



December 14, 2005

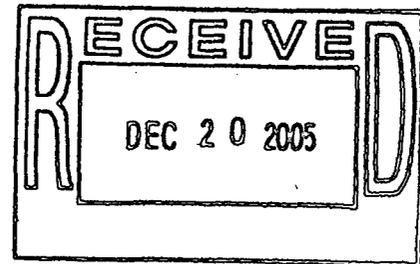
The pages supplied here replace information contained in the Closeout Report for IHSS Group 000-2 in response to regulatory agency comments.

The following pages are included:

- Pages 5 through 17 (Table 2) and 159. Page 159 was formerly issued as Page 164 in the previous page change transmittal.

If you have any questions, please contact Susan Serreze at 303-966-2677.

Thank you.



ADMIN RECORD

1/15

OPWL P-27

The P-27 OPWL that branched off P-28 at the southeast corner of Building 774 could not be located during the excavation and removal of P-28 and P-29 OPWLS nor during more extensive pothole excavations.

OPWLS P-28 and P-29

The P-28 and P-29 OPWL, which ran from the Tank 207VVN to Tanks T-14 and T-16 (Building 774), were removed from the tanks to a point approximately 45 ft south of the tanks, where the depth of the pipes reached 6 ft below final grade. A grout plug was inserted in both P-28 and P-29 at this location and both pipes were grout filled from the Tank 207VVN excavation by continuously flowing grout until a continuous flow of grout was observed flowing through the grout vent tube at Tank 207VVN.

OPWL P-31

The P-31 OPWL (between Buildings 771 and 774) was completely removed as part of building demolition.

OPWL P-33

The P-33 OPWL, which originated within the Building 771 footprint and terminated within the Building 774 footprint, did not require any action because the pipe outside of the building footprint was not breached.

OPWL P-34

The P-34 OPWL was completely removed from the 207 VVW to Building 774.

OPWL P-56

The P-56 OPWL (between Buildings 771 and 774) was completely removed as part of building demolition.

4.2.6 Disposition of Manways and Valve Pits – Building 771/774

The manway immediately west of the Building 728 tank pit was completely removed during the excavation and removal of the Building 728 tank pit.

4.2.7 Disposition of Process Waste Tanks and Pits – Building 771/774

All above slab, free standing OPWL tank structures were removed building demolition. Additional details are listed below:

- Tank T-8 was in the Building 728 tank pit and it was completely removed.
- Tank 12, which was shown outside of the Building 771 footprint on the north side of the building, (Figure 8) never existed.
- Tanks 36 and 37 were sumps in the Building 771 Annex. After the steel inserts were removed, they were both decontaminated, below 3.5 ft of final grade, were left in place and backfilled with soil.

Table 2
OPWL Historical Summary

Area	IHSS/PAC	IHSS Group	Description
100/400 500 700 800 Eastern OPWL	000-121 OPWL	000-2	<p>The OPWL were a network of tanks and underground pipelines designated as IHSS 000-121. There were approximately 6 miles (33,000 feet [ft]) of underground pipelines that carried process waste from facilities generating waste to the Building 774 treatment facility. The OPWL were placed into service around 1952 with repairs and additions made to the system through 1975 (DOE 1992-2004). Leaks and releases were expected or confirmed at many locations within the OPWL.</p> <p>Between 1975 and 1984, the OPWL were replaced by the separate, double-contained New Process Waste Lines (NPWL). Some of the tanks and pipelines from the OPWL were removed, other lines were incorporated into the NPWL, and some tanks were converted into the plenum deluge system. The OPWL that was not replaced or removed remains in place and consists of 66 pipeline segments and 5 pipeline spurs. Most of the OPWL were located in highly congested areas with other active and inactive utility lines. Approximately 13,000 ft of pipeline was beneath buildings, with another 7,000 ft beneath asphalt or concrete. There are few engineering drawings for the OPWL, and, in some instances, the drawings that were found contain contradictory information (DOE 1992-2004).</p> <p>The pipelines ranged from 1 to 10 inches in diameter and were constructed of a variety of materials including black iron, cast iron, plastic, polyethylene, vitrified clay, cement/asbestos, saran-lined steel, stainless-steel, fiberglass, polyvinyl chloride (PVC), Pyrex, and Teflon. Twenty-nine concrete valve pits/manways provided access for operation and maintenance. These were included in the initial installation or added later at locations with persistent leaks such as at elbows, valves, and transitions from one pipe material to another (DOE 1992-2004).</p> <p>The OPWL were not a continuous flowing system. Wastes were accumulated in holding tanks within the buildings, then transferred to Building 774 in batches, generally by gravity feed. To complete some transfers, lift stations were utilized in a number of buildings/areas where needed to pump the collected waste into the gravity fed portions of the OPWL or the ponds. The wastes transported were various aqueous process wastes containing low-level radioactive materials, nitrates, caustics, and acids. Small quantities of other liquids were also handled including medical decontamination fluids, miscellaneous laboratory wastes, and laundry effluent. These process waste streams also contained metals, volatile organic compounds (VOCs), oil and grease, and cleaning compounds (DOE 1992-2004).</p>
700	000-121 Tank 29 (OPWL Tank 207)	000-2	<p>Tank T-29 was located in the 700 Area northeast of Building 776 and east of the cooling tower. Tank T-29 was a 200,000-gallon carbon steel aboveground storage tank (AST). A valve pit on the north side of Tank T-29 was also sampled.</p> <p>Tank T-29 was installed in 1952 and was reportedly abandoned in the mid-1980s. The tank was used to store untreated process waste from Building 774, including acids, bases, solvents, radionuclides, metals, chlorides, oils, and grease. No reported releases from this tank are known. As part of the Operable Unit (OU) 9 Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) (DOE 1992b) radiological surveys, soil and tank sampling were conducted.</p> <p>Three High Purity Germanium (HPGe) survey locations surrounding Tank T-29 showed elevated activities of uranium-238 and uranium-235. Thorium-232 was slightly elevated at one station and americium-241 was elevated at all three locations. Plutonium-239/240 was also elevated.</p> <p>Results of three of the 48 sodium iodide (NaI) survey sites around Tank T-29 were</p>

Area	IHSS/PAC	IHSS Group	Description
			<p>greater than background levels. NaI activities ranged between 1,900 and 3,000 counts per minute (cpm) with background levels in the same range.</p> <p>A direct radiological survey of the interior of Tank T-29 for fixed and removable beta/gamma activity revealed 45,456 disintegrations per minute (dpm)/100 square centimeters (cm²) at the plane of the opened inspection port. Activity dropped to 2,841 dpm/100 cm² at 8 inches above the port. The valve pit on the northern side of Tank T-29 showed areas of fixed and removable alpha contamination. The northeastern quadrant of the manhole cover had 208 dpm/100 cm² fixed and removable alpha contamination, and the concrete pad had 210 dpm/100 cm² fixed and removable alpha contamination.</p> <p>Two soil samples were collected and analyzed during the OU 9 Phase I RFI/RI. Americium-241, gross alpha, plutonium-239/240, copper, and silver were detected above background values. Methylene chloride was the only organic detected above 1.0 microgram per liter (ug/L).</p> <p>Four boreholes were drilled around Tank T-29. Americium-241 and plutonium-239/240 were detected above background, at a depth of 0 to 6 inches in all four boreholes. Lead was detected above background concentrations in the western, eastern, and southeastern boreholes. Methylene chloride was the only VOC detected, at a level of 1 microgram per kilogram (ug/kg). Cadmium and silver were detected above background in the eastern borehole.</p> <p>A liquid sample was collected at the Tank T-29 vault. Gross beta, uranium-233/234, and uranium-235 had elevated activities and americium-241, gross alpha, plutonium-239/240, and uranium-238 had significantly elevated activities. There were also elevated levels of metals including arsenic, barium, beryllium, cadmium, copper, silver, strontium, and vanadium. There were significantly elevated levels of iron, lead, manganese, potassium, sodium, and zinc.</p> <p>Radiological samples of Tank T-29 showed results for removable alpha and beta contamination on the base of the tank ranging from 2,970 to 6,020 dpm/100 cm² for alpha and less than 200 to 263 dpm/100 cm² for beta. The sides near the base of the tank had significantly lower removable activities.</p> <p>These data are available in the IA Data Summary Report (DOE 2000a).</p>
Eastern OPWL	000-121 Tank 31	000-2	<p>Tank 31 was reportedly located directly south of Building 990 at the end of P-39. The P-39 line ran into a manway northeast of Building 990 labeled P-39MWC. No evidence indicating the presence of Tank 31 has been found, including information contained in the OU 9 reports or in the building Reconnaissance Level Characterization Report (RLCR). However, there was a waste water holding basin adjacent to Building 990 may have been mistakenly associated with the OPWL system. When Building 990 and the waste water holding basin were excavated and removed, no evidence of any OPWL was found. In addition, field surveys conducted during the IHSS Group 000-2 field project did not locate this tank and associated OPWL from the north; therefore, it was concluded that these purported components of the OPWL system did not exist.</p>
700	IHSS 000-162 Radioactive Site 700 Area	000-2	<p>IHSS 162 is located along Eighth Street and extends from the southern end of Building 771 to the northern end of Building 850. Radiochemical activity was identified during groundwater monitoring activities in 1974. In response to this activity, Eighth Street was paved over to prevent mobilization of the affected material. In January 1981, an air sample collected during excavation activities at Eighth Street and Central Avenue yielded a long-lived alpha activity concentration, indicating the presence of residual activity in the area. Excavation crews were required to wet the surface soil prior to</p>

Area	IHSS/PAC	IHSS Group	Description
			<p>removal to reduce airborne dispersion of the soil (DOE 1992-2004).</p> <p>No releases occurring in IHSS 162 south of the 700 Area are documented. However, there are at least 10 other IHSSs involving radioactive waste overlapping or in close proximity to this IHSS. According to the HRR (DOE 1992a), it is possible that releases in the surrounding IHSSs may have affected this IHSS.</p> <p>HPGe survey data for locations in IHSS 162 did not indicate elevated activities in southern portions of the IHSS. HPGe survey data at northern locations indicated elevated activities for Th-232, uranium-238, americium-241, and plutonium-239/240. The proximity to Building 569 may have influenced the measurements.</p> <p>Twenty-three surface soil samples were collected in and around IHSS 162 as part of IA RFI/RIs. Organics, inorganics, and radionuclides were detected. These data are available in the IA Data Summary Report (DOE 2000a).</p>
100/400	PAC 100-602 Building 123 Process Waste Line Break	000-2	<p>On April 13, 1989, Valve Vault 17, a component of the NPWL system, located on Cottonwood Avenue between Buildings 443 and 444, was found flooded with approximately 1,200 gallons of aqueous waste. Subsequent investigation showed the source of the waste was a break in the process waste line in Manhole 1, south of Building 123. Leakage from the break had migrated into bedding material surrounding the pipe and ultimately reached Valve Vault 17 through either pipe bedding materials (that is, soil), or a PVC electrical conduit. The release also migrated into a section of the abandoned OPWL network (IHSS 121). Discharge of Building 123 process waste into the broken line was discontinued on April 18, 1989, five days after the release to Valve Vault 17 was first detected. The potentially affected area includes the process waste line between Manhole 2 and Valve Vault 18 (immediately south of Building 123), the process waste line between Valve Vaults 18 and 17, soil around Valve Vaults 18 and 17, and the OPWL between Manholes 2 and 3. In July 1989, groundwater containing blue dye, used several months earlier to trace the release, was observed seeping into excavations around Valve Vault 18. According to one report, the release may also have reached the storm sewer system (DOE 2001b).</p> <p>The release consisted of Building 123 process waste. Based on typical daily quantities of wastes discharged from Building 123, the following materials were likely released to the environment:</p> <ul style="list-style-type: none"> • 25 gallons urine; • 12.5 gallons nitric acid (HNO₃) (unknown concentration); • 20 gallons hydrochloric acid (HCl) (unknown concentration); • 1.5 pounds ammonium thiocyanate; • 1.0 pound ammonium iodide; and • 2.5 gallons ammonium hydroxide (unknown concentration). <p>The above materials would have been diluted in approximately 2,000 gallons of tap water. After process waste discharge to the broken line was discontinued, soil sampling was conducted to determine the source and extent of the release. A temporary aboveground line was installed, and a replacement underground line was planned for completion by June 1, 1989.</p> <p>Minor amounts of naturally occurring uranium were detected in soil and water samples collected after the release. Up to 140 picocuries per liter (pCi/L) alpha activity was recorded in samples of the waste from Valve Vault 17. One water sample from a manhole south of Building 123 also contained 8 percent ethylene glycol.</p> <p>Because the affected areas were near existing IHSSs scheduled for investigation and</p>

Area	IHSS/PAC	IHSS Group	Description
			remediation activities (see PAC 400-122 and PAC 100-148), no cleanup was initiated. The release was documented in RCRA Contingency Plan Implementation Report (CPIR) No. 89-003 and in Rocky Flats Plant Internal Investigation Report (IIR) No. 89-55.
700	IHSS 700-123.2 Valve Vault West of Building 707	000-2	<p>In December 1958, a leak occurred at an OPWL elbow in the valve vault located west of the present location of Building 707. Process waste followed the containment pipe and flowed into a ditch to the northeast of the present location of Building 707. Up to 4,050 gallons of process waste were released. Leaks occurred in the elbow connections of the OPWL due to joint expansion following the introduction of steam condensate from Building 881. The elbow was repaired and the line remained in use for another 10 years. In March 1973, this valve pit was replaced as part of an upgrade program for this section of the OPWL system. Interviewees for the Comprehensive Environmental Assessment and Response Program (CEARP) Report (DOE 1986) indicated that this vault overflowed a number of times prior to 1973.</p> <p>The liquid released contained uranium, solvents, oil, beryllium, HNO₃, HCl acids, and fluoride. A soil sample collected at the valve pit west of Building 707 in 1976 indicated 54 milligram per kilogram (mg/kg) nitrate and 0.145 dpm plutonium. No documentation was found that further details response to this occurrence or other occurrences at this location.</p>
700	IHSS 700-127 Low-Level Radioactive Waste Leak	000-2	<p>Persons interviewed for the CEARP recalled construction activities near Building 774 and west of Pond 207-C that resulted in breaking a low-level radioactive waste discharge line several times. This line carried liquids from the process waste treatment facility (Building 774) to the sanitary waste water treatment plant (Building 995).</p> <p>On October 14, 1957, a line that carried process waste between Building 774 and a 200,000-gallon waste holding tank (Tank 207) leaked at a joint. It was determined that the joint had not been properly packed during construction. The joint was repaired and the excavation backfilled by November 5, 1957. Another leak was detected in 1971 when the waste line between Building 774 and Building 995 was pressure tested. The liquid waste that flowed from Building 774 to Building 995 was high in nitrate and had small amounts of plutonium. In April 1982, the leaking section of line was replaced.</p> <p>The location of IHSS 127 defined in the Interagency Agreement (IAG) did not correspond with the location of any process waste lines located on RFETS utility drawings. The HRR indicates the location of the process waste line between Building 774 and Building 995 is approximately 70 ft west of the previously identified IAG location. It was proposed that the location of IHSS 127 be redefined to coincide with the location of the process waste-line discussed as PAC 700-127.</p>
700	IHSS 700-147.1 Process Waste Line Leaks	000-2	<p>On September 27, 1955, a possible leak in the OPWL north of Building 881 was reported. Approximately 1 ft of process waste water was present in a manhole. In June 1959, monitoring and environmental samples showed low-level contamination along the OPWL from Building 881 to Building 774. In February 1960, the OPWL from Building 881 ruptured, releasing waste in the construction area near Building 777. On October 27, 1964, there was a break in the OPWL from Building 881 to Building 774 and process waste water was pumped into a ditch around the parking lot. In October 1964, an excavation was made in the 776 parking lot. In November 1964, contaminated liquid wastes were released into the sanitary sewer due to breaks and leaks in the process waste line from Buildings 441, 444, 881, and 883.</p> <p>A May 1971 report stated that the transfer line from Building 444 and Building 881 to Building 774 had broken and leaked several times during the past 20 years. The leaks generally occurred east of Eighth Street and north of Central Avenue. The report</p>

Area	IHSS/PAC	IHSS Group	Description
			<p>states that nitrate migration in the soil from the leaking transfer line was traced by samples collected from shallow wells.</p> <p>Groundwater samples collected from monitoring wells located at various points east of where breaks had occurred indicated several hundred parts per million (ppm) nitrate. Typical constituents of waste discharged into the process waste system include uranium, plutonium, beryllium, acids, and solvents.</p>
700	IHSS 700-149.1 Effluent Line	000-1 000-2	<p>In 1972, two 1.5-inch polyvinyl chloride (PVC) pipes were installed to transfer wastes between Building 774 and the 207 SEP. These lines were abandoned in place in 1980 after the vapor compression evaporator in Building 374 was constructed.</p> <p>While still in use, sometime during June or July 1973, a contractor broke the plastic line that ran from the evaporation ponds to Building 774. Repairs were made and the water continued to be drawn to the ponds.</p> <p>In the late 1970s, an Original Process Waste Line (OPWL) break southeast of Building 774 resulted in a release of liquid that flowed around to the front of the building. Another, more detailed document reports that on July 21, 1980, an eight-year-old process waste line was discovered leaking southeast of Building 774. Process wastewater was observed seeping into the soil on the south side of the road southeast of Building 774. The leaking process wastewater flowed down slope, through a 30-ft culvert, along the east chainlink fence, and under the fence at the corner. From this point, the liquid flowed under the unpaved access road into a boggy area, the 771/774 Footing Drain Pond, north of Building 774 (PAC 700-1108). The vegetation in the boggy area was damaged where the spilled liquid formed a pool. It was estimated that approximately 1,000 gallons had leaked from the process waste line.</p> <p>The initial response to the July 1980 incident was to stop the flow through the waste line causing the leak to stop. When the soil dried, a Field Instrument for the Detection of Low-Energy Radiation (FIDLER) survey was conducted and verified that the flow did not go beyond the 771/774 Footing Drain Pond. On July 24, the broken waste line was excavated and the problem identified as a loose flange. Soil excavation began July 28, 1980; as soil was excavated, it was surveyed with radiation monitors.</p> <p>Low-level radioactive wastes containing caustics and acids were released to the environment. Analysis of the spilled water from the July 1980 incident indicated 2,500 picocuries per liter (pCi/L) total alpha activity, 4,000 pCi/L gross beta activity, 10,000 milligrams per liter (mg/L) nitrate, and a pH of 12. Other than repair of the pipeline in 1973, documentation was not found for any other response to the pipeline leak.</p> <p>IHSS 149.1 was characterized in accordance with IASAP #IA 02-07 (SEP) (DOE 2002a) and # IA-03-01 (700-4) (DOE 2003f). Two hundred and seventy feet of P-26 north of Pond 207A was removed. The remaining pipe ends in the SEP area were grouted (DOE 2003a).</p>

Area	IHSS/PAC	IHSS Group	Description
700	IHSS 101	000-1	<p>OPWL and valve pits were located in the SEP area. Most of the lines were installed in the 1950s and 1960s and included P-26, P-35, P-36, P-37, P-38, P-48, P-49, and P-50. It was noted that some of these lines (P-26, P-36, P-37, and P-38) leaked. IHSS 149.1 includes part of P-26.</p> <p>As described in the Closeout Report for IHSS Group 000-1 (DOE 2003a), OPWL within 3 feet of the surface were removed. This includes 270 feet of P-26 north of Pond 207A, approximately ten feet of P-36/P-37/P-38 southeast of Pond 207C and the valve pit, and approximately 100 feet of small OPWL segments through out the SEP area were removed. Remaining pipe ends were grouted.</p>
700	IHSS 149.1	000-1	<p>A 1.5-inch PVC pipe was installed in 1972 to transfer wastes between Building 774 and the 207 SEP. This line was abandoned in place in 1980 after the vapor compression evaporator in Building 374 was constructed. While in use, the plastic line that ran from the evaporation ponds to Building 774 was broken and repaired. In the late 1970s, an OPWL break southeast of Building 774 also resulted in a release of liquid that flowed around to the front of the building. On July 21, 1980, an OPWL were discovered leaking southeast of Building 774. It was estimated that approximately 1,000 gallons had leaked from the process waste line.</p> <p>IHSS 149.1 was characterized in accordance with IASAP #IA 02-07 (SEP) (DOE 2002a) and # IA-03-01 (700-4) (DOE 2003f). Two hundred and seventy feet of P-26 north of Pond 207A was removed. The remaining pipe ends in the SEP area were grouted (DOE 2003a).</p>
100/400	Tank 1	100-1	<p>Tank T-1 was located, along the southern side of Building 122 near the southeastern corner. Tank T-1 was an 800-gallon, stainless-steel underground tank that was installed in 1955 and then removed in January 1984. It held waste streams from Building 122, the Medical Facility, including wastes such as trace radionuclides and decontamination water with constituents such as bleach, soap, blood, and hydrogen peroxide. Efforts were made to locate Tank 1 as part of the UBC 122 characterization project, however it was confirmed that the tank had previously been removed (DOE 2004a).</p>
100/400	IHSS 148	100-4	<p>The eastern wing of Building 123 was encompassed by IHSS 148. OPWL beneath the building (P-1 and P-2) and associated sumps were in use from the start of operations in Building 123 until the OPWL were replaced by the NPWL.</p> <p>Building 123 was serviced by a 4-inch-diameter process waste line (P-1) buried beneath the north and east wings of the building. P-1 drained from west to east in the north wing, and from north to south in the east wing. A number of connections were made to the main pipe, some of which consisted of headers servicing process waste drains in the building. All OPWL and sumps were removed (DOE 2003c).</p>
100/400	PAC 100-611	100-4	<p>An inoperative pump in the Building 123 process waste transfer system caused the Building 123 scrubber system to overflow, spilling several hundred gallons of scrubbing solution into a bermed area outside of the building and into three pits beneath the floor of the building.</p> <p>The OPWL and Manhole 2 in PAC 100-611 were removed (DOE 2003c).</p>
100/400	Tank 4	400-3	<p>Tank 4 - OPWL Process Waste Pits were located in the southwestern portion of Building 447 which was demolished in 2004. Tank 4 and the process waste pits were removed.</p>
100/400	Tank 5	400-3	<p>Tank 5 - OPWL Process Waste Tanks were located in the northeastern portion of Building 444 and consisted of two tanks each with a volume of 4,000 gallons Tank 5 was installed in 1952 and was removed before Building 444 was demolished in 2005.</p>

Area	IHSS/PAC	IHSS Group	Description
100/400	Tank 6	400-3	Tank 6 - OPWL Process Waste Floor Sump and Foundation Drain Floor, was located in northeastern portion of Building 444. Tank 6 consisted of an OPWL floor sump, installed in 1953 and removed when Building 444 was demolished in 2005.
100/400	IHSS 122	400-8	<p>IHSS 122 partially underlies Building 441 and extends south of the building encompassing Tanks T-2 and T-3. Tanks T-2 and T-3 were two interconnected underground tanks south of Building 441. Both tanks were constructed of reinforced concrete and had a combined capacity of approximately 12,000 gallons (DOE 1996). The tanks were part of the OPWL system and were used to handle waste from Building 123, Building 441, and possibly Buildings 122 and 444. Tanks T-2 and T-3 were installed in 1952 and abandoned in June 1982 after reportedly being decontaminated, filled with gravel, and covered with concrete (DOE 2001b). Tanks 2 and 3 were removed in November and December 2003 (DOE 2004b). Both tanks had concrete covers. Tank T-3 had been previously pumped, cleaned of sludge, rinsed; and filled with polyurethane foam (DOE 1996).</p> <p>The northern tank, Tank T-2 (3,000 gallons), consisted of two chambers: a wet well for settling and a chamber containing a limestone bed for pH control. The limestone bed may be the source of references to the tanks being filled with gravel. Tank T-2 was wholly or partially beneath Building 441. Tank T-3 (9,000 gallons) was an underground holding tank with a cover consisting of three enclosed chambers that gave access to a control valve, the tank itself, and transfer pumps. Chamber access from the surface was through steel cover-plates. Tank T-3 was located underground directly outside the Building 441 footprint. Flow was from the (Tank T-2) wet well to the limestone bed and then to the (Tank T-3) holding tank. Because of the conversion of Building 441 to an office, waste was no longer generated from this source. However, the tanks may have received waste from Building 123 as late as June 1966.</p> <p>The tanks were originally installed 60 feet south of Building 441. In 1966, the Building 441 addition was constructed over approximately 7.5 feet of the northern part of the tank system (DOE 2001b). At this time, a footing wall was laid over Tank T-2 to accommodate construction.</p>
100/400	Tank 2	400-8	<p>See IHSS 122</p> <p>Tank 2 was removed in November and December 2003 (DOE 2004b).</p>
100/400	Tank 3	400-8	<p>See IHSS 122</p> <p>Tank 3 was removed in November and December 2003 (DOE 2004b). Tank T-3 had been previously pumped, cleaned of sludge, rinsed, and filled with polyurethane foam (DOE 1996).</p>
500	UBC 528	500-3	Building 528 housed two storage tanks (Tank 7) and that held process wastes from the Building 559 analytical laboratories and plenum deluge water from Building 561. The tanks were pumped to Building 374 for treatment. Wastes from Building 559 include wash water and expired reagents, such as ferric sulfate, HNO ₃ , and potassium hydroxide (KOH); aqueous standards from the laboratory sinks; a waste solution containing solvents and acids; and waste water from the decontamination room. Waste from occasional building cleanup, maintenance, and refurbishing activities was transported to Building 559 for eventual disposition (DOE 2001b). Building 528 and associated tanks were removed in 2005 (DOE 2005b).
500	IHSS 159	500-3	IHSS 159 was located directly east of Building 559. When Building 559 began operation in March 1968, the OPWL consisted of Pyrex glass lines beneath the building and adjacent support buildings. Less than 1 year later, a break was discovered in the process waste line from the building to the pump house. In May 1972, the southern half of the process waste line beneath Building 559 was discovered to be

Area	IHSS/PAC	IHSS Group	Description
			<p>leaking. Additionally, the rupture of the process waste line from Building 559 to the process waste tank valve pit resulted in soil contamination. Typically, process waste consists of an aqueous solution with radioactive constituents.</p> <p>In 1968 several hundred square feet of contaminated soil from over and around the process waste line to the process waste tank pit was removed. In 1972, a PVC pipe bypass of the Pyrex line beneath the south half of Building 559 was installed and the remaining lines were static leak-tested. In May 1972, 82 drums of contaminated soil were removed from over and around the process waste line from Building 559 to the process waste tank pit south of the building and disposed off site. The soil under the process waste line was not removed. Also in May 1972, the pit building was decontaminated.</p> <p>The OPWL P-17 and contaminated soil in IHSS 159 were removed in 2005 (DOE2005b).</p>
500	Tank 7	500-3	<p>Tank 7 was located within Building 528, which was referred to as the Building 559 Process Waste Pit, approximately 30 ft southeast of Building 559. Tank 7 consisted of two 2,000-gallon, in-sump steel tanks within an underground concrete vault. Tank 7 was reportedly installed in 1969 and received waste streams from Building 559, the Analytical Laboratory, including acids, bases, solvents, radionuclides, metals, pesticides, herbicides, and possibly PCBs. Building 528 and Tank 7 were removed in 2005 (DOE 2005b).</p>
500	Tanks 33, 34, and 35	500-3	<p>Based on field reconnaissance, it was concluded that these three tanks were a single tank located in the northwestern portion of Building 561. According to the Version 7.0 WSRIC Report, the function of the tank was to hold deluge water in case of a plenum fire in any of the four plenums housed in Building 561. Because this event did not occur, the tank was reportedly never used (DOE 2005b). These tanks were removed in 2005 (DOE 2005b).</p>
700	Tanks 11 and 30	700-2	<p>Tanks T-11 and T-30 were located on the eastern side of Building 707 in Building 731, which was referred to as the Building 707 Process Waste Pit. Tank T-11 was composed of two 2,000-gallon concrete tanks within Building 731. Tank T-30 consisted of a 23,111-gallon underground concrete structure and a 100-gallon concrete sump.</p> <p>Tanks T-11 and T-30 were installed in 1959. In 1975, the concrete tanks were partially removed. The concrete wall separating the two tanks was removed along with part of the concrete tank surface, and new concrete was poured into the old process waste tanks and the 100-gallon sump. Recently, the area of the old process waste tanks served as a secondary containment for the Building 707 process waste and plenum deluge tanks. Original waste streams for these tanks originated from Building 707, including solvents, radionuclides, metals, and other wastes. A 100-gallon steel tank was reportedly filled with Raschig rings and was used to contain fire deluge from Building 707 but did not reportedly receive process waste. The piping that connected with this tank was removed in 1975. Any leak from this tank would have flowed to the T-11 and T-30 tanks.</p> <p>Tanks 11 and 30 along with Building 731 were removed (DOE 2005c).</p>
700	UBC 707	700-2	<p>OPWL P-14, P-15, and P-19 were present within IHSS Group 700-2. Several small segments of P-19 were removed. All other OPWL were left in place. The ends of all OPWL lines were grouted (DOE 2005c).</p>

Area	IHSS/PAC	IHSS Group	Description
700	Tanks 9 and 10	700-3	<p>Tanks T-9 and T-10 (also known as Tanks 776A/776C and 776B/776D) were located in Building 730, which was referred to as the Building 776 Process Waste Pit. These tanks were approximately 50 ft north of Building 776 and approximately 30 ft east of Building 701. Tank T-9 consisted of one 22,500-gallon underground concrete tank and one 4,500 gallon concrete underground storage tank. Tank T-10 consisted of one 4,500-gallon concrete underground tank. The T-9 tanks were installed in 1955 and were taken out of service in October 1984, at which time both chambers were cleaned, painted, and converted to plenum deluge catch tanks. These tanks originally received laundry waste from Building 778. The T-10 tanks were installed in 1955 and were abandoned in December 1982; however, these tanks reportedly were not cleaned when abandoned. Tank T-10 received waste streams from Building 776, Production Support, and Building 778, the Laundry. Waste streams for both sets of tanks included radionuclides, solvents, metals, and limited amounts of machinery and lubricating oils. Both T-9 and T-10 were removed during demolition of Building 730.</p>
700	Tank 18		<p>The Tank 18 sump was located at the west end of Building 778 where the laundry was located (DOE 2005g). The laundry was added to the building when plutonium laundry operations were consolidated on site. Decontaminated respirators were also cleaned in Building 778. Laundry wastewater was sent to Building 774, and later to Building 374, via the tank sump. When the Site first began operations, laundry wastes were discharged directly to North Walnut Creek. It is not known whether the tank sump leaked. Tank 18 and the tank sump was removed prior to building demolition (DOE 2005h)</p>
700	IHSS 126.1 and 126.2		<p>The westernmost and easternmost out-of-service process waste tanks (Tank 8) were housed below grade in Building 728. Tank 8 was located in the 700 Area within Building 728, which was referred to as the Building 771 Process Waste Pit. It was located approximately 30 ft north of Building 771. Tank 8 was also referred to as the westernmost and easternmost out-of-service process waste tanks. Tank 8 was housed below grade in Building 728. Tank 8 consisted of two 25,000-gallon underground concrete tanks. For clarity, these two tanks were designated T-8 (west) and T-8 (east). The combined exterior tank dimensions were 33 ft 6 inches (east-west) by 23 ft 5 inches (north-south) and 11 ft 8 inches high. The ceiling and wall thickness was 10 inches and the floor thickness was 1 ft. The tanks shared the inner wall. The bottom elevation of the tanks' interior was at 5,931 ft. The tanks were designed with a minimum cover of 3 ft of fill except for the area overlain by the building. The original design indicated that two pipes enter each tank from the south. The invert elevations of the pipes where they entered the tanks were 5,939 and 5,938 ft. The tanks had stored laundry water from the Building 771 laundry facility which ceased operations in the late 1950s.</p> <p>The pump house (Building 728) was a concrete structure situated directly above the tanks with dimensions of 14 ft 10 inches (east-west) by 7 ft 10 inches (north-south) and 7 ft 6 inches high. The south wall of the pump house was above the south wall of the tanks and contained manholes for access into the tanks and one sump pump for each tank as well as one sampling point into each tank. The pump house was partially underground so it did not appear as large as its dimensions indicate. Liquid process wastes that likely contained nitrate, plutonium, uranium, and various other organic and inorganic constituents were released to the environment.</p> <p>Building 728 and Tank 8 were removed in 2004.</p>
700	Tank 8	700-4	<p>Tank 8 was located in the 700 Area within Building 728, which was referred to as the Building 771 Process Waste Pit. It was located approximately 30 ft north of Building 771. Tank 8 was also referred to as the westernmost and easternmost out-of-service process waste tanks. Tank 8 was housed below grade in Building 728. Tank 8</p>

Area	IHSS/PAC	IHSS Group	Description
			<p>consisted of two 25,000-gallon underground concrete tanks. For clarity, these two tanks were designated T-8 (west) and T-8 (east). The combined exterior tank dimensions were 33 ft 6 inches (east-west) by 23 ft 5 inches (north-south) and 11 ft 8 inches high. The ceiling and wall thickness was 10 inches and the floor thickness was 1 ft. The tanks shared the inner wall. The bottom elevation of the tanks' interior was at 5,931 ft. The tanks were designed with a minimum cover of 3 ft of fill except for the area overlain by the building. The original design indicated that two pipes enter each tank from the south. The invert elevations of the pipes where they entered the tanks were 5,939 and 5,938 ft. The tanks had stored laundry water from the Building 771 laundry facility which ceased operations in the late 1950s.</p> <p>These two tanks were installed in 1952 and were reportedly taken out of service in May 1984, cleaned, painted, and converted to plenum deluge catch tanks for fire water from Building 771. The tanks originally received waste streams from Building 771, the plutonium and uranium Recovery Building, including radionuclides, acids, bases, solvents, metals, fuel oil, lubricating oil, PCBs, and photography laboratory wastes. Building 728 and Tank 8 was removed in 2004 (DOE 2005h).</p>
700	Tank 12	700-4	<p>Tank 12 was located at the northeastern corner of Building 771 at the northern end of OPWL P-22. Tank 12 consisted of two abandoned 20,000-gallon underground concrete tanks. Tank 12 was removed in 2004. (DOE 2005h).</p>
700	Tank 13	700-4	<p>Tank 13 was a 600 gallon abandoned sump located in Building 774. The sump was abandoned in 1972. The sump was removed in 2004 (DOE 2005h).</p>
700	Tanks 14 and 16	700-4	<p>Tanks T-14 and T-16 were located in the 700 Area on the eastern side of Building 774 underlying a chemical storage shed. Tank T-14, which was designated by RFETS as Tank 68, was a 30,000-gallon concrete underground tank. Tank T-16 consists of two 14,000-gallon concrete underground tanks underlying the chemical storage shed to the north of Tank T-14. The northernmost T-16 tank, which was referred to as T-16 (north), is designated by RFETS as Tank 66, while the other T-16 tank, which was referred to as T-16 (south), was designated by RFETS as Tank 67.</p> <p>These tanks were installed in 1952 and were reportedly abandoned in November 1989. The HRR (DOE 1992a) indicates that the tanks were to be closed in compliance with RCRA closure requirements, although confirmation of this is unavailable. These tanks were reportedly removed from the list of RCRA-permitted or RCRA interim status tanks before closure was conducted and were then transferred to OU 9. The tanks received waste streams from Building 774, the Process Waste Treatment Facility, including acids, bases, radionuclides, metals, and other wastes from RFETS processes. Releases from the tanks were documented, specifically from tank overflows in 1980 and 1981(DOE 1992a). The tanks and underlying contaminated soil were removed in 2003 (DOE 2004d). These tanks are also considered IHSSs 124.1, 124.2, and 124.3.</p>
700	IHSSs 124.1, 124.2 and 124.3		<p>IHSS 124.1 included Tank 68, a 30,000-gallon concrete underground tank. IHSS 124.2 consisted of Tank 66 a 14,000 gallon concrete underground tank, and IHSS 124.3 consisted of Tank 67 a 14,000 gallon concrete underground tank.</p> <p>These tanks were installed in 1952 and were reportedly abandoned in November 1989. The HRR (DOE 1992a) indicates that the tanks were to be closed in compliance with RCRA closure requirements, although confirmation of this is unavailable. These tanks were reportedly removed from the list of RCRA-permitted or RCRA interim status tanks before closure was conducted and were then transferred to OU 9. The tanks received waste streams from Building 774, the Process Waste Treatment Facility, including acids, bases, radionuclides, metals, and other wastes from RFETS processes. Releases from the tanks were documented, specifically from tank overflows in 1980 and 1981(DOE 1992a). The tanks and underlying contaminated soil were removed in</p>

Area	IHSS/PAC	IHSS Group	Description
			2003 (DOE 2004d).
700	Tank 15	700-4	Tank 15 consisted of two 7,500-Gallon Process Waste Tanks also referred to as 34W and 34E. Tank 15 was located in the southern portion of Building 774 and was reportedly used for americium solutions. The tanks were removed in 1974 when an addition was added to Building 774.
700	Tank 17	700-4	Tank 17 consisted of four concrete process waste tanks also referred to as 30, 31, 32, and 33. Tank 17 was located in the southern portion of Building 774 and was reportedly used for americium solutions. The tanks were removed in 1974 when an addition was added to Building 774.
700	Tank 36	700-4	Tank 36 was a steel carbon tetrachloride sump located in the western portion of Building 774. The sump was at a depth greater than 3.5 feet. The steel insert was removed, the sump was decontaminated, left in place, and backfilled.
700	Tank 37	700-4	Tank 37 was a steel-lined concrete sump located in the western portion of Building 774. The sump was at a depth greater than 3.5 feet. The steel insert was removed, the sump was decontaminated, left in place, and backfilled.
700	IHSSs 146.1 through 146.6	700-4	<p>Six underground process waste holding tanks were located south of the original Building 774. Building 774, a liquid waste processing facility, was modified several times since its construction in 1952. During the construction of a southern addition in 1972, the tanks were removed.</p> <p>PAC 700-146 represents a six-chambered reinforced concrete structure south of Building 774. The chambers of the structure were referred to as Tanks 30, 31, 32, 33, 34W, and 34E. Tanks 30 and 33 had a 3,000-gallon capacity. The others had a 6,000-gallon capacity. It is unclear when they were first placed into service. Liquid waste was transferred to or from the tanks through OPWL. The area occupied by the tanks was 22.5 ft (east-west) by 32.5 ft (north-south). The walls of the tanks were 11 ft 8 inches high and the floor of the tanks was at the same approximate height as the second floor of Building 774. Ground elevation to the south of the tanks was approximately 5,965 ft. The ground surface south of Building 774 sloped steeply to the north and levels out near the top of the tanks. The process waste stored in the tanks was an aqueous solution with plutonium, uranium, acids, and caustics.</p>
700	Tanks 19 and 20	700-7	Tanks 19, and 20 were located within the Building 779 subbasement and were believed to constitute two of four subbasement pits that contained process tanks (1A, 2A, 2B, and the T5 tank pit) (DOE 2004e). The process tanks were removed just prior to the FY00 building demolition (DOE 2000b). Inspection of the sub-basement during the IHSS Group 700-7 accelerated action confirmed no stand-alone tanks were present (DOE 2004e). Tank 19 consisted of two 1,000-gallon concrete sumps and Tank 20 consisted of two 8,000 gallon concrete sumps. Tanks 19 and 20 sumps were flow filled when the basement was flow filled and left in place.
700	Tank 38	700-7	Tank 38, a 1,000 gallon steel tank, was located within the Building 779 Tank 38 was one of several tanks located within the Building 779 concrete subbasement. The tank was removed just prior to the FY00 building demolition (DOE 2000b). Inspection of the sub-basement during the IHSS Group 700-7 accelerated action confirmed no tanks were present (DOE 2004e).
800	PAC 800-1204	800-1	PAC 1204 was located to the west and north of Building 865. PAC 1204 included Building 866 which held five process waste tanks that serviced Buildings 865 and 889. The tanks in Building 866 were closed pursuant to RCRA and removed prior to building demolition, which occurred during 2003 (DOE 2004f).
800	Tank 23	800-1	Tank 23 was located in Building 865 was a 6,000-gallon concrete tank. The tank in Building 865 was removed prior to building demolition, which occurred during 2003

Area	IHSS/PAC	IHSS Group	Description
			(DOE 2004f). All OPWL were removed from beneath the building.
800	Tank 24 and Tank 32	800-2	Tank-24 and Tank-32 were located in Building 887 and the Building 881 Process Waste Pit. Tank T-32 was a 131,160-gallon concrete vault underlying Building 887 and served as secondary containment for the seven 2,700-gallon aboveground tanks (T-24 was one of the seven ASTs). Tanks T-24 and T-32 were installed in 1952 and received waste streams from Building 881, including radionuclides, solvents, metals, acids, bases, oils, and PCBs. Process waste from these tanks and tank pit was pumped uphill through P54. Tanks 24 and 32 as well as the OPWL north of these tanks were removed.
800	Tank 39	800-2	Tank 39 consisted of four 250-gallon steel process waste tanks located in Building 881. The tanks were reportedly removed in 1972.
800	Tanks 25 and 26	800-3	Tank 25 consisted of three 750-gallon steel tanks (also referred to as Tanks 18, 19) and Tank 26 consisted of three 750-gallon steel tanks (also referred to as Tanks 24, 25, 26) located in Building 883. These tanks had been removed prior to building demolition (DOE 2005e).
800	UBC 886	800-4	<p>Building 886 contained several OPWL components, including Building 828, a below-grade concrete vault containing a sump, process waste tanks, and associated process waste lines. Tank T-21 was a 250-gallon floor sump located in the southeastern corner of the vault. Tank T-22 consisted of two, 250-gallon stainless steel tanks located on the floor of the vault. Tank T-27 was a 500-gallon portable tank that was located on a concrete pad north of Building 828. This tank was used to transfer process waste from Tanks T-21 and T-22 to the Site waste treatment facility.</p> <p>Tanks T-21 and T-22 were installed in 1963 and abandoned in 1978. It is unknown when Tank T-27 was installed. Tank T-22 held waste from the laboratories in Building 886, including radionuclides, laboratory soaps, janitorial cleaning fluids, and possible nitrates. Tank T-21 captured overflow from T-22.</p> <p>Tanks 21 and 22 were removed along with Building 828 and the associated OPWL in accordance with the IM/IRA Action Plan for the Building 886 Cluster (DOE 2003o). Tank 27 was decontaminated and removed in 1989 (DOE 2003o).</p>
800	Tank 21 and Tank 22	800-6	<p>Tank T-21 was a 250-gallon floor sump located in the southeastern corner of the vault. Tank T-22 consisted of two, 250-gallon stainless steel tanks located on the floor of the vault. Tanks T-21 and T-22 were installed in 1963 and abandoned in 1978. Tank T-22 held waste from the laboratories in Building 886, including radionuclides, laboratory soaps, janitorial cleaning fluids, and possible nitrates. Tank T-21 captured overflow from T-22.</p> <p>Tanks 21 and 22 were removed along with Building 828 and the associated OPWL in accordance with the IM/IRA Action Plan for the Building 886 Cluster (DOE 2003o).</p>
800	Tank 27	800-4	Tank T-27 was a 500-gallon portable tank that was located on a concrete pad north of Building 828. This tank was used to transfer process waste from Tanks T-21 and T-22 to the Site waste treatment facility. It is unknown when Tank T-27 was installed. Tank 27 was decontaminated and removed in 1989 (DOE 2003o).
800	UBC 887	800-5	Building 887 housed process waste and sanitary waste holding tanks. Tank-24 and Tank-32 were located in Building 887 and the Building 881 Process Waste Pit. Tank T-32 was a 131,160-gallon concrete vault underlying Building 887 and served as secondary containment for the seven 2,700-gallon aboveground tanks (T-24 was one of the seven ASTs). Tanks T-24 and T-32 were installed in 1952 and received waste streams from Building 881, including radionuclides, solvents, metals, acids, bases, oils, and PCBs. Process waste from these tanks and tank pit was pumped uphill through P54. Tanks 24 and 32 as well as the OPWL north of these tanks were removed.

Area	IHSS/PAC	IHSS Group	Description
800	Tank 28	800-6	Tank 28 consisted of two 1,000-gallon concrete sumps located in Building 889. During Building 889 demolition, these sumps were removed, sprayed with Instacote™ and disposed of (DOE 2003p). Additionally, the portion of OPWL P-10 under the Building 889 slab was removed. The remaining end was filled with grout (DOE 2003p).
800	Tank 40	800-6	Tank T-40 was located west of Building 889. Tank T-40 was reportedly installed in the mid-1950s and was abandoned in 1981 or 1982. The tank consisted of two 400-gallon underground concrete tanks underlying a concrete vault approximately 7 ft deep. The two tanks were emptied, rinsed, and foamed in 1996. Tank 40 and the associated sump were removed in 2002 sprayed with Instacote™ and disposed of (DOE 2003p).
Eastern OPWL	IHSS Group NE-1	NE-1	The "Pond B-1 Dam Hot Spot" was located on the eastern side of the dam near the OPWL discharge point into Pond B-2. The OPWL has been removed from this area.

1.2 Accelerated Action

Based on historical information, anions/cations, glycol, herbicides, metals, PCBs, pesticides, radionuclides, sulfides, SVOCs, and VOCs were identified as potential contaminants of concern (PCOCs) in IHSS Group 000-2 soil and were the focus of accelerated actions conducted under IASAP Addendum #IA-03-11 (DOE 2003q) and other IASAP addenda (Table 1).

The sampling design specified in IASAP Addendum #IA-03-11 (DOE 2003q) and other addenda (Table 1) was based on RFCA Attachment 14 (DOE et al. 2003) and included the following elements:

- Soil associated with OPWL between 3 and 6 feet below the surface in areas with reported leaks will be characterized to 8 feet below the surface in accordance with the IASAP (DOE 2001b) at the leak location;
- If initial characterization results indicate soil activity is greater than 3 nanocuries per gram (nCi/g), additional sampling will be conducted as follows:
 - At locations perpendicular to the pipe run and 2 meters from the original sampling location;
 - At locations between 5 and 10 meters on either side of the original sampling location; and
 - At locations to adequately characterize soil to implement the SSRS (RFCA Attachment 5 [DOE et al. 2003]) based on step-out sampling.
- Soil associated with OPWLs will be characterized in accordance with the IASAP (DOE 2001b).

Based on the consultative process several sampling locations that targeted OPWL were sampled at deeper intervals, as necessary.

The known and suspected leak locations described in RFCA Attachment 14 and the ER RSOP Notification #03-14 (DOE 2003s) are shown on Figure 2. Known and suspected

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