated.



Tritium Extraction Facility (TEF) at SRS is amongst a complex of buildings that process the radioactive gas for all US nuclear weapons and is a source of tritium leakage into the environment at SRS.

As tritium has a half-life of only 12.5 years it "must be" periodically replaced if the weapons are to function as designed. The reservoirs, or canisters, are filled and recharged at SRS and shipped back to military installations to be inserted into nuclear weapons.



Tritium reservoir, to be inserted into a nuclear weapon. This pre-2001 photo has no scale on it so the size of the reservoir is unknown. New and old reservoirs are filled at SRS, still "The Bomb Plant."

## Nuclear Weapons Production = Nuclear Waste Legacy

About 35 million gallons of high-level waste remain in the SRS tanks and the waste is being removed and being vitrified (glassified) in large, robust containers. About 4500 containers are now filled with such waste - over half the goal of 8500 canisters. This material is defined by law as high-level waste and is required to be disposed of in a non-existent geologic repository.



Empty high-level nuclear waste canisters at SRS, before being filled with a mixture of high-level waste and molten glass. Once filled, the canisters emit a lethal dose of radiation.

It is this massive volume of this dangerous waste that is a sad, long-lasting and costly by-product of the Cold War. The SC Department of Health & Environmental control has many times stated this about the waste in the SRS tanks: ***“The thirty-seven million gallons of highly radioactive and toxic waste, stored in aging and degrading tanks at SRS, is the single largest environmental threat in South Carolina.”***



SRS waste tanks under construction, early 1950s. 51 carbon-steel tanks were constructed at SRS, with some of them actually into the water table (for reason of gravity flow of waste into the tanks).

The largest part of the mission of DOE is managing nuclear weapons, nuclear weapons materials and cleaning up the Cold War waste. DOE would best be called the Department of Nuclear Weapons & Waste. About \$9 billion of the DOE budget goes to nuclear weapon and \$6 billion to nuclear waste “clean-up,” both making up almost half the department’s budget. Estimates to “clean up” this waste range up to \$100+ billion. The annual budget for all activities at SRS is about \$2 billion, so Aiken, SC/Augusta, GA is somewhat dependent on SRS and local politicians are fiercely loyal to big-spending projects at SRS.

In conclusion, Savannah River Site is a key nuclear weapons and nuclear waste storage and processing facility, which few in South Carolina understand. Efforts must be increased to stop more plutonium and nuclear waste imports to SRS and to convert the site to cleaner uses.

### Unknown Nuclear Weapons Facility in Columbia’s Backyard: WesDyne/Westinghouse

Another facility located near Columbia, SC also plays a key role in US nuclear weapons. That secret facility, operated by WesDyne, a subsidiary of Westinghouse, is located in the Westinghouse uranium fuel plant on Bluff Road just outside of Columbia. The WesDyne facility fabricates the rods – called Tritium Producing Burnable Absorber Rods (TPBARs) – that are shipped to the Watts Bar reactor to produce tritium gas for nuclear weapons. Those highly radioactive rods are removed from the reactor and shipped back to the Savannah River Site for processing, with by-product nuclear waste being stored at SRS.



Sign at entrance of Westinghouse house fuel plant – fabricates uranium fuel for nuclear power reactors. Employs about 10000 people. Secret WesDyne facility is located somewhere at this site.

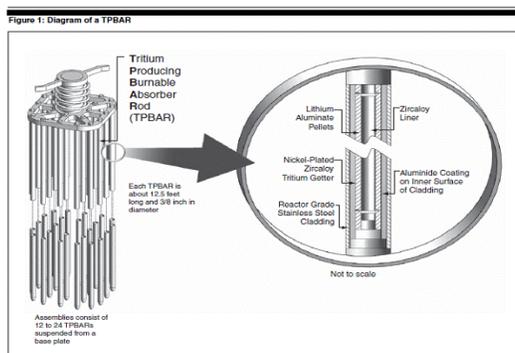


Diagram of tritium production rod, manufactured by WesDyne in Columbia, SC; transported to TVA’s Watts Bar unit 1 reactor in Tennessee; the irradiated rods are shipped back to SRS for extraction of tritium gas, a key nuclear weapons material. Final disposal plan for the by-product waste is unknown.

See this article for more on the disturbing activities of WesDyne: ***“The Nuke Factory in Your Backyard - How the U.S. quietly turned a civilian atomic power site into a so-called bomb facility — and what it means for the global arms race”***

<https://medium.com/@coreyhutchins/the-nuke-factory-in-your-backyard-8f2a77a250>

Few people know that SRS and Columbia, SC play a key role in the US nuclear weapons. How can this be explained and how can it be remedied?

The role of South Carolina in the nuclear weapons merits talking about at public activities, such as events to commemorate the bombings of Hiroshima and Nagasaki.



Hiroshima, August 6, 2016, 71<sup>st</sup> anniversary of the bombing, photo by Tom Clements



Mock-up of Nagasaki plutonium bomb – “Fat Man” - atomic bomb museum, Nagasaki, August 9, 2016, photo by Tom Clements

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