IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER

The Idaho Nuclear Technology and Engineering Center (INTEC) was established in the 1950s as the Chemical Processing Plant (CPP) to recover usable uranium in spent nuclear fuel used in government reactors. The facility recovered more than $1 billion worth of highly enriched uranium, which was returned to the government fuel cycle.

In 1992, the Department of Energy announced that the changing world political situation and the lack of demand for highly enriched uranium made reprocessing no longer necessary. In 1998, the plant was renamed INTEC.

Today, the workers at INTEC have turned their focus to cleanup and protection of the Snake River Plain Aquifer. Planned and/or ongoing major cleanup activities include:

- Management of spent nuclear fuel at dry storage facilities
- Treatment of high-level and liquid radioactive waste
- Characterization, repackaging, and shipment of remote-handled transuranic waste
- Closure of liquid waste tanks

INTEC encompasses 200 acres and is located two miles north of the Central Facilities Area. Major facilities include:

BUILDING CPP-666 contains a modern, large storage area consisting of six pools that stored spent nuclear fuel until March 2023. Radioactive spent fuel was safely stored in racks beneath pools containing some three million gallons of water. The water provided protective shielding while protecting the environment. The fuel storage pool area is built into the concrete structure of the building. All spent fuel was removed from underwater storage pools, placed in a dry storage system and prepared for shipment to a national nuclear waste repository. Experimental Breeder Reactor-II spent nuclear fuel was transferred to two dry-storage locations at the Materials and Fuels Complex: the Radioactive Scrap and Waste Facility and the Fuel Conditioning Facility. Advanced Test Reactor spent nuclear fuel was transferred to CPP-603 for dry storage.

The Idaho Environmental Coalition, LLC (IEC) is tasked with treating sodium-contaminated debris in the Fluorinel Dissolution Process (FDP) cell of CPP-666 and inside a hot cell at Building CPP-659, the New Waste Calcining Facility (NWCF), to enable the debris to be shipped to the Waste Isolation Pilot Plant (WIPP). The sodium waste is primarily a product of experiments from the Engineering Test Reactor, Transient Reactor Tests, and Experimental Breeder Reactor-II and cannot go to WIPP in its present state. One treatment process involves bringing the waste in the FDP hot cell, sorting it, segregating it, and loading

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baskets that are lowered into the distillation unit. The material is then heated, and vapors are drawn from the debris. Sodium is then converted back to a metal, collected, and stored for future treatment.

Another approach to processing waste involves minimizing the volume of waste required for sodium distillation. The approach is intended to water treat components contaminated with sodium that have simple geometries and aggressively spritz/immerse to deactivate the sodium and reduce volume of waste required for distillation (complex components/geometries).

CPP-691, FUEL PROCESSING RESTORATION (FPR) FACILITY. The FPR was constructed to reprocess government-owned spent nuclear fuel. Construction was halted in the early 1990s as a result of a U.S. policy decision to end spent nuclear fuel reprocessing. The Calcine Retrieval Project has since constructed a full-scale replica of a one of the canisters in calcine bin set #1. Engineers are using the mockup to test retrieval technologies that could be employed to retrieve the 220 cubic meters of calcine and transfer the material to bin set #6. Calcine bin set #1 would then be closed under federal regulations.

THE THREE MILE ISLAND-2 INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) is a dry storage area licensed by the Nuclear Regulatory Commission for core debris from the Three Mile Island (TMI) commercial nuclear reactor accident. The ISFSI provides safe, environmentally secure, above-ground storage for the spent fuel and debris, which is kept in metal canisters inside concrete vaults.

NWCF contains equipment necessary to perform decontamination/treatment of debris and HEPA filters and underwent modifications to its hot cell to allow for the treatment and repackaging of larger remote-handled transuranic (RH-TRU) waste items.

CPP-749, UNDERGROUND FUEL STORAGE FACILITY
The Underground Fuel Storage Facility (CPP-749), a gated, 260,150-square foot area, provides safe, retrievable, interim storage of fuel. The facility consists of vertical fuel storage vaults installed below grade, a cask storage pad on which empty and fuel-loaded casks are positioned. The facility contains a total of 218 underground fuel storage vaults.

THE CPP-603 IRRADIATED FUEL STORAGE FACILITY (IFSF) is used for dry storage of spent fuel. The IFSF has 636 storage positions and is about 90 percent full. Spent fuel stored there came from both onsite and offsite reactors (Advanced Test Reactor; Fort St. Vrain, Colorado; and foreign and domestic research reactors). Current and projected offsite receipts include foreign and domestic research reactor fuel. Building 603 also housed three pools once used for underwater storage of spent nuclear fuel. The pools were constructed in the 1950s and served as the primary spent fuel storage facility until the CPP-666 Fuel Storage Building opened in 1984. Fuel and sludge debris in CPP-603 have been removed, and the basins have been filled with grout.

Presently, the facility is accepting fuel receipts directly from the Advanced Test Reactor that is operated by the Idaho National Laboratory contractor. A new spent nuclear fuel bucket allows the placement of 50 percent more fuel elements in the same storage space, which will extend the storage mission of the facility by up to 10 years.

CPP-2707 (CASK STORAGE AREA) provides additional dry storage in shipping casks.

CPP-659, THE NEW WASTE CALCINING FACILITY (NWCF), once converted liquid high-level radioactive waste from the Tank Farm into calcine, a granular solid similar in consistency to sand. Calcine was transferred to large stainless steel bins encased in six high-integrity concrete vaults called bin sets. Calcining achieved significant volume reduction from liquid to solid. The calciner was shut down in May 2000. NWCF is currently used for characterization, repackaging and preparation of remote-handled transuranic waste for shipment to WIPP. NWCF contains equipment necessary to perform decontamination/treatment of debris and HEPA filters and underwent modifications to its hot cell to allow for the treatment and repackaging of larger remote-handled transuranic (RH-TRU) waste items. The facility will also be used for transferring sodium-bearing waste from the Tank Farm to the Integrated Waste Treatment Unit for processing.

TANK FARM. The high-level waste Tank Farm includes 11 underground stainless steel storage tanks used to store the radioactive liquid waste generated during the reprocessing of spent nuclear fuel and plant decontamination work. No leakage has occurred from the tanks. The tanks are encased in concrete vaults which have sumps and leak detection. Seven tanks have been cleaned to Resource Conservation and Recovery Act (RCRA) standards and have been grouted in place for final closure. The remaining four tanks (three full and one spare) will be cleaned and grouted once the sodium-bearing waste has been removed. Some leaks from transfer lines outside the tanks have occurred, and this drives the current cleanup program. An asphalt cap was constructed over a large portion of the Tank Farm and additional water diversion methods have been employed to divert rain and snowmelt from the Tank Farm.

CPP-1617, MIXED WASTE STORAGE FACILITY (MWSF). RH-TRU waste from the Naval Reactors Facility and the Materials and Fuels Complex is stored at the INTEC Waste Management Facility (IWMF) CPP-1617, a Category 2 nuclear facility designed to store mixed waste for an indefinite period of time. RH-TRU is also stored in Interim Storage Areas (ISAS) ISA-1 and ISA-3 within the IWMF. RH-TRU waste that is received at INTEC is characterized and repackaged in both CPP-659 (NWCF) and CPP-666 (FDP) after the RH-TRU waste has been repackaged, it is sent to CPP-659 where dose to curie measurements are taken for radiological characterization and non-intrusive x-ray examinations (RTR) are performed to ensure no WIPP prohibited items remain in the repackaged waste. Once certified, the repackaged waste is placed into Removable Lid Canisters and loaded in a cask for shipment to WIPP.

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