



6.2 Facility Decommissioning Activities

This section provides information about the transition of facilities on the Hanford Site from operation to stabilization, surveillance and maintenance, and decommissioning. Decommissioning activities include the interim safe storage of plutonium production reactors and the decommissioning of ancillary reactor facilities.

6.2.1 Facility Decommissioning in the 200 Areas (Central Plateau)

This section provides information about the transition and decommissioning of facilities within the 200 Areas.

6.2.1.1 Decommissioning of the 224-T Plutonium Concentration Facility

C. R. Haas and D. L. Klages

The 224-T Plutonium Concentration Facility (224-T facility) is currently an inactive surplus facility and is administered under a surveillance and maintenance program while awaiting final disposition. DOE has identified no further use for the 224-T facility, making the facility a candidate for decontamination and decommissioning.

Presently, the decontamination and decommissioning project for the 224-T facility, which is to be accomplished as a CERCLA non-time-critical removal action, has been deferred to a later time because of limited funding and the need to complete more significant priorities.

The 224-T facility is located in the 200-West Area, to the south and parallel to the T Plant Complex Canyon Building (221-T). (Canyon is a vernacular term used at

the Hanford Site for the chemical separations plants, inspired by their long, high, narrow structure.) Completed in 1944 and originally designated the 224-T Bulk Reduction Building, the purpose of the 224-T facility was to concentrate the plutonium nitrate solution produced in the first major step during the plutonium recovery process conducted at the T Plant complex. It operated in this capacity from January 16, 1945, until early 1956, when the T Plant complex was retired from active service as a chemical processing facility.

The 224-T facility was idle before being modified in 1975 to meet the requirements for storing plutonium-bearing waste. In 1985, the building became the 224-T Waste Storage and Assay Facility and operated in that capacity until the late 1990s. These past operations resulted in contamination throughout the structure.

6.2.1.2 Decommissioning of the 224-B Plutonium Concentration Facility

D. L. Klages

The 224-B Plutonium Concentration Facility (224-B Building) is located within the B Plant complex in the 200-East Area. The 224-B Building is a deactivated plutonium concentration facility that formerly was associated with the B Plant complex.

The 224-B Building was used to facilitate plutonium recovery following the reprocessing of spent nuclear fuel. The 224-B Building was used to purify and concentrate diluted plutonium nitrate solution that was the product of the 221-B (B Plant complex) bismuth-phosphate process. The purified solution was transferred to the 231-Z Isolation Building. Plutonium concentration operations were



performed in conjunction with B Plant complex separations activities from approximately 1944 to 1952. The process components were deactivated shortly thereafter. These past operations resulted in contamination throughout the process portion of the structure.

In addition to the 224-B Building, the area adjacent to the facility, which is identified as the B Plant construction laydown yard, was included as part of the CERCLA non-time-critical removal action. The B Plant laydown yard is located south of the 221-B Building in the 200-East Area. The laydown yard contains potentially radiologically contaminated materials, equipment, mobile offices, and miscellaneous trailers. The 224-B Building and the additional laydown yard structures and equipment will be included as part of this response action and will be identified as the 224-B facility.

The B Plant construction laydown yard has a history of contaminated biological components including rodents, tumbleweeds, and fruit flies. The source of contamination that led to the 1998 fruit fly contamination event was the 241-ER-152 diversion box located in the laydown yard. Trailers, materials, and equipment in the vicinity of this diversion box were placed within a Radiological Buffer Area until surveys could be performed to verify the presence or absence of radiological contamination.

After the 1998 fruit fly contamination event, there were efforts to survey some of the trailers, materials, and equipment within the laydown yard for reuse or excess. Specks of low-level fixed contamination were found on a small number of tools, equipment, and building surfaces. These specks are believed to be tumbleweed fragments, mouse feces, and/or fruit fly remnants.

The 224-B Facility Decommissioning Project for the B Plant construction laydown yard was conducted as a non-time-critical removal action under CERCLA and involved the safe demolition, waste packaging, and disposal of 23 contaminated structures, including mobile trailers and storage units, in the B Plant construction laydown yard. Demolition began in June 2004 and was completed in September 2004.

6.2.1.3 Decommissioning of the 233-S Plutonium Concentration Facility

D. L. Klages

Decontamination and demolition activities were completed in 2004 at the 233-S Plutonium Concentration Facility (233-S facility) located in the 200-West Area adjacent to the Reduction-Oxidation (REDOX) Plant. The 233-S facility and associated process equipment were used to concentrate plutonium produced at the REDOX Plant from 1955 to 1967.

The 233-S Facility Decommissioning Project was conducted as a non-time-critical removal action under CERCLA and involved the safe demolition, waste packaging, and disposal of the 233-S facility. The scope of this project included the demolition of the 233-S Plutonium Concentration Building, the 233-SA Exhaust Filter Building, and the Mobile Office-317. This project represented the first open-air demolition of a highly contaminated plutonium facility at the Hanford Site. This project may also represent the first plutonium facility in the DOE complex to have been demolished without first decontaminating surfaces to near “free release” standards. This project used an excavator with concrete shears, diamond circular saws, water misting and fogging equipment, commercially available fixatives and dust suppressants, conventional mobile crane and rigging services, and near real-time modeling of meteorological and radiological conditions. Following a significant amount of preparation, actual demolition of the 233-S facility began in October 2003 and was completed in late April 2004.

6.2.1.4 Removal of Ancillary Facilities at the 221-U Chemical Processing Facility

D. L. Klages

The 221-U Chemical Processing Facility (U Plant) ancillary facilities are being decontaminated and demolished as a CERCLA non-time-critical removal action. The

facilities are located within the U Plant complex in the 200-West Area and consist of processing, support, and administrative buildings.

The main building associated with the U Plant ancillary facilities is the Uranium Trioxide Facility (224-U), which was used to convert uranyl nitrate hexahydrate solution from the Plutonium-Uranium Extraction (PUREX) Plant into a solid uranium trioxide powder. The Uranium Trioxide Facility's processing schedule was determined by the uranium product inventory buildup in the Plutonium-Uranium Extraction (PUREX) Plant. The last operating campaign was completed in June 1993. Deactivation of the facility began shortly thereafter. The Uranium Trioxide Facility is designated as a key facility in the Tri-Party Agreement (Ecology et al. 1989). The majority of the other U Plant buildings and structures were used in support of the uranium trioxide process.

The U Plant ancillary facilities removal action began in November 2004 and demolition of at least 11 of the structures will begin in January 2005. Demolition of the 224-U and 224-UA Buildings is expected to be deferred to coincide to the remedial action for the 221-U Canyon Facility.

6.2.1.5 Decommissioning of the Plutonium Finishing Plant

M. S. Gerber

During 1949, the Plutonium Finishing Plant began processing plutonium nitrate solutions into metallic plutonium for shipment to nuclear weapons production facilities. Operation of this plant continued into the late 1980s. During 1990, DOE issued a shutdown order for the plant, and in 1996 authorized deactivation and transition of the plutonium processing portions of the facility in preparation for decommissioning.

Workers at the Plutonium Finishing Plant complex embarked on a large and multifaceted effort to stabilize, immobilize, re-package, and/or properly dispose of nearly 18 metric tons (19.8 tons) of plutonium-bearing materials in the plant, and completed this mission in February 2004. The workers then turned their full energies to a large closure project, to decontaminate and deactivate the processing facilities, while still providing for the safe and secure storage of nuclear materials until final disposition.

Significant accomplishments achieved at the Plutonium Finishing Plant during 2004 included:

- Completing stabilization of all (nearly 18.1 metric tons [20 tons]) plutonium-bearing scraps and leftovers identified by the Defense Nuclear Facilities Safety Board as needing stabilization and repackaging.
- Shipping 4.5 metric tons (5 tons) of re-packaged plutonium-bearing residues off of the Hanford Site to permanent disposal at the Waste Isolation Pilot Plant in Carlsbad, New Mexico.
- Cleaning out contaminated equipment from seven plutonium processing gloveboxes, allowing the gloveboxes to be downgraded to low-level radioactive waste status. Plant workers were cleaning out equipment from several other gloveboxes by the end of 2004.
- Removing nearly 50% of the designated legacy plutonium remaining in processing equipment in Plutonium Finishing Plant facilities.
- Completing a chemical risk mitigation program in the main Plutonium Finishing Plant building (the 234-5Z facility) and in the Plutonium Reclamation Facility by flushing, draining, capping, and/or removing 128 pipes and headers contaminated with mixed transuranic waste.
- Entering the highly contaminated Plutonium Reclamation Facility canyon area for the first time in 11 years to re-activate the canyon crane and perform decontamination work necessary to use the crane in upcoming cleanout work. Nearly 20 entries were made by the end of 2004.
- Transferring the last batch of liquid wastes from the 241-Z Liquid Waste Treatment Facility to Hanford Site tank waste storage, 7 months ahead of a Tri-Party Agreement milestone. The transfer ended 55 years of contaminated liquid waste transfers out of the 241-Z facility.
- Entering the sump pits beneath the 241-Z facility to perform characterization and cleanout work. When inspection showed that cover blocks over the sump pits were thinning, workers constructed a safe new platform to conduct work in the 241-Z facility.
- Decontaminating 176 of 625 large highly contaminated drums that once held plutonium nitrate stored beneath the 234-5Z facility.



- Removing eight uncontaminated ancillary buildings within the Plutonium Finishing Plant complex and creating over 929 square meters (10,000 square feet) of new storage space for transuranic waste being prepared for shipment off the Hanford Site.

6.2.1.6 Surveillance, Maintenance, and Deactivation Activities in the 200 Areas and on the Fitzner/Eberhart Arid Lands Ecology Reserve Unit

G. J. LeBaron

Disposition of 200 Areas facilities includes the surveillance, maintenance, and deactivation of buildings and waste sites in the 200-East, 200-West, and 200-North Areas, and on the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit.

Facilities include interim status RCRA treatment, storage, and disposal units awaiting closure, the canyon facilities (Plutonium-Uranium Extraction Plant [PUREX], B Plant, Reduction-Oxidation [REDOX] Plant, and U Plant), three operating major air emission units (two stacks and a passive vent), and three operating minor emission stacks.

In 2004, data were collected at the B Plant and the Plutonium-Uranium Extraction (PUREX) Plant stacks to show that they are minor emission units. This work was done in addition to the normal surveillance and maintenance that were conducted to ensure that the facilities were secure and maintained and did not pose a threat to human health or the environment.

Surveillance, maintenance, and decontamination or stabilization of over 500 waste sites including former cribs, ponds, ditches, trenches, unplanned release sites, and burial grounds continued in 2004. Periodic surveillances, radiation surveys, and herbicide applications were performed at these sites and timely responses to identified problems were initiated. The overall objective was to maintain these sites in a safe and stable configuration and to prevent contaminants at these sites from spreading in the environment.

6.2.1.7 Investigating the Potential for Using the 200 Areas Chemical Separations Plants as Waste Disposal Facilities

J. R. Robertson

The Canyon Disposition Initiative was created to investigate the potential for using the five canyon buildings (B Plant, T Plant, U Plant, Plutonium-Uranium Extraction [PUREX] Plant, and Reduction-Oxidation [REDOX] Plant) at the Hanford Site as disposal facilities for Hanford Site remediation waste, rather than demolishing the structures. While planning and sampling activities of the Canyon Disposition Initiative actually began in the mid-1990s, the bulk of the work to prepare the final feasibility study (DOE/RL-2001-11) was completed in 2001 as the final phase of the CERCLA remedial investigation/feasibility study for disposition of the U Plant. The U Plant was used as the pilot project for the Canyon Disposition Initiative.

In December 2004, the final feasibility study (DOE/RL-2001-11) and the associated proposed plan (DOE/RL-2001-29) were released for public review. These documents examine five alternatives for the remediation of the 221-U facility: (1) no action, (2) full removal and disposal, (3) entombment with internal waste disposal, (4) entombment with internal and external waste disposal, and (5) close in place – collapsed structure. The proposed plan (DOE/RL-2001-29) identifies the close in place – collapsed structure alternative as the preferred alternative. Under this alternative, process equipment already in the U Plant would be consolidated into the below-ground U Plant process cells, the cells would be backfilled with grout, the exterior walls and roof would be collapsed in place, and the site would be covered with a barrier. The final disposition path for the U Plant will be selected during the record of decision process.

6.2.2 Decommissioning of Facilities in the 300 Area

This section provides information about the transition and decommissioning of facilities within the 300 Area.

6.2.2.1 Deactivation of the 327 and 324 Facilities

D. E. Rasmussen

Construction of the 327 and 324 Buildings was completed and operations began in 1953 and 1966, respectively. These facilities contain hot cells that were used for radiological research and development work. Deactivation of both buildings was assigned to Fluor Hanford, Inc. during 1996 and will be completed by the contractor managing the River Corridor Closure contract.

Significant accomplishments achieved at the 327 Building during 2004 included:

- Initiating equipment and facility preparations for removal of remaining waste items in support of the 327 Building portion of a Tri-Party Agreement milestone. Activities were proceeding on track for completion ahead of the September 30, 2006, milestone due date.
- Maintaining the 327 Building in surveillance and maintenance mode in compliance with safety and regulatory requirements.

Significant accomplishments achieved at the 324 Building during 2004 included:

- Completing procurement of the Liquid Waste Handling System equipment for use in future 324 Building deactivation and decontamination activities.
- Maintaining the 324 Building in surveillance and maintenance mode in compliance with facility safety and regulatory requirements.

6.2.2.2 Status of the 309 Plutonium Recycle Test Reactor Facility

D. E. Rasmussen

The original 309 Plutonium Recycle Test Reactor Facility mission was to provide an operating test reactor to research and develop nuclear fuel technology during the 1960s. The facility was shut down in 1969. It currently contains a cold replica of the Fast Flux Test Facility Interim Examination and Maintenance Cell (built in 1975), which has been used by Fast Flux Test Facility staff for training and procedure

purposes. Facility disposition is to be completed by the contractor managing the River Corridor Closure contract. Activities at the 309 facility during 2004 included surveillance and maintenance activities to maintain compliance with facility and regulatory requirements.

6.2.2.3 Decommissioning of the 313 and 314 Buildings

D. E. Rasmussen

The 313 and 314 Buildings were used during the 1950s to support uranium metal fuel fabrication development and engineering activities associated with Hanford's production reactors. The 313 Building was used during the 1980s for N Reactor fuel fabrication activities. The 314 Building was used during the 1970s through 1990s for laboratory work. The 313 and 314 Buildings have been in a surveillance and maintenance mode in recent years. These two facilities were turned over to Bechtel Hanford, Inc. in October 2004 to start preparation for facility decontamination and decommissioning activities. Planning and preparatory activities supporting achievement of a new Tri-Party Agreement milestone applicable to the two buildings were initiated and are proceeding on track. Completion of decontamination and decommissioning of the 313 and 314 Buildings is scheduled for September 30, 2006.

6.2.3 Decommissioning of Facilities in the 400 Area

This section provides information about the transition and decommissioning of facilities within the 400 Area.

Deactivation of the Fast Flux Test Facility

D. A. Gantt

The Fast Flux Test Facility is a 400-megawatt thermal, liquid-metal-cooled reactor located in the 400 Area. It was built in the late 1970s to test equipment and fuel for the Liquid Metal Fast Breeder Reactor Program. The Fast Flux Test Facility operated from April 1982 to April 1992, during which time it successfully tested advanced nuclear fuels, materials, and safety designs and also produced a



variety of isotopes for medical research. The reactor has been in a standby mode since December 1993. Fuel has been removed from the reactor vessel and stored in two sodium-filled vessels and in aboveground dry-storage casks. Twenty-three of the facility's 100 systems were deactivated during the previous deactivation period from 1993 to 1997.

The Fast Flux Test Facility continued with deactivation actions in 2004. Liquid sodium was drained from the primary heat transport system loops and auxiliary systems, as well as the upper portion of the reactor vessel to the Sodium Storage Facility tanks, where approximately 567,812 liters (150,000 gallons) of liquid sodium metal are now stored, pending future conversion to sodium hydroxide for use by the Waste Treatment Plant. The sodium-potassium alloy systems containing approximately 3,407 liters (900 gallons) of sodium-potassium alloy were drained or flushed into associated sodium systems for disposition with the sodium. Eighty-four fueled components were washed and packaged into 12 interim storage casks. These interim storage casks and 22 filled interim storage casks previously stored in the 400 Area Interim Storage Area were transferred to the 200 Areas Interim Storage Area.

TransNuclear, Inc. began fabrication of the remainder of the interim storage casks and the first nine were delivered. Work continued on design and fabrication of the reactor vessel drain pump. Three polychlorinated biphenyl-(PCB-) cooled transformers were removed from service and shipped offsite for disposal; this leaves 10 of the original 19 PCB transformers in service. Additionally, selected process systems were deactivated that are no longer required since the secondary heat transport system sodium has been drained.

6.2.4 Decommissioning of Facilities in the 100 Areas

This section provides information about the transition and decommissioning of facilities within the 100 Areas.

Decommissioning of Facilities in the 100-D, 100-H, 100-N, and 100-K Areas

J. W. Golden, Jr.

Decontamination and decommissioning activities continued during 2004 in the 100-D, 100-H, and 100-N Areas. Activities to support the interim safe storage of reactor buildings (D and H) for up to 75 years were conducted in 2004. The interim safe storage of the D Reactor was completed in 2004, while work on the H Reactor will continue through 2005. Installation of a 75-year roof and decontamination of areas at the H Reactor will be addressed. These activities are conducted as non-time-critical removal actions under CERCLA.

Facility demolition was conducted at the 100-N Area in 2004. Facilities and structures demolished included the 1304-N emergency dump tank, 1300-N emergency dump basin, 11-N, 13-N, 1714-N, 1714-NA, and 1714-NB facilities. During 2004, work began on the demolition of the 190-DR pump house.

Engineering evaluation cost analyses were produced for the 105-N/109 Reactor interim safe storage and the demolition of 27 facilities at the 100-K West Area.