WCH-309
Rev. 0

River Corridor
Closure Contract

300 Area D4 Project
Fiscal Year 2007
Building Completion Report

December 2008

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

STANDARD APPROVAL PAGE

Title: 300 Area D4 Project Fiscal Year 2007 Building Completion Report

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METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
Sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
Ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

1.0 SCOPE

This report documents the deactivation, decontamination, decommissioning, and demolition (D4) of 20 buildings in the 300 Area of the Hanford Site that were demolished in fiscal year 2007. The D4 of these facilities included characterization; engineering; removal of hazardous and radiologically contaminated materials; equipment removal; utility disconnection; deactivation, decontamination, demolition of the structure; and stabilization or removal of the remaining slab and foundation as appropriate.

2.0 FACILITY DESCRIPTION AND CONDITIONS

The 20 buildings detailed in this report were located in the 300 Area of the Hanford Site, which is owned and operated by the U.S. Department of Energy (DOE) in Benton County, Washington. The 300 Area was constructed and operated as a reactor fuel fabrication and laboratory complex.

2.1 306E BUILDING

The 306 Building was completed in 1956 as the Metallurgical Semi-Works. The building contained metallurgical equipment and a fuel element pilot plant (Figure 1). Its initial mission was to support 313 Building operations and to pilot process improvements in single-pass reactor fuel fabrication methods. This included the development and fabrication of experimental fuel elements. Equipment at this time included standard metal finishing and forming tools, heat treating, welding, and metallographic equipment.

Figure 1. 306E Building.

The building was turned over for demolition in 2004.

In 1960 the 306 Building was expanded to approximately double its original size to contain the pilot plant for the co-extrusion fabrication process for N Reactor fuel elements. The addition (later 306E) contained a complete fuel element manufacturing line including component preparation, canning, finishing, and all inspections except autoclaving.

The 306E Building was a two-story bolted steel frame building with no basement. It had a concrete roof, fluted steel insulated panels for exterior siding, reinforced concrete first floor slab, and second floor of steel deck topped with concrete. The overall building size was 3,393.7 m^2 (36,531 ft^2). The west wall of 306E was a common wall with the 306W Building.

In 1972 the 306 Building was spilt into two parts. The newer part was designated as 306E and was used by Hanford Engineering Development Laboratory (HEDL). The older section was designated as 306W and was used by Battelle Northwest Laboratory (BNWL) (later Pacific Northwest National Laboratory [PNNL]).

In 1995, the 306E Building provided large, high clearance and heavy floor loading space for assembling, inspecting, and testing of equipment. A variety of specialty development and testing activities take place in the central assembly area and adjacent smaller facilities.

Operations in the 306E Building were phased out by 2004 and the building was turned over for demolition.

2.2 306EBA BUILDING

The 306EBA (Boiler Annex) was built to supply steam to the 306 Building. All of the 300 Area boiler annexes were pre-engineered metal buildings on concrete slabs (Figure 2). The building was 7.2 m by 6.9 m by 4.3 m (23.5 ft by 22.5 ft by 14.0 ft). Each annex had 3-in. curbing around the sump and water softener. The buildings were electrically heated with one or two corner units installed in each annex.

Figure 2. 306EBA Building.

The building was turned over to WCH in 2005.

2.3 306W BUILDING

The 306 Building was completed in 1956 as the Metallurgical Semi-Works. The building contained metallurgical equipment and a fuel element pilot plant (Figure 3). Its initial mission was to support 313 Building operations and to pilot process improvements in single-pass reactor fuel fabrication methods. This included the development and fabrication of experimental fuel elements. Equipment at this time included standard metal finishing and forming tools, heat treating, welding, and metallographic equipment.

Figure 3. 306W Building.

In 1960 the 306 Building was expanded to approximately double its original size to contain the pilot plant for the co-extrusion fabrication process for N Reactor fuel elements. The addition (latter 306E) contained a complete fuel element manufacturing line including component preparation, canning, finishing, and all inspections except autoclaving.

In 1972 the 306 Building was spilt into two parts. The newer part was designated as 306E and was used by HEDL. The older section was designated as 306W and was used by BNWL (later PNNL).

The 306W Building was a two-story bolted steel frame building with no basement. It had a concrete roof, fluted steel insulated panels for exterior siding, reinforced concrete first floor slab, and second floor of steel deck topped with concrete. The overall building size was 3,393.7 m^2 (36,531 ft^2). The east wall of 306W was a common wall with the 306E Building.

Its initial mission of what became 306W was to support 313 Building operations and to pilot process improvements in single-pass reactor fuel fabrication methods. This included the development and fabrication of experimental fuel elements. Equipment at this time included standard metal finishing and forming tools, heat treating, welding, and metallographic equipment. With the shutdown of the single-pass reactors in the 1960s, the mission of the 306W Building transitioned into that of metallurgical research and development (R&D).

The R&D mission continued until the facility was shut down in the early 2000s. By early 2004, the 306W Building had been vacated.

2.4 3705BA BUILDING

Boiler Annex 3705BA was located immediately adjacent and to the east of the 3705 Building. The boiler annex shared natural gas and waste piping with the 3705 Building (Figure 4). The boiler annexes were pre-engineered metal buildings on concrete slabs. The building was 4.1 m by 4.1 m by 3 m (13.5 ft by 13.5 ft by 10.0 ft). Each annex had 3-in. curbing around the sump and water softener. The building was electrically heated with one or two corner units installed in each annex.

Figure 4. 3705BA Building.

The 3705BA Building was turned over to Washington Closure Hanford (WCH) in 2005.

2.5 3706 BUILDING

The 3706 Building, the original radiochemistry and radiometallury laboratory on the Hanford Site, was successively called the Technical Building (1943), the General Services Building (1964), and the Communications & Documentation Services Building (2001 [Figure 5]).

Figure 5. 3706 Building.

The building was vacated in 1996 and was turned over to WCH in 2005.

The 3706 Building was a single-story, mostly wooden rectangular building measuring approximately 100 m (327 ft) by 43 m (140 ft) including two interior courtyards. The building consisted of wood frame and concrete block with concrete floor and foundation, wood section exterior walls covered with asbestos shakes, sheetrock and cement asbestos board (CAB) interior walls, and roofing of mineral surface asphalt shingles over tar paper. Two brick fire walls divide the structure into three sections. Near the center of the building on the south side was a room with 2-ft-thick concrete walls that was used as a counting room for radiological work. The total plan area of the building was 3,480 m^2 (37,459 ft^2).

The 3706 Building was built in 1943 as the 3706 Technical Building and housed the original radiochemistry and radiometallurgy laboratory for the Hanford Engineer Works. Its original mission was to perform small-scale experiments with both high- and low-radioactivity materials. It housed 57 separate and varied laboratories including a counting room (H-3-6085, Rev. 1) with 2-ft-thick concrete walls and roof in the south center of the 3706 Building. This shielded area was reported as a special laboratory for working with highly radioactive materials (WHC 1992). However, the access design and the ventilation design is consistent with that of a counting facility. No detectable radiological contamination was found in this shielded room during characterization of the building (BHI 1997).

From 1947 to 1953 much pioneering radiochemical work in the development of the reduction and oxidation (REDOX), plutonium/uranium reduction and extraction (PUREX), and recovery of uranium and plutonium by extraction (RECUPLEX) processes took place there. Work included all types of radiological materials. In 1954, the 3706 Building underwent a major decontamination and remodeling effort in which many laboratories were converted to office space. The control (sampling) laboratory for uranium fuel fabrication continued to operate into the mid-1960s.

In 1964, the 3706 Building was called the General Services Building. It housed some analytical laboratories, but the majority of the space was devoted to mail services, duplicating, photographic, and drafting services; a first aid station; 300 Area Patrol headquarters; and other administrative and clerical functions. During the 1970s and 1980s, additional minor remodeling took place as all laboratory work was phased out. By the late 1980s the building was used for

graphics, photography, mail, duplicating, publications, word processing, microfilming, document processing, central files, and first aid.

2.6 3706A BUILDING

The 3706A Building was a small concrete structure that housed the heating, ventilation, and air conditioning (HVAC), vacuum system (i.e. vacuum pump and receiver tank), electrical distribution panels, and other support equipment for the 3706 Building (Figure 6).

Figure 6. 3706A Building.

The building was turned over to WCH in 2005.

The 3706A Building was located immediately south and parallel to the 3706 Building and was constructed of concrete block walls and a roof consisting of built-up asphalt felt supported by wooden rafters. The total plan area of the building is 139 m^2 (1,500 ft^2).

2.7 3706BA BUILDING

Boiler Annex 3706BA was built to supply steam to the 3706 Building. All of the 300 Area boiler annexes were pre-engineered metal buildings on concrete slabs (Figure 7). The building was 7.2 m by 5.9 m by 3.7 m (23.5 ft by 19.5 ft by 12.0 ft). Each annex had 3-in. curbing around the sump and water softener. The buildings were electrically heated with one or two corner units installed in each annex.

Figure 7. 3706BA Building.

The building was turned over to WCH in 2005.

2.8 3707H BUILDING

The 3707H Building was known as the Maintenance Crafts Change Room. The 3707H Building was a single-story, insulated, modular-type relocatable structure placed on a reinforced concrete wall footing (Figure 8). The exterior walls were polyurethane insulating core between reinforced pre-cast concrete. Interior walls contained acoustical material for attenuation of sound transmission. The walls of the change room were waterproof and all others were covered with hardwood veneer panels or vinyl. The floors were vermin-proof and covered with 0.125-in.-thick vinyl tile. The dimensions of the building were 12 m by 9 m (39 by 30 ft).

Figure 8. 3707H Building.

The building was turned over to WCH in 2005.

2.9 3709 BUILDING

As originally constructed, the 3709 Building was a single-story, 14.3 by 11.6 m (47- by 38-ft) wood frame structure on a concrete slab (Figure 9). Centered on the south wall was a 9 m (30-ft-) high hose-drying tower. The exterior walls were asbestos shakes, and the roof was wood base with built up felt, tar, and gravel surface. Two modifications and 60 years later, the building measured 14.3 by 20 m (47 by 66 ft), the tower had been removed, portions of the walls were concrete block, and some of the roof was metal. The building contained two small offices, lunchroom, kitchen, bathroom, and heated and vented rooms that were devoted to paint and solvent storage, sign painting, spray painting, silk screening, sandblasting, and paint drying.

Figure 9. 3709 Building.

The 3709 Building was vacated in 2005 and turned over to WCH.

Because of the various roles it played throughout its 60-year history, the 3709 Building was known as the Fire Station, the Experimental Mechanics Laboratory, and, most recently, the Paint Shop.

The 3709 Building was the 300 Area fire house from 1944 until 1964, when a new fire house (3709A) was constructed. The building was then expanded west by 5 m (17 ft), modified internally, and became the Experimental Mechanics Laboratory (also called the Engineering Mechanics Laboratory). Static and dynamic stress testing of various equipment and materials was conducted here, including the accelerometer testing (in the tower area) and the pure bend fixture (in the northeast corner).

Circa 1978, the building expanded by 3.4 m (11 ft) to its current width of 20 m (66 ft), the tower was removed, and the Paint Shop was born. Since that time, the internal layout changed many times to accommodate the need for not only painting equipment, but silk screening, sandblasting, and making signs. Large volumes of paint and solvents were also stored there, and many modifications were made over the years to remove noxious vapors from the various rooms.

2.10 3719 BUILDING

The original 3719 Building has been used as a first aid station, fire protection headquarters, janitor service building, and finally as a transportation dispatch office (Figure 10). Most recently, the 3719 Building had been used as a document storage facility and finally as a computer facility.

Figure 10. 3719 Building.

The 3719 Building was vacated and turned over to WCH in 2006.

The original structure was a small wood-framed building (816 ft^2) with concrete foundation and concrete floor on grade. The outside walls were covered with asbestos shakes, and the gable roof was covered with roll tar paper.

The original building was replaced in the 1977 to 1978 time frame, with a single-story modular construction building with poured concrete slab foundation. Exterior walls were polyurethane insulating core placed between reinforced pre-cast concrete. Interior partitions contained acoustical material for attenuation of sound transmission. The ceiling was equipped with acoustical tile constructed from noncombustible materials. The dimensions of the building were 22 m by 12 m (72 by 39 ft).

2.11 3720 BUILDINGS

The 3720 Building was built in 1964 as the Consolidated Service Facility - Maintenance and Quality Control Laboratory. It was used by General Electric (GE), Douglas United Nuclear (DUN), and United Nuclear Industries (UNI) to provide analytical chemistry support for the fabrication of nuclear fuels for the Hanford Site reactors (Figure 11). The 3720 Building was transferred to PNNL in 1971 as the Material Sciences Laboratory.

Figure 11. 3720 Building.

The 3720 Building was vacated and turned over for demolition in August 2005.

There were 29 offices and 31 laboratories of various sizes in the building. The 3720 Building was a two-story metal frame structure on a concrete foundation and concrete slab floor. The exterior walls were steel panels with fiberglass insulation. The building had a concrete partial basement (southwest quadrant), a concrete block addition with a full basement (northwest end), and covered storage area (southwest end). The sloped gable roof had tar and gravel over a corrugated sheet metal base. The main 3720 was 73 m (240 ft) long (north-south), 30.5 m (100 ft) wide, 4.2 m (13.8 ft) high at the roof eaves (9.2 ft to top of concrete masonry unit [CMU] wall), and an overall height of 6.1 m (20 ft) to the roof peak.

2.12 3720BA BUILDING

The 3720BA Building (Boiler Annex) was located at the southwest corner of the 3720 Building to provide steam (Figure 12). The boiler annexes were pre-engineered metal buildings on concrete slabs. The building was 7.2 m by 7.2 m by 3.7 m (24 by 24 by 12 ft). Each annex had 3-in. curbing around the sump and water softener. The buildings were electrically heated with one or two corner units installed.

Figure 12. 3720BA Building.

The building was turned over to WCH in 2005.

2.13 3731 BUILDING

The 3731 Building was originally built as an Army mess hall. It was relocated to the 300 Area in 1961 as the 3731 Building for Hanford laboratory storage (Figure 13). Its primary use was for storing graphite materials. The north end of the 3731 Building was used for maintenance of U.S. Department of Transportation 6L (special nuclear material) shipping containers from 1968 to 1987 when it was identified as a Fissile Material Storage Facility. A criticality detection/alarm system was installed in 1968 and fire protection sprinklers were installed in 1980 for a paint spray booth to support painting shipping containers. In 1966, a new graphite shop (3731A) was constructed immediately adjacent to the west side of the 3731 Building with an adjoining wall and a fire door to the south half of 3731.

Figure 13. 3731 Building.

The 3731 Building was vacated and turned over for demolition in August 2005.

The 3731 Building was a 12.2 m (40 ft) wide by 24.3 m (80 ft) long by 5.2 m (17 ft) high all metal building with aluminum siding, frame, trusses, and roofing. The metal building sits on a 2- to 3-ft-high concrete block foundation on concrete slab floor.

2.14 3731A BUILDING

The 3731A Building was built in 1966 and operated as a “cold” graphite machine shop until 1995 when it was placed in standby condition by PNNL (Figure 14). The building included a large external vacuum dust (graphite) collection system outside the northwest corner of the building. The 3731A Building was constructed immediately adjacent to the west side of the 3731 Building with an adjoining wall and a fire door to the south half of 3731.

Figure 14. 3731A Building.

The building was turned over to WCH in 2005.

The 3731A Building was a 12.2 m (40 ft) wide by 24.3 m (80 ft) long by 5.2 m (17 ft) high concrete block building on a concrete slab with a 4:12 pitched wooden truss roof.

2.15 3745 BUILDING

The 3745 Building was known as the “Radiological Calibrations and Standards” Building (Figure 15). The 3745 Building was built in 1944 to support the calibration of a wide range of radiation detection instruments using x-ray, alpha, gamma, and neutron sources. From the beginning, the building experienced contamination and personnel exposure problems from contaminated portable survey instruments being brought in from the field and from instruments with faulty cases or shielding. An instrument decontamination area was established in the facility in about 1945. This building received major shielding upgrades in 1956 to reduce radiation exposures to calibration personnel within the building and to reduce radiation dose rates outside the building.

Figure 15. 3745 Building.

The 3745 Building was vacated and turned over for demolition in 2005.

The 3745 Building was a two-story wood-frame rectangular building with a multiple gable-type roof. The exterior measured 29.6 m by 11.0 m by 12.2 m high (97 ft by 36 ft by 40 ft high). Part of the roof was built-up hot mopped asphalt; the rest was asphalt shingle. There were three large ventilators on the roof. A reinforced concrete vault in the southwest corner of the building had a flat, reinforced concrete roof with tar and gravel surface. The exterior walls were asbestos shake shingles over the concrete block. The main floor was on-grade concrete and the building was supported on concrete footings. The second floor was wood framing with a wood deck and asphalt tile. The building was steam heated, first by steam provided by the 384 Power House and later by a Johnson Controls, Inc. steam boiler located inside the building.

2.16 3745A BUILDING

The 3745A Building was known as the “Electron Accelerator” Building (Figure 16). The 3745A Building was constructed in 1947-1948 as shielded laboratory space for health physics research involving ion bombardment in support of General Electric Hanford Company’s Radiological Physics Group. The building and equipment were later used in support of Battelle Northwest/Pacific Northwest Laboratories’ Occupation and Environmental Safety Department.

A 2-million volt (MV) Van de Graff accelerator and controls console were installed in 1953 to provide high-dose x-ray exposure for routine calibration of dosimetry and hand-held, high-range radiation monitoring instruments used at the Hanford Site, replacing an x-ray machine that could not be operated reliably at the high dose required. The original console underwent considerable technological modifications since the 1970s. The accelerator was later modified to provide high-dose-rate irradiation for studies of biochemical mechanisms in mammalian cells.

Figure 16. 3745A Building.

The building was vacated around 2000.

Periodic health physics safety surveys conducted by Battelle led to the upgrade of the flashing lights and start-up horns on the building's roof used to alert 300 Area personnel that the accelerator was in use. Additional physical barriers and internal shielding were used to achieve a maximum dose rate of less than 2 mrem/hr within and around the 3745A Building during accelerator operations.

The accelerator program was terminated in 1995 and the particle accelerators were removed. Washington State University leased 3745, 3745A, and 3745B from 1997 to about 1999 for its experimental physics program. The 3745A Building was used primarily for storage space.

3745A was a rectangular building with concrete block walls and an at-grade concrete slab floor that measures approximately 22.3 m (73 ft) long in an east-to-west direction by approximately 5.3 m (17.5 ft) wide in a north-to-south direction. The main roof was 3 m (10 ft) high and the high bay roof was 8.8 m (28.8 ft) high. The roof was concrete with a tar and gravel finish. The center of this building consisted of a high-bay section designed to house a vertical standing accelerator. The south exterior wall is composed of concrete block that has been augmented with poured concrete for radiation shielding purposes. This poured concrete extends outward 18 in. from the building's concrete block walls. The west wall is composed of concrete block that has been similarly reinforced with poured concrete shielding. The shielding helped reduce the amount of radiation that escaped the building during accelerator operations. At the western end of the north side of the building is a reinforced concrete wall off set from the building.

2.17 3745B BUILDING

The 3745B Building was known as the "Positive Ion Accelerator" Building (Figure 17). The 3745B Building was constructed in 1949 to provide a shielded laboratory instrument calibration and research using a 2-MV Van de Graff accelerator. Projects included the development of methods for calibrating neutron film badges and portable radiation measuring instruments. The

accelerator had multiple beam tubes and used a variety of gases such as hydrogen, helium, and deuterium. Targets included beryllium, carbon, and tritium. The facility underwent many structural modifications to accommodate new projects, including studies involving protons. A tandem accelerator was added to the facility. Experimental work was shut down in 1995 due to budget cuts.

Figure 17. 3745B Building.

The building was vacated in approximately 1995.

3745B was a rectangular building that evolved into its pre-demolition configuration through a series of additions. Initially, the building had a concrete floor, walls, and roof at the sample target area while the remainder was constructed of wood frame covered with asbestos shake siding. Subsequent additions to the north and south sides of the building were constructed of concrete block with some concrete shielding walls. All the tar and gravel roof areas had a slight slope for water run-off. A concrete block equipment storage addition 7.9 m by 4.6 m by 10.1 cm (26 ft by 15 ft by 4 in.) was added to the building in 1981. Heating and cooling was provided by steam and refrigeration, respectively.

2.18 3746 BUILDING

The 3746 Building has been identified with several names including the Control Building, the Irradiation Physics Building, and the Radiation Protection Administration Building. The 3746 Building provided support space such as offices, lunchroom, and restrooms (Figure 18). The building was used as office space for personnel associated with health physics and research, and development projects in the 3746-A, 3745-A, and 3745-B Buildings. The function of the building was to perform tests and verify that the composition of various process substances were within specifications. The building was also used to calibrate thermoluminescent dosimeters, which were first used at the Hanford Site in the 1970s.

Figure 18. 3746 Building.

The facility was turned over for demolition in January 2007.

The 3746 Building was built in 1945 and was a 205 m^2 (2,211-ft^2) gable roofed, one-story wooden building that contained 10 rooms. A 10.1 cm (4-in.) reinforced concrete slab floor was supported by reinforced foundation walls and well-tamped earth. The walls were of drop siding over building paper and 2 cm (7/8-in.) sheathing. The gable roof was a built-up felt roof supported by wooden rafters. Wooden louvers are located at either end of the building for attic ventilation. The rooms consisted of a small electronics laboratory, shop, dark room, storage room, two restrooms, four offices, and a corridor that runs from one end of the building to the other along a center axis. The overall dimensions of the 3746 Building were 22.1 m (72.5 ft) long (north-to-south), 9.3 m (30.5 ft) wide (east-to-west), and 6.5 m (21.5 ft) in height. Cooling was by evaporation and heating was by steam.

In 1981, the office space was slightly modified to accommodate an interconnecting corridor built in conjunction with the 3746A Building construction. At an unknown date (possibly at the time of the 3746A addition), the original siding was covered with asbestos transite shingles and the original double-hung windows were replaced with single-pane windows. In addition, acoustic ceiling tiles were added over the existing ceiling, the original transite board interior wall surface was replaced with gypsum wallboard, and office walls and partitions along the west wall were removed to make room for the new concrete block corridor connecting 3746 to 3746A. Air ducting was located in the attic area in a north-south direction above the offices on both sides of the building. Apparently, the ducting was added to the building in 1977 and connected to a heat pump for heating and cooling purposes.

2.19 3746A BUILDING

The 3746A Building (Radiological Physics Laboratory) provided laboratory and office space for PNNL's Radiological Science Department (Figure 19). Records are poor and the history of the operations that took place at the building is not documented. Based on drawings, available information, and lack of hazardous identification postings, the activities that occurred within the

facility are assumed to be of minimal hazards and nonradioactive in nature. However, common laboratory chemicals are presumed to have been used in the laboratory portions of the building.

Figure 19. 3746A Building.

The facility was turned over for demolition in January 2007.

The 3746A Building was leased from DOE-RL to Washington State University – Tri-Cities for office and laboratory use from early 1998 to March 2002. Bioguard Technologies also leased a portion of the building in 2002.

The 3746A Building was originally constructed in 1948 on a concrete foundation with an on-grade concrete floor slab. The one-story building originally contained a total of four offices, seven laboratories and support rooms, a water purification room, and a mechanical room of various sizes. The seven laboratory and support rooms were identified as the cell biology laboratory, tissue culture laboratory, instrumentation development and microdosimetry room, x-ray room, two radiation and biochemistry laboratory rooms, and a micro-spectrofluorimetry room. The outside walls and internal bearing walls were constructed of concrete block. All internal partitions were constructed of gypsum board on steel studs. The roof was constructed of wood planking with built-up roofing and insulation supported on glue-laminated wood beams. Laboratory floor covering consisted of sheet vinyl, and the office/corridor floor covering was vinyl asbestos tile.

A 15.2 by 12.2 m (50- by 40-ft) addition was constructed in 1981 similar to the original structure, which added four offices and two laboratories. A connecting hallway and vestibule constructed of concrete masonry units and gypsum wallboard over rigid insulation was also constructed in 1981. Other office wall modifications were made to provide the inter-connecting corridor between the 3746A and 3746 Buildings. The predemolition overall dimensions of the 3746A Building were 29.5 m (96.75 ft) long (north-to-south) and 15.8 m (52 ft) wide (east-to-west) with a total of 473.8 m^2 (5100 ft^2).

2.20 MO-905 BUILDING

The MO-905 temporary mobile office trailer was used by Field Remediation Radiological Controls group as a temporary office space, meeting room, and lunch area (Figure 20). One room of the trailer was also used for counting radiological air samples and smears, and performing source checks. The building was a double-wide 24- by 60-ft transportable metal clad building on a steel frame located in the north-central region of the 300 Area.

Figure 20. MO-905 Building.

MO-905 was apparently in service from roughly 1997 through demolition.

3.0 PROJECT ACTIVITIES

3.1 ENGINEERING AND PERMITS

The Removal Action Work Plan #1 for 300 Area Facilities (DOE-RL 2005) was prepared to satisfy the requirements of the action memorandum (EPA and DOE 2005), outlining how compliance with, and enforcement of, applicable regulations will be achieved for cleanup of 300 Area facilities. Additionally, the removal action work plan (DOE-RL 2005) and environmental control plan (WCH 2006) serve as the decommissioning plan and project management plan for the 300 Area project. The removal action work plan was prepared in accordance with Section 7.2.4 of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989) and was approved by DOE Richland Operations Office and the regulators.

Plant forces work reviews (PFWRS) were prepared for the demolition of these 20 buildings to determine whether *Davis-Bacon Act of 1931* prevailing wage rates for the work were applicable. Table 1 summarizes the reviews performed. The D4 work on all 20 buildings was determined to be “not applicable” and the work was performed by plant forces.

Table 1. Plant Forces Work Reviews.

Building	PFWR Number	PFWR Title
306E, 306W, 306EBA, 3705BA	8850-024-05, Rev. 0	North 300 Area Minor Building Removal
3706, 3706A, 3706BA, 3707H, 3720, 3731, 3731A	8850-021-06, Rev. 0	300 Area Building Removal North
3709, 3720BA, 3745, 3745A, 3745B, 3746, 3746A	8850-059-06, Rev. 0	Demolition of Various 300 Area Buildings
MO-905	8850-013-07, Rev. 0	Demolition and Replacement of MO-905 and MO-059
3719	8850-011-07, Rev. 0	Demolition of the 3719 Building

Criticality screenings were performed for all buildings. These criticality evaluations showed that fissionable material inventories did not exceed threshold activity values and no criticality safety requirements or controls were needed for the buildings. In addition, all the buildings were below the Category 3 threshold quantity as defined in Table A.1 of DOE Standard – *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports* (DOE-STD-1027-92, Change Notice NO. 1 [DOE 1997]). Additionally, when D4 work began in the buildings, some standard industrial hazardous substances remained in the buildings (e.g. polychlorinated biphenyls, lead paint, mercury, Freon, asbestos, beryllium). The quantity of these nonradioactive hazardous substances also did not exceed the threshold quantities ("Threshold quantities" as defined in 29 *Code of Federal Regulations* [CFR] 1910.119 or 40 CFR 68.130). Table 2 identifies the buildings and associated initial hazard categorization (IHC) documents for each.

Table 2. Initial Hazard Categorization Evaluations and Results.

Building	IHC Number
306E	IHC-2005-0024, Rev. 0
306W	IHC-2005-0028, Rev. 0
3720	IHC-2005-0042, Rev. 0
306EBA, 3705BA, 3706BA, 3707H, 3719, 3720BA, 3731, 3731A	IHC-2005-0031, Rev. 1
3706, 3706A	IHC-2006-0005, Rev. 0
3709, MO-905	IHC-2006-0017, Rev. 1
3745, 3745A, 3745B	IHC-2006-0022, Rev. 1
3746, 3746A	IHC-2007-0007, Rev. 0

3.2 HAZARDOUS MATERIAL REMOVAL

The scope of the demolition project included removing and properly disposing of hazardous materials (e.g., oils, grease, asbestos-containing material, mercury, lead, and polychlorinated biphenyls). All known hazardous materials were removed from inside and outside of the buildings prior to demolition. In most cases, some Class II nonfriable asbestos-containing material (roofing material, floor tile, and vinyl sheeting) was left in place and removed during the demolition phase of the project. In these cases, all building demolition waste was treated as asbestos waste, and controls to minimize asbestos fiber release (fixatives, wet methods, and air monitoring) were used throughout the demolition process.

Beryllium-contaminated equipment, including high-efficiency particulate air filters and duct work, were of particular concern in those buildings that were beryllium listed. These items were thoroughly characterized prior to removal, and work control methods to minimize airborne beryllium particulate (fixatives, wet methods, air monitoring, and hygiene practices) were implemented throughout the decommissioning and demolition process.

3.3 UTILITY AND DRAIN ISOLATION

Once the utilities were no longer needed in the building (prior to hazardous materials removal), all electrical, water, and telecommunications services were disconnected from the buildings. Floor drains were inspected for mercury and then sealed to provide isolation. Sanitary sewers to the building were disconnected during early deactivation activities and all drains were grouted.

3.4 DEMOLITION OF ABOVE-GRADE STRUCTURES

In general, after the hazardous materials and equipment removal activities were performed and utilities isolated, the above-grade structures were ready for demolition. The building structures were demolished using excavator-mounted hydraulic shears and a bucket-and-thumb. The debris was segregated for loading and disposal. Building debris was processed and sampled until industrial hygiene monitoring confirmed that loading and unloading waste did not generate airborne beryllium. Standard Environmental Restoration Disposal Facility (ERDF) roll-on/roll-off containers with two 6-mil liners were used to package and ship debris. Beryllium controls required that a pool of containers were designated for use in the 300 Area only. These containers were part of a "closed-loop" disposal system and remain exclusively for use in the 300 Area.

3.5 BELOW-GRADE DEMOLITION AND SITE RESTORATION

All 20 buildings addressed in this report were demolished and the slab and foundations (if any) were left in place in all but two cases. The slab for 3720 and 3720BA were removed by the D4 project during fiscal year 2008. The slabs that were left in place will be removed at a later date either by the D4 Closure Project or the Field Remediation Closure Project.

All of the remaining slabs are within the 300 Area Radiologically Controlled Area (RCA) fence. The slabs for the 3705BA, 3706, 3706A, 3706BA, 3707H, 3709, 3719, 3720, 3720BA, 3731, 3731A, 3745, 3745A, 3746, 3746A, and MO-905 have been completely downposted. The

306E, 306EBA, and 306W Building slabs are posted as a Contamination Area within the same fence. The 3745B Building slab has a small area posted as a Radiological Buffer Area (RBA) around the vaults in the slab.

In general, for each building demolished (or for a given complex) a post-demolition summary report is prepared that documents the characterization and final status of the building at the completion of the D4 activities. Table 3 summarizes the as-left conditions of each building.

Table 3. Building As-Left Condition Summary.

Building	Slab Condition	Site Posting
306E	Remains	Contamination Area
306EBA	Remains	Contamination Area
306W	Remains	Contamination Area
3705BA	Remains	None
3706	Remains	None
3706A	Remains	None
3706BA	Remains	None
3707H	Remains	None
3709	Remains	None
3719	Remains	None
3720	Removed	None
3720BA	Removed	None
3731	Remains	None
3731A	Remains	None
3745	Remains	None
3745A	Remains	None
3745B	Remains	Small Radiological Buffer Area posted around Pits in Slab
3746	Remains	None
3746A	Remains	None
M0-905	Not Applicable	None

4.0 COST AND SCHEDULE

Tables 4 through 22 detail start and finish dates and total labor costs for major D4 activities in each of the 20 buildings. These costs do not include deactivation or surveillance and maintenance work performed by the other contractors prior to turnover of the building to WCH. They also do not include overhead or distributed costs, equipment and material costs, or work performed by subcontractors.

Note that some activities began prior to the current reporting year (fiscal year 2007). Also, entries reading "NC" mean that no costs were collected or charged specifically to this activity.

The total labor cost (before overhead and distributed costs) for all 20 buildings was $4,067,126.

Table 4. 306E Building.

	Start Date	Completion Date	Cost
Engineering Planning	August 29, 2005	September 28, 2006	$25,091
Building Deactivation	January 9, 2006	September 28, 2006	$186,906
Building Demolition	November 21, 2006	December 21, 2006	$67,979
Waste Loadout	January 15, 2007	May 3, 2007	$93,389
		TOTAL	$373,365

Table 5. 306EBA Building.

	Start Date	Completion Date	Cost
Engineering Planning	June 25, 2007	August 6, 2007	$4,585
Building Deactivation	July 19, 2007	July 19, 2007	$395
Building Demolition	August 29, 2007	August 29, 2007	$505
Waste Loadout	August 29, 2007	August 30, 2007	$1,207
		TOTAL	$6,692

Table 6. 306W Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 3, 2005	December 22, 2005	$51,399
Building Deactivation	June 26, 2006	September 28, 2006	$386,318
Building Demolition	August 2, 2007	September 27, 2007	$95,350
Waste Loadout[a]	October 8, 2007	December 13, 2007	$182,445
		TOTAL	$715,512

[a*] Waste loadout occurred during fiscal year 2008.

Table 7. 3705BA Building.

	Start Date	Completion Date	Cost
Engineering Planning	June 11, 2007	August 6, 2007	$409
Building Deactivation	July 18, 2007	July 18, 2007	$11,833
Building Demolition	August 20, 2007	August 20, 2007	$5,123
Waste Loadout	August 20, 2007	August 20, 2007	$1,331
		TOTAL	$18,696

Table 8. 3706 Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 3, 2005	March 7, 2007	$73,423
Building Deactivation	October 11, 2006	April 19, 2007	$913,623
Building Demolition	May 31, 2007	June 13, 2007	$74,083
Waste Loadout	June 11, 2007	July 19, 2007	$65,412
		TOTAL	$1,126,541

Table 9. 3706A Building.

	Start Date	Completion Date	Cost
Engineering Planning	February 2, 2006	March 15, 2007	$10, 914
Building Deactivation	February 5, 2007	May 31, 2007	$97,911
Building Demolition	June 11, 2007	July 10, 2007	$1,705
Waste Loadout	June 25, 2007	August 20, 2007	$2,560
		TOTAL	$113,090

Table 10. 3706BA Building.

	Start Date	Completion Date	Cost
Engineering Planning	June 11, 2007	August 6, 2007	$513
Building Deactivation	July 17, 2007	July 17, 2007	$505
Building Demolition	August 20, 2007	August 20, 2007	$506
Waste Loadout	August 20, 2007	August 20, 2007	$826
		TOTAL	$2,350

Table 11. 3707H Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 2, 2006	October 12, 2006	$7,499
Building Deactivation	October 9, 2006	October 18, 2006	$681
Building Demolition	May 3, 2007	May 3, 2007	$8,395
Waste Loadout	May 14, 2007	May 14, 2007	$1,932
		TOTAL	$18,507

Table 12. 3709 Building.

	Start Date	Completion Date	Cost
Engineering Planning	April 5, 2007	May 21, 2007	$3,680
Building Deactivation	April 5, 2007	May 21, 2007	$51,863
Building Demolition	May 29, 2007	May 29, 2007	$3,070
Waste Loadout	June 4, 2007	June 4, 2007	$9,918
		TOTAL	$68,531

Table 13. 3719 Building.

	Start Date	Completion Date	Cost
Engineering Planning	March 1, 2007	May 21, 2007	$1,621
Building Deactivation	May 14, 2007	May 21, 2007	$10,339
Building Demolition	May 29, 2007	June 21, 2007	$3,312
Waste Loadout	June 4, 2007	June 13, 2007	$7,280
		TOTAL	$22,552

Table 14. 3720 Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 2, 2006	June 13, 2007	$134,839
Building Deactivation	October 16, 2006	March 21, 2007	$599,379
Building Demolition	June 28, 2007	July 17, 2007	$99,946
Waste Loadout	August 6, 2007	September 27, 2007	$105,520
		TOTAL	$939,684

Table 15. 3720BA Building.

	Start Date	Completion Date	Cost
Engineering Planning	March 1, 2007	June 13, 2007	$1,790
Building Deactivation	March 1, 2007	March 21, 2007	$35,207
Building Demolition	June 28, 2007	June 28, 2007	$15,404
Waste Loadout	August 6, 2007	August 6, 2007	$4,078
		TOTAL	$56,479

Table 16. 3731 Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 2, 2006	October 12, 2006	$14,113
Building Deactivation	October 9, 2006	October 16, 2006	$27,461
Building Demolition	May 10, 2007	May 10, 2007	$10,984
Waste Loadout	May 21, 2007	May 21, 2007	$13,600
		TOTAL	$66,158

Table 17. 3731A Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 2, 2006	October 12, 2006	$2,485
Building Deactivation	October 9, 2006	October 16, 2006	$157,885
Building Demolition	May 10, 2007	May 10, 2007	$22,226
Waste Loadout	May 21, 2007	May 21, 2007	$5,716
		TOTAL	$188,312

Table 18. 3745 Building.

	Start Date	Completion Date	Cost
Engineering Planning	October 16, 2006	May 21, 2007	$15,929
Building Deactivation	February 22, 2007	July 12, 2007	$87,251
Building Demolition	July 16, 2007	July 19, 2007	$15,831
Waste Loadout	July 31, 2007	August 20, 2007	$30,285
		TOTAL	$149,296

Table 19. 3745A Building.

	Start Date	Completion Date	Cost
Engineering Planning	November 13, 2006	May 21, 2007	$2,160
Building Deactivation	February 22, 2007	March 14, 2007	$2,026
Building Demolition	May 21, 2007	May 21, 2007	$2,709
Waste Loadout	June 4, 2007	August 6, 2007	$11,411
		TOTAL	$18,306

Table 20. 3745B Building.

	Start Date	Completion Date	Cost
Engineering Planning	November 13, 2006	May 21, 2007	$3,745
Building Deactivation	February 22, 2007	April 5, 2007	$28,781
Building Demolition	May 21, 2007	May 21, 2007	$2,817
Waste Loadout	June 4, 2007	June 13, 2007	$8,290
		TOTAL	$43,633

Table 21. 3746 Building.

	Start Date	Completion Date	Cost
Engineering Planning	February 12, 2007	May 29, 2007	$6,766
Building Deactivation	May 21, 2007	June 18, 2007	$57,996
Building Demolition	July 23, 2007	July 31, 2007	$1,125
Waste Loadout	August 6, 2007	August 6, 2007	$17,960
		TOTAL	$83,847

Table 22. 3746A Building.

	Start Date	Completion Date	Cost
Engineering Planning	February 12, 2007	May 29, 2007	$5,589
Building Deactivation	May 21, 2007	June 18, 2007	$484
Building Demolition	July 23, 2007	July 26, 2007	$1,423
Waste Loadout	August 6, 2007	August 6, 2007	$4,286
		TOTAL	$11,782

Table 23. MO-905 Building.

	Start Date	Completion Date	Cost
Engineering Planning	June 4, 2007	June 4, 2007	$4,330
Building Deactivation	June 11, 2007	June 14, 2007	NC
Building Demolition	June 18, 2007	June 18, 2007	$10,734
Waste Loadout	June 21, 2007	July 12, 2007	NC
		TOTAL	$15,064

5.0 WASTE DISPOSITION

One of the objectives of the 300 Area D4 Project is to support recycling and waste minimization. However, beryllium and radiological contamination throughout the site will prevent most of the material and equipment from the buildings to be salvaged and/or transferred offsite. Therefore, all of the debris for buildings identified in this report was shipped to the ERDF for disposal.

Waste generated during demolition of the 20 buildings demolished in FY 2007 was characterized under nine different waste profiles and shipped to ERDF. Roll-on/roll-off boxes were used to ship the debris. The total number of these shipments (“cans”), tons of debris disposed of in ERDF, and the profiles used are listed in Table 24.

Table 24. Waste Transferred to ERDF.

Building	Number of Shipments	Tons	Waste Profile(s)
306E	330	2622	WP300HF001, WP300UFPSB001, WP306001
306EBA			
306W	354	1910	WP300UFPSB001, WP306001
3706	382	2541	WP300UFPSB001, WP300UFPSB003, WP3706001
3706A			
3706BA			
3707H	13	151	WP300UFPSB001
3709	67	841	WP300LSF001
3719	27	210	WP300UFPSB001
3705BA			
3720	194	1460	WP300UFPSB001, WP3720001
3720BA			
3731	31	286	WP300UFPSB001
3731A	10	82	WP300UFPSB001
3745	62	391	WP300LSF001
3745A	26	275	WP300LSF001
3745B	35	305	WP300LSF001
3746	88	741	WP300LSF001, WP300LSF002
3746A			
MO-905	16	78	WP618FFBG001

6.0 OCCUPATIONAL EXPOSURES

6.1 PERSONNEL INJURIES

WCH personnel worked a total of approximately 249,440 hours (manual and nonmanual, including subcontractors) on the 300 Area D4 project with two Occupational Safety and Health Administration recordable injuries and no lost workday cases.

6.2 PERSONNEL RADIOLOGICAL EXPOSURES

Of the twenty 300 Area buildings, no clothing or skin contamination incidents occurred during D4. In addition, the “as low as reasonably achievable” (ALARA) goal of zero person-mrem was achieved. All boundary air sample results were below procedural action levels for the duration of the project.

7.0 REFERENCES

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