7.0 OPERATIONAL HISTORY OF BUILDING 707

7.1 INTRODUCTION

Construction of Building 707 began in 1967 to support production of the Part V weapons design that could not be fully accommodated by existing capabilities in Building 776/777. However, as a result of the 1969 fire in Building 776/777, Building 707 acquired additional plutonium foundry, casting and machining functions that were moved from Building 776/777 (ChemRisk, 1992; EG&G, 1992). Further, an addition to Building 707 (referred to as Building 707A or the Building 707 Annex) was constructed to accommodate all of the Building 776/777 operations that needed to be moved to Building 707 (EG&G, 1990).

Plutonium manufacturing operations began on May 25, 1970 (Buffer, 1993). Between 1970 and 1989, Building 707 provided metallurgical support for plutonium and was involved in final product assembly. Plutonium metal was first cast into ingots in the foundry. The ingots were then rolled and formed prior to being machined, cleaned and assembled in various areas within the building. Upon completion of Building 707, the majority of plutonium pit assembly operations were moved from Building 777 (ChemRisk, 1992; Dingman, 1994). Operations involving radioactive and fissile material (except storage facilities and limited laboratory activities) were discontinued in November 1989 (EG&G, 1992). As of 1992, certain non-production operations had resumed in Building 707, but no future weapons production is anticipated (EG&G, 1994; EG&G, 1992).

7.2 HISTORICAL TIMELINE

1967	Construction of Building 707 began (EG&G, 1992).
1970	The first plutonium operations in Building 707 began on May 25 (Buffer, 1993). Operations focused on casting and fabrication of plutonium components and final assembly of the plutonium pit.
1971	The Building 707 Annex (sometimes referred to as Building 707A) was constructed to accommodate operations moved from Building 777 as a result of the 1969 fire (EG&G, 1990).
1971	The X-Y retriever used for handling and storing plutonium began operation in the spring (Buffer, 1993).
1989	Operations (production and assembly) involving radioactive materials ceased in November (EG&G, 1992).
1992	Operations including thermal stabilization of residue materials, removal of oxides and packaging for storage began.

7.3 PHYSICAL BUILDING DESCRIPTION

The building is located in the north-central section of Rocky Flats Plant (RFP), within the Protected Area (PA) and just south of Building 776/777 (Figure 7-1). Building 707 is a two-story building with a single-story section on the east side. The two-story portion is 74,240 square feet per floor while the single-story section is 18,560 square feet. There is a small basement under Module C with an area of 1,000 square feet. The 707 Annex is a two-story free-standing structure with 13,100 square feet per floor (EG&G, 1992).

The main floor of the building is compartmentalized into eight modules (Modules A through H) which contain one or more of the primary production operations. There are two additional modules referred to as Modules J and K within the 707 Annex. During its years of operation, no significant changes were made to the building design (Slaybaugh, 1991).

Air filtration, ventilation and dehumidification are provided to the modules and gloveboxes by utilities equipment located on the second floor of Buildings 707 and 708. There are two inert atmosphere systems for special enclosures within Building 707. These systems maintain a dry, inert atmosphere of nitrogen and less than 5 percent oxygen. System 1 provides the atmosphere within the gloveboxes in Modules A, B, and C while system 2 provides the same function for equipment in Modules J and K and the storage area in Module K. Each system includes four-stage HEPA filter exhaust plenum with a standby filter interconnected to the two (EG&G, 1990).

The air pressure in the building becomes progressively more negative from office areas to production areas and to gloveboxes. This provides contamination control by directing air flow through designated emission control devices. The building is equipped with airlocks which

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separate plutonium production and handling areas (the modules) from office and general support areas. Air exhausted to the outside is first drawn into nine plenums by 18 parallel-mounted fans (EG&G, 1990). The Building 707 exhaust stacks are equipped with 4-stage HEPA filter plenums (Slaybaugh, 1991; Koffer, 1994).

7.4 DESCRIPTION OF OPERATIONS

Operations in Building 707 can be divided into two categories: (1) plutonium fabrication operations which occurred between 1970 and 1989, and (2) recent operations since production curtailment in 1989.

7.4.1 PLUTONIUM FABRICATION OPERATIONS (1970-1989)

Construction of Building 707 began in 1967 with plutonium operations actually commencing on May 25, 1970 (Buffer, 1993). The building was originally intended to support production of the Part V plutonium weapon design but took over many of the Part IV operations from Building 776/777 after the 1969 fire. When operations were moved from Building 777, they were not changed significantly. Detailed descriptions of the casting, fabrication and assembly process operations are described in the following sections.

7.4.1.1 CASTING OPERATIONS

In general, casting operations focused on production of feed ingots and production ingots. Feed ingots were produced by blending plutonium from various sources including scrap, briquettes, buttons from the Building 771 recovery operations, and/or rejected parts. A portion of the feed ingot was then tested for purity in Building 559 and its composition catalogued. Final gallium-stabilized War Reserve ingots were then produced by blending feed ingots of known purity and composition (Dingman, 1994). Most of the casting occurred in Rooms 145 in Module K and Room 140 in Module J, although some also took place in Room 100 of Module A. Differences in the processes employed in each module are described below.

7.4.1.1.1 Module K Casting

In the Module K casting process, metal was weighed, placed into tantalum crucibles and melted in the casting furnaces. Molten metal was poured into erbium oxide coated stainless steel molds to form ingots. Although four furnaces were present in Module K (Lombardi, 1994), only two furnaces were used during routine operations for casting (EG&G, 1990). Rejected ingots from casting in Modules A, J and K were cut with a shear press within a glovebox and returned to the X-Y Retriever for storage (EG&G, 1990).

During routine operations, carbon tetrachloride was used at an approximate rate of one gallon per month for cleaning inside the gloveboxes. During inventories, an estimated 40 gallons of carbon tetrachloride were used to clean the gloveboxes and shuttle area to the X-Y Retriever. There were generally six inventories per year (EG&G, 1990).

Another significant use of chemicals occurred during testing of the tantalum crucibles for cracks and leaks. In this operation, any suspect crucible was filled with freon (compound unspecified) and the crucible was inspected for leakage. This method of testing was discontinued in the mid-1980s due to problems encountered with de-halogenation of the freon (Lombardi, 1994).

7.4.1.1.2 Module J Casting Operations

The casting operation in Module J differed from that in Modules A and K in that the starting materials included plutonium buttons, plutonium scrap such as machine turnings, briquettes and scrap from the rolling and forming operations, as well as plutonium feed ingots. Most of the gloveboxes in Module J contained casting furnaces, although only four were generally used during routine operations (EG&G, 1990).

Plutonium was placed inside tantalum crucibles and heated inside the furnace vessel. The bottom-pour furnaces used reusable tantalum rods to release the molten metal into stainless steel molds. The tilt-pour furnaces used reusable tantalum funnels to divert the molten metal into graphite molds. The molds were used until their coatings were worn off and then were discarded. Carbon tetrachloride was used to clean the gloveboxes (EG&G, 1990).

Other gloveboxes were used for sampling ingots, cleaning graphite and steel molds and for plutonium oxidation. Carbon tetrachloride usage for Module J operations was estimated to be the same as for the previously described Module K operations (EG&G, 1990).

7.4.1.1.3 Module A Casting Operations

Limited casting of plutonium into feed or production ingots took place in the furnaces located in Room 100 (EG&G, 1990; EG&G, 1994; Dingman, 1994). Graphite molds, delivered from the Building 444 carbon shop, were prepared in a fume hood with a spray application coating of a water-based calcium fluoride solution (Lombardi, 1994). The ingots were placed in tantalum crucibles and melted in one of four electric induction furnaces. The metal was poured through a funnel into the graphite molds which were then allowed to cool. Crucibles and funnels were scraped clean and reused until worn. Graphite molds were recoated with calcium fluoride and reused (EG&G, 1990).

During routine operations, approximately one gallon per month of carbon tetrachloride was used to clean the interior glovebox walls. However, during each of six annual inventories, approximately 40 gallons of carbon tetrachloride were used to thoroughly clean the furnaces. Use of freon for leak testing of tantalum crucibles also occurred until the mid-1980s (Lombardi, 1994).

7.4.1.2 FABRICATION OPERATIONS

After casting, the molded parts underwent a series of fabrication steps to produce the required final shape. These included rolling, forming, thermal treatment, and final machining.

7.4.1.2.1 Rolling, Forming and Thermal Treatment

Rolling, forming and thermal treatment of plutonium production ingots occurred in Module B. Production ingots were rolled until a specified thickness was obtained. Oil was used in rolling, and rags and carbon tetrachloride were used to clean the rollers. The rolled ingots were moved to another glovebox where shapes were cut out of the sheet in a blanking press. Scraps left from cutting were cut into smaller pieces in the same glovebox, placed in a container and sent to the briquetting process in Module C. The cut blanks were sent to adjacent gloveboxes for thermal treatment (annealing and homogenizing). Following thermal treatment, the blanks were formed into hemishells in a hydroform press. Oil was used as a lubricant to facilitate forming (EG&G, 1990; Dingman, 1994).

After forming, the parts were annealed, cleaned and measured on a density balance. Cleaning took place using carbon tetrachloride in a small bath tank (Lombardi, 1994). Carbon tetrachloride was used at a rate of approximately three gallons per day (EG&G, 1990). The density balance consisted of a 55-gallon drum filled with Freon 113, which was used due to its density and thermal characteristics (Lombardi, 1994). A percentage of the parts were selected for further quality assurance evaluation (EG&G, 1990).

7.4.1.2.2 Final Machining Operations

Module C performed final machining operations on the bulk of plutonium parts used for weapons production. The various gloveboxes within Module C contained lathes, mills, a drillbox and a high-precision drill press. Machining operations used cutting oil (the long straight chain hydrocarbon, Texaco 634 (Lombardi, 1994)) as a coolant which was pumped into a tank adjacent to each machine. The oil was then pumped through a filter, used to cool the cutting process equipment, and recycled to the tank. Spent oil was pumped from the tank, through two filters, and to the C-pit. Machining generated plutonium fines and chips were collected in cans at each machine (EG&G, 1990).

After machining, parts were weighed in a density balance. The density balance measured the density of a part by reference to the density of Freon 113. Parts were suspended while a 15-gallon tank filled with Freon 113 was lifted until the parts were submerged. The parts were then allowed to drip and dry by evaporation (EG&G, 1990). The Freon 113 tank was changed out every two months or when the Freon 113 became visibly dirty. Approximately 1.5 gallons per day of make-up Freon 113 were added to the tank to compensate for evaporative losses (EG&G, 1990).

After the part was machined, carbon tetrachloride was spray applied to remove gross quantities of machine oil from the part, the drill chuck and gloves. Additional degreasing of the part was performed with a spray of fresh solvent prior to placing the part on the carrier for transfer (Hobbs and Swan, 1983). Carbon tetrachloride was also used to clean the gloveboxes during inventories. The oil sumps were emptied and the glovebox interiors washed to remove remaining oil and residual chips (Hobbs and Swan, 1983).

The solvent cleaning operations drained into an oil sump and thus became intermingled with the used coolant oil. This intermingled waste stream was pumped from the tank, through two filters for removal of plutonium fines, and then to the C Pit for disposal (Lombardi, 1994). The used oil filters were changed during inventories. An estimated 3,400 gallons per year of carbon tetrachloride were used in the machining operations (EG&G, 1990). The plutonium fines were periodically collected and sent to the oxidation process. Larger turnings from the machining operations were cleaned and sent to briquetting (Dingman, 1994).

7.4.1.3 ASSEMBLY

Machined parts went through a series of cleaning and assembly steps to produce the final plutonium pit. The steps varied depending on the design of the pit (i.e., whether it was a Part IV or Part V design) but were usually iterative. Some of the parts received from other buildings on plant site required cleaning prior to being incorporated into the pit assembly. As examples, beryllium parts from Building 444 were coated and therefore did not require cleaning. Vanadium parts, however, were uncoated and had to be cleaned in Building 707 (Dingman, 1994).

Pre-Assembly Cleaning Operations. In Module D, plutonium parts were inspected and marked with a serial number prior to cleaning in an ultrasonic cleaner. Trichloroethylene (TCE) was used for cleaning up until about 1972, at which time RFP switched to trichloroethane (TCA) (Dingman, 1991; Hornbacher, 1994). Parts were also cleaned in Module E using a vapor-degreaser-ultrasonic cleaner combination and a single ultrasonic cleaner (EG&G, 1990; Hobbs, 1970). After cleaning, the parts were wrapped in aluminum foil (EG&G, 1990).

In both the ultrasonic and vapor wash tanks, the TCA was changed based on weekly sample results that indicated the solvent contained too much plutonium or water. Ful-Flo filters purified the spent TCA discharged from the wash basins before being piped to a sump tank (V-100) in the C-Pit. When this tank was full, the contents were pumped to a tank in Building 777 and then piped to Building 774 for waste treatment (EG&G, 1990).

Subassembly of Plutonium Parts. Plutonium parts were welded with electron beam welders in gloveboxes housed in Module E. The area to be welded was first treated with Scotch-brite and cleaned with TCA. The welders used machine oil, which was changed periodically and discarded. The parts were then checked for leaks in a procedure using liquid nitrogen. The parts underwent the same three steps again (i.e., washing, welding and leak detection). Parts were also repeatedly wire brushed to remove oxides (EG&G, 1990; Dingman, 1994).

Outershell Assembly. Rooms 125 and 125A in Module F were used for the assembly "Superdry" process in which an outer metal casing was welded onto the plutonium subassembly using a pigma or electron beam welder. Aluminum foil wrapped plutonium parts were unwrapped and cleaned using wipes and TCA or sometimes ethyl alcohol (Crisler and Dingman, 1991; EG&G, 1990). The parts were assembled, welded and sent for acceptance testing. TCA and ethyl alcohol were used at rates of approximately one gallon per month and one-half gallon per month, respectively (EG&G, 1990). Some parts were sent on to Room 126 in Module F to have the interior evacuated on a vacuum pump-down table. This evacuation process occurred repeatedly after various steps (Dingman, 1994).

Electron Bombardment Brazing. Brazing was a process in which two metals were joined using a nonferrous alloy that melted at a lower temperature than the metals being joined. An electrical filament, connected to a high-voltage power source, was used to melt the alloy. Plutonium parts encased in other metals were brazed in a glass bell jar in Room 130 of Module G. Prior to brazing, parts were cleaned with acetone. Estimates of acetone use rates were one-half gallon three gallons per year (EG&G, 1990; Crisler and Dingman, 1993; Dingman, 1994).

During brazing, waste material was deposited on the walls of the bell jar and a metal cleaner was used with an abrasive pad to clean the jar. Bell jars were cleaned a final time using Kimwipes and acetone or TCA. These materials were mixed with floor-dry for disposal (EG&G, 1990).

High Pressure Assembly. Module H included a high pressure assembly process where parts comprised of various metals including beryllium, plutonium and uranium were bonded together as part of the Part V weapon design (Dingman, 1994). The component was then cleaned in Module H with TCA and cheesecloth (EG&G, 1990; Mahaffey, 1993).

7.4.1.4 DISASSEMBLY

Rejected aluminum, stainless steel and beryllium parts were disassembled in Module G using machining operations (EG&G, 1990; Dingman, 1994). The process used two lathes inside "B-boxes" (similar to lab hoods) and a milling machine. Light oil was used for equipment lubrication. Small amounts of Freon 113 and distilled water were used for cooling and lubrication during machining of the beryllium parts. Approximately one gallon of Freon 113 was used per year (EG&G, 1990).

7.4.1.5 INSPECTION AND TESTING

Parts were tested and inspected after each operation. The following subprocess related to checking the integrity of welding complemented the welding and cleaning steps:

Radiography - Module E. Radiography involved the x-ray examination of plutonium parts to identify structural flaws. Parts were transferred to a glovebox in Room 167 of Module E and then transferred to Room 169, where they were x-rayed. Room 173 was the darkroom for x-ray image development for this process. When plutonium operations ceased, the used fixer was being sent to Building 774 for silver recovery. The used developer was washed down the process drain, pumped to Room 173, and then pumped to Building 374 for treatment. Radiography also used several other rooms for storage of drums and radiographic film (EG&G, 1990). Approximately 20 gallons of the fixer solution were used per week. TCA was also used in this process at a rate of 2 gallons per year (EG&G, 1990).

Eddy Current Testing - Module E. Eddy current testing on plutonium parts was conducted in Module E to check the depth of weld penetration. Approximately 2 gallons of TCA were used per year to clean the gloveboxes during inventories (EG&G, 1990).

Weld Scanners and Fluorescent Penetrant Operations. These operations, housed in Module E, used an ultrasonic scanner, a weld scanner and a fluorescent penetration station for qualifying welds, although the weld scanner was not typically used. The penetrant station was located under a hood and was used to detect minute cracks or voids in parts. Following application of the dye to a part, it was allowed to sit for ten minutes before being cleaned with TCA. TCA was used at a rate of approximately 40 gallons per year (EG&G, 1990).

Leak Testing. Leak testing was conducted on stainless steel and beryllium parts in Room 126 of Module F (EG&G, 1990; Mahaffey, 1993; Dingman, 1994). Each part was placed on one of ten pump-down tables and a vacuum was exerted on the part to check for leaks and to remove any moisture. Electro-etch was used to mark any pits or imperfections in the part. Electro-etch was the only chemical used in this process (EG&G, 1990).

Ultrasonic Scanning, Weld Scanning, and Fluorescent Dye Penetration. Ultrasonic scanning, weld scanning and fluorescent dye penetration also took place in Module G as quality control measures for detection of flaws in plutonium parts. An ultrasonic scanner was used to take readings on a part immersed in deionized water. Spent water was pumped to process waste. Fluorescent dye was applied to the part and the part was then cleaned with TCA and viewed under a black light. An estimated two gallons per month of acetone and TCA were used. Developer was also used in this process (EG&G, 1990).

Pressure testing. Pressure testing occurred in Room 131B of Module G to test the integrity of the interior of various assemblies (Dingman, 1994). The parts were tested using high purity helium as an inert pressurization gas. Following testing, the gas was recycled and the parts were sent to material analysis or back to assembly. The gas compressors used oil as a lubricant. The oil was stored in tanks near the compressors. Potassium hydroxide was also used in the compressors and was collected in an adjacent caustic storage cabinet. TCA was used infrequently at a rate of less than one-half gallon per year (EG&G, 1990).

Destructive Testing. Destructive testing of parts occurred in Module A. Parts and metal were weighed in a glovebox while coring on a variety of metal parts, including plutonium and beryllium, was performed in another. All lathing and milling functions, both of which used Freon 113 and oil, were performed inside gloveboxes. It was estimated that less than one gallon of Freon 113 was used per week (EG&G, 1990; Mahaffey, 1993; Dingman, 1994)

A band saw and coring machine were operated on a non-routine basis approximately once every one or two months. These machines were operated dry, so some particulates were generated. All other material processing in Module A was done using oil or Freon 113, so no particulate emissions occurred (EG&G, 1990).

Inspection. Inspection activities took place in Modules C and D of Building 707. Operations in these modules involved dimensional non-destructive testing of parts and assemblies. Various metal gauges, micarta rings, and optical- and computer-assisted instruments were used to inspect and measure part dimensions. Due to the sensitivity of instrumentation, the parts were periodically cleaned with carbon tetrachloride. During 1989, 15 gallons of carbon tetrachloride were used in inspection operations in Module D and 24 liters were used in Module C (EG&G, 1990).

7.4.1.6 RECOVERY

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Plutonium recovery operations were limited to recycling of relatively pure materials through oxidation of metal fines and briquetting metal scraps.

Plutonium Oxidation. In a glovebox in Module K, carbon tetrachloride was used to remove oil from metal fines generated from various machining operations. These fines then underwent plutonium oxidation to convert pyrophoric plutonium residues to non-pyrophoric plutonium oxide (PuO_2) in a glovebox in Module J. The operation was carried out in a stainless steel container atop an electric hot plate which was located inside a glovebox. The oxide material was then sorted and stored in cans and eventually sent on to the Building 771 recovery operations (EG&G, 1990; Dingman; 1994).

The oxidation process took place in the presence of carbon tetrachloride which was used heavily as a degreaser. In 1983, a reaction between carbon tetrachloride and burning plutonium fines caused an explosion within the oxidation glovebox (Hobbs and Swan, 1983)

Briquetting of Scraps - Module C. Briquetting involved cleaning and pressing metal turnings from the Module C machining process and metal scrap from Module B scrap cutters. The scrap plutonium metal from Module B and plutonium machine turnings from Module C were placed in perforated metal baskets. The baskets were dipped into a series of five carbon tetrachloride baths. Each bath was a steel tank which contained approximately four gallons of solvent. After cleaning, the scraps and turnings were air-dried and then pressed into pucks with a hydraulic press (EG&G, 1990).

The solvent baths were changed-out after approximately 30 basket dips. All five baths were changed at one time. The used carbon tetrachloride was passed through two Ful-Flo filters for removal of plutonium fines. Ful-flo filters are spun polypropylene cartridge filters used to filter solids from the cleaning solutions. Filtered carbon tetrachloride was then piped directly to pencil tanks in the C-pit prior to being sent to Building 774 for treatment and off-site disposal as a solid (EG&G, 1990).

7.4.1.7 SOLVENT AND WASTE HANDLING

Building 707 handled large quantities of Freon 113, TCA, and machining oil. Each of these compounds was stored prior to use in large tanks located on the second floor of the building. Process waste was collected in tanks located in the basement. These systems are described below.

Feed Tanks. A 500-gallon Freon 113 tank (V-32) and three TCA feed tanks (V-36A, B and C) located in Room 200 provided solvents to Buildings 707 and 777. A carbon tetrachloride feed tank for these buildings was located and remains north and outside of Building 707 (EG&G, 1990). At one point in time, a 200-gallon carbon tetrachloride day tank was housed inside the building (Crocker, 1991). The total amount of Freon 113 used in Building 707 ranged from 800 to 990 gallons per year. Each TCA feed tank had a capacity of 200 gallons. The total purchase of TCA for Buildings 707 and 777 in 1989 was 2,450 gallons. Equal use of each tank was assumed, so approximately 817 gallons per year was the total throughput for each tank (EG&G, 1990).

Waste Tanks and the C-pit. Waste tanks containing these spent solvents were located in the C-pit, which is a partial basement under Module C. The pit contained two storage tanks for commingled carbon tetrachloride, oil and Freon 113. It also contained 16 pencil tanks for carbon tetrachloride, a glovebox for a Ful-Flo filtration system and a large storage tank for TCA. Waste carbon tetrachloride from machining processes was pumped through Ful-Flo filters, located with each machining process, to the 16 pencil tanks in the C-pit. It was then pumped through the filtration system to a holding tank where it was sampled for nuclear

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materials. Following sampling, the waste was transferred to Building 774 for waste treatment. Machining oil, used as a coolant during machining processes, Freon 113 from density balances and spindle oil from calibration of sight gauges were also collected in the carbon tetrachloride system (EG&G, 1990).

Waste TCA from ultrasonic cleaners in the building was collected in a sump tank (V-100). When this tank was full, the TCA was pumped to a tank in Building 777 and then piped to Building 774 for waste treatment (EG&G, 1990).

The TCA waste tank throughput for 1989 was equivalent to the amount of TCA emptied or flushed from the five degreaser systems in Modules D, E and G a minimum of six times, or 723 gallons per year (EG&G, 1990).

7.4.1.8 STORAGE

Various locations in Building 707 were used to store nuclear and non-nuclear materials. Materials stored included raw materials needed for casting, feed ingots, products cast within the building, and finished components awaiting assembly or transfer to Building 991 for eventual off-site shipment.

X-Y Retriever. The Module K X-Y retriever, which began operation in 1971 (Buffer, 1993), was used to store and retrieve plutonium metal for distribution to other processes in Building 707. Operators retrieved an appropriate quantity of plutonium from the retriever then conveyed it to the X-Y shuttle area where it was cut and weighed. The metal was then conveyed to Modules A, J or K for casting, or Module B for rolling and forming.

Module J Vaults. Rooms 141 and 142 in Module J were called the J vault and were used for storage of oxides, plutonium buttons received from Savannah River, and to some extent, from Building 771 molten salt extraction (MSE) operations (Dingman, 1994).

Production Control Operation. The main function of the Production Control group was scheduling and tracking all activities associated with the assembly of weapons components produced at RFP. Nuclear and non-nuclear materials were received, inventoried and placed into storage in Building 707. Shipping and receiving was located in Room 184 (Mahaffey, 1993), and Rooms 183 and 184 in the corridor outside the modules were also used for packaging and storage (Dingman, 1994).

Production Control was responsible for maintaining inventory/accountability records for all materials received and shipped from Building 707. Part of this task involved etching serial numbers on parts using a grit blaster (EG&G, 1990). Following grit blasting, the parts were cleaned with TCA. One dip tank was used prior to final inspection. The tank was kept covered when not in use to prevent evaporation of TCA. The tank held approximately four gallons of TCA. Approximately one-half to one gallon of TCA per week of tank use was added to the tank to make up for losses. The tank was drained during the Christmas shutdown and the six annual inventory periods (EG&G, 1990). The TCA in the tank was changed frequently to ensure efficient cleaning. It was changed when it became visibly dirty or when sampling indicated that fresh TCA was needed. Used TCA was pumped through Ful-Flo filters to the collection tanks located in the C-pit (EG&G, 1990).

7.4.1.9 SUPPORT OPERATIONS

Support activities active during the production period included a calibration laboratory, calorimetry operations, and utilities and maintenance.

Calibration Laboratory - Modules D and G. The Calibration Laboratory, located in Rooms 133 and 133A of Module G, calibrated gauges from various locations in Building 707. In addition, three gloveboxes in Module D were used for storage and dimensional measurements of gauges. Lint-free rags were used with ethyl alcohol to clean the gauges before precision measurements were made. These cloths were dried and disposed with dry combustible waste. All gauges were returned to the users after calibration (EG&G, 1990).

Calorimetric Assay - Module G. Calorimetric assays were historically performed and continue to be performed in Room 130B of Module G (EG&G, 1994). Calorimetry is the process by which radioactivity is measured and isotopic contents of a package are determined. Plutonium metal fines and chips from other processes in Building 707 were assayed for radioactivity using calorimetry techniques and gamma spectroscopic analysis. The plutonium was kept in stainless steel cans which were placed in air or water baths to regulate temperature. The heat produced by the air/water can system was measured and related directly to the alpha activity in the can. The cans were then placed under a high purity germanium detector for measurement of the relative amounts of plutonium, americium, uranium and neptunium in the can. After measurement, the cans were returned to Module J for storage. Water used for cleaning and liquid nitrogen in the laboratory evaporated to the room air (EG&G, 1990).

Utilities and Maintenance. Six Freon 12 tanks, located on the second floor of Building 707, were used for the heating, ventilation and air conditioning (HVAC) system (EG&G, 1990). The Maintenance group performed a variety of support functions in both process and non-process areas of Building 707. Batteries, lightbulbs, insulation and lubricating oils, as well as broken or cracked leaded glass and plexiglass from gloveboxes, were changed out and replaced by this group on an as-needed basis. The cleaning of compressors was performed with isopropyl alcohol (Crisler and Dingman, 1993).

7.4.2 RECENT OPERATIONS (1989-PRESENT)

After plutonium operations were shut down in November of 1989, Building 707 was classified as a Production Contingency Facility, meaning it was to be maintained in a condition to allow restart of production operations if national security requirements mandated such action (EG&G, 1992). In 1992, however, the plant mission was changed and all future weapons production was cancelled.

The current and anticipated future activities in Building 707 are to provide brushing of oxides from stored items and thermal stabilization of radioactive residue materials. The source of the residue is from previous production activities or oxides from current brushing. Other activities involve maintaining building safety envelopes. The detailed status of the various operations and Modules is discussed below.

7.4.2.1 WASTE HANDLING

Building 707 is involved in stabilizing residues containing plutonium and the decontamination of gloveboxes formerly used for plutonium operations. These operations are discussed below.

7.4.2.1.1 Thermal Stabilization

With the change in plant mission, the casting furnaces in Modules A, J, and K in Building 707 are no longer used to cast plutonium ingots, although the equipment for these functions still remain. Current operations in these areas include unpackaging, weighing, brushing and inspecting of various parts or materials, maintenance of various equipment within the process area, thermal stabilization, can-sealing and activities to maintain the "safety envelope" of process areas (EG&G, 1994).

Miscellaneous pyrophoric plutonium residues such as metal scrapings and fines and materials contaminated with plutonium such as insulation, combustibles, turnings, tools and glass are conveyed to Building 707 from other buildings and from within Building 707. If necessary, oxide is removed from the material with a brush. The oxide itself is stored in stainless steel cans. Pre-sampling of the material to be stabilized is conducted in approved gloveboxes in Modules A, J or K before the thermal stabilization process can be performed. Samples are transferred to Building 559 for analysis and thermal stabilization does not begin until analytical results are available.

Containers of material to be thermally stabilized are transferred into either the Glovebox J-25 oxidation vessel or Glovebox J-60 oxidation furnace. The material in the container is weighed and stabilized in small batches. These materials are placed in a stainless steel pan, steel crucible or graphite crucible and heated to convert plutonium metal to plutonium oxide. The residue remaining in the pan after burning is carefully screened to remove plutonium oxide from the non-plutonium material. The stabilized plutonium oxide is placed in a stainless steel storage container until the container is filled. Towels are used for glovebox cleaning. Gloves, cans, plastic, tape, glass and tools are used for handling materials (EG&G, 1994).

Samples are obtained from each container of stabilized plutonium oxide and stored in an approved glovebox for eventual analysis in Building 559. The sampled containers of stabilized plutonium are bagged out of the gloveboxes and moved to Building 771 for calorimetry operations (EG&G, 1994). Glovebox J-65 is used to seal cans of oxide (A-65 is a backup). Can sealing provides an airtight shipping container for material destined for long-term storage in Building 371 or an off-site location (EG&G, 1994).

When graphite molds are no longer usable for stabilization, they are placed in a 55-gallon graphite drum. Other line-generated plastics, metal, combustibles, glovebox HEPA filters, glass and furnace insulation are placed in the appropriate 55-gallon drum. Line-generated leaded glovebox gloves and floor stripping waste are drummed and then deposited in a 90-day accumulation area. Non-line-generated combustibles, plastics and light metal are placed in the appropriate 55-gallon drum. Glovebox and furnace exhausts are vented to the building filter plenum system (EG&G, 1994).

7.4.2.1.2 Decontamination and Decommissioning

Modules B through H are for the most part idle. However, activities occur within the modules related to the maintenance of safety systems and the implementation of Decontamination and Decommissioning (D&D) programs. Safety systems activities include the performance of various surveillance, radiological surveys, maintaining glovebox integrity and glovebox systems decontamination. D&D activities are the removal or disposal of excess chemicals, repackaging of waste drums or crates, management of building waste, general housekeeping within the modules. Other D&D activities will be determined as D&D objectives are defined. If repackaging of a drum or crate is required as a result of a packaging deficiency, it is repackaged in the C-cell in Module B.

7.4.2.2 STORAGE

Nuclear and non-nuclear components and materials for use in Buildings 707, 776 and 777 continue to be received, stored, and inventoried in Room 184 by the Nuclear Material Handling and Packaging Group. Incoming parts and materials are stored or transferred to the thermal stabilization areas. Radioactive sealed source standards are transferred to Nondestructive Assay (NDA). Module K still houses the X-Y Retriever where plutonium metal is stored and distributed to other processes in the building. The X-Y Shuttle Area in Module K is generally used for unpackaging of materials that do not require a glovebox environment.

Materials handled within Building 707 are sent to Nuclear Material Handling and Packaging for storage or preparation and packaging for shipment on-site or off-site. Packing materials such as drums, fixtures, insulation, cushioning and replacement hardware are ordered as needed from the Building 991 product warehouse. Preparation may require cleaning of the product with Alconox or Mariko cleaner or water and Kimwipes to reduce the level of removable surface contamination (alpha) to less than 20 disintegrations per minute. Packing materials are examined for integrity and discarded if defective. Reusable containers and packing materials are monitored for surface contamination, cleaned to less than 20 disintegrations per minute, if necessary, and stored or shipped to Building 991. Packages are typically sealed with a copper cup seal or other tamper-indicating device (EG&G, 1994).

Dry combustibles, Kimwipes with Mariko or Alconox residues and plastic bags and vinyl tape are collected in the appropriate 55-gallon drums in Room 184. Light metal wastes, such as used copper cup seals, aluminum foil and defective hardware are accumulated and taken to a designated drum in the Module K foundry (EG&G, 1994).

7.4.2.3 SUPPORT OPERATIONS

Support operations include laboratories for calorimetric assays, mass spectrometry of gases and calibration of equipment. In addition, the building retains utilities and maintenance functions.

Calorimetric Assay - Module G. Calorimetric and gamma spectroscopic analyses continue to be performed in Module G to non-destructively determine the abundance of select radionuclides in an assortment of matrices. The compounds of interest are plutonium, americium, uranium and neptunium in matrices which include metal, fines, chips, oxides, duct samples, colloids and liquids from a variety of processes (EG&G, 1994).

Assayed materials, including plutonium metal, fines, chips and plutonium oxide are returned to the originator in entirety. The metal cases are placed in a 55-gallon drum for light metal. Lead bricks and cadmium sheets used to shield the samples and detectors from interferences are not normally discarded (EG&G, 1994).

Calibration Laboratory - Module G. The Calibration Laboratory calibrates measurement and test equipment from various non-glovebox operations in the Protected Area. Types of measurement and test equipment used by the Calibration Laboratory include electrical, electronic, mechanical and physical precision standards. Measurement and test equipment may require in-place calibration at the user's site if the system is not mobile. When the calibration is completed, documentation of the calibration is generated, certification labels are affixed to the equipment and the equipment is returned to the user (EG&G, 1994).

The equipment is cleaned before being brought to the Calibration Laboratory. The Calibration Laboratory cleans its own equipment using approved wipes. Some standards use alkaline, nickel-cadmium or mercury batteries for a source of power (EG&G, 1994).

Mass Spectrometry - Module F. The mass spectrometry laboratory analyzes gases for various programs at RFP. The process is located in Room 127, Module F. Process equipment includes vacuum generators and mass spectrometers. The primary purpose of the laboratory is to perform analyses in support of the Waste Isolation Pilot Plant Program, Stockpile Laboratory Test, New Materials Laboratory Test, Phase 7 retirements and shelf-study programs. Gas analyses are performed upon request in support of Research and Development activities and for other groups. Gas samples are received in stainless steel canisters and bottles. The sample is analyzed and the sample container is returned if reusable. Unusable containers are discarded as non-

line metal waste. Vacuum pump oil is periodically replaced in the vacuum generators. Wipes are used to clean up any excess oil on the equipment (EG&G, 1994).

Utilities and Maintenance. Utilities personnel maintain and operate the heating, air supply, air filtering, air conditioning, water supply and power systems associated with Building 707. These systems include process water, an air supply plenum and an exhaust air plenum.

Maintenance personnel are responsible for maintaining electrical systems, lighting systems, gloveboxes, vacuum pumps, diffusion pumps, insulation and equipment fabrication, repairs and service. Maintenance operates two electrical shops. Process equipment includes a lightbulb crusher, two drills, two grinders, a band saw and a pipe threader.

Miscellaneous electrical work and electrical support work is conducted in Room 186 in Module G. The room contains a drill and a grinder. Electrical work requires the use of spray cleaners, sealers, joining compound, soldering flux, methanol and, occasionally, Kimwipes to clean electrical devices. Another electrical shop is located on the second floor of Building 707 in Room 223. It contains a drill, a grinder, a band saw and a pipe threader. Dry-Rite oil is used with this machinery (EG&G, 1994).

Maintenance personnel replace spent lead-acid batteries used for the emergency lighting system with new Gel-Cel batteries. Gel-Cel and mercury batteries used in the uninterrupted power supply system and dry cel and nickel-cadmium batteries used in some small equipment are also replaced as needed. Burned-out fluorescent lightbulbs are collected and crushed in a small device mounted on the top of a 55-gallon drum. Polychlorinated biphenyls (PCB) ballasts are replaced in light fixtures with non-PCB ballasts.

Solid waste is collected in drums and handled as nonhazardous or hazardous appropriate. For example, PCB ballasts are placed in a designated Toxic Substances Control Act (TSCA) 55-gallon drum. Used Gel-Cel and lead acid batteries are radiologically surveyed and collected for recycle. Dry cell batteries are placed in 55-gallon drums in the Radioactive Materials Management Area. Nickel/cadmium and mercury batteries are radiologically surveyed and collected in a 90-day accumulation area on Building 778's south dock (EG&G, 1994).

7.5 CURRENT CONTAMINATION STATUS

Building 707 is moderately to highly contaminated with plutonium and some enriched uranium. There is also some beryllium contamination in the building. Asbestos exists on the second floor in Building 707 at 57 locations in three rooms as insulation on steam lines, chilled water lines and domestic hot water pipes (EG&G, 1992).

As of 1992, 82 drums or boxes of radioactive waste were stored in Building 707. Forty-two were low-level waste and forty were TRU-waste. This number is expected to vary as additional waste is generated by maintenance activities (EG&G, 1992). Forty-three drums of radioactive residue was stored in Building 707 as of 1992. This material was scheduled to be processed in Building 771 to recover the plutonium content (EG&G, 1992).

Radiologically, much of the removable contamination in Building 707 has been removed. Some contamination remains under the vacuum pumps of the casting furnaces in Modules A, J and K due to contaminated oil. The inside of all of the gloveboxes in Building 707 are radioactively contaminated. All fixed or non-removable contamination has been covered or painted over.

Radiation emanates from the SNM storage areas, the waste drums and crates, the residue drums, the exhaust ducts and several of the gloveboxes (EG&G, 1992).

The two large C-Pit tanks and 16 pencil tanks once used for storage of commingled waste carbon tetrachloride and machine oil and waste TCA are operationally empty and the lines in and out of the C-Pit process are locked and tagged out (EG&G, 1994).

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IHSS, PAC & UBC INFORMATION

The 700 Area is located in the north-central portion of the RFP. It is bounded on the north by the buffer zone, on the east by the Solar Evaporation Ponds, on the southeast by the 900 Area, on the south by the 800 Area, and on the west by the 500 Area (see Figure 3.1). 700 Area Buildings are contained within the PA (Protected Area). The more important buildings and features in this area are as follows.

- Building 701 was originally a carpentry and paint shop. Currently, this building is used for research and development of new waste treatment systems.

- Building 705 was placed into service in 1966. This building was originally used for ceramics research and development. Currently, this building is a research and development laboratory for vapor metal disposition.

- Building 707 was placed into service in 1970. This building is the main plutonium components production facility at the RFP. Plutonium metal is cast in a foundry, machined into parts, and assembled into weapons components.

- The Building 750 mixed hazardous storage area was established in the mid-1980s. Originally, an asphalt parking lot was used for open storage of pondcrete and saltcrete waste boxes. Later, five portable buildings were added for storage of these wastes.

- Building 771 was placed into service in 1953. This building was the original plutonium components production facility at the RFP. In 1957, the plutonium components production operations performed in Building 771 were transferred to Building 776 and Building 777. From 1957 to the present, Building 771 continued to be used for chemical recovery of plutonium and americium from manufacturing residues and scrap metal. Building 771 also contained a laundry.

- Building 774 was placed into service in 1953. This building is used for the treatment of high-level radioactive aqueous wastes, waste oils and non-radioactive waste photographic solutions. The low-level radioactive waste solutions produced from the original process waste collection system were transferred to the Solar Evaporation Ponds and/or were evaporated in an evaporator (approximately 1966 to 1980). Since 1980, the majority of this waste has been transferred to Building 374 for further processing.

- Building 776 was initially placed into service in 1957. This Building was used as a plutonium foundry (transferred from Building 771) until 1969. After a fire in 1969 in the building, the operation was transferred to Building 707. Currently, Building 776 houses pyrochemistry, waste reduction, a coatings laboratory, RFP Utilities, and preventive maintenance. Pyrochemistry processes metal and residues for recovery at RFP or offsite. Waste size reduction repacks transuranic, low-level, and mixed wastes for more efficient storage. The coatings laboratory develops coatings for a variety of substrates. Utilities and preventive maintenance service both Buildings 776 and 777.

- Building 777 was placed into service in 1957. This building was used for production of plutonium components (transferred from Building 771) until 1969. After a fire in 1969, these operations were transferred to Building 707. Currently, Building 777 is used for and/or has the capability for production processes that machine, assemble, disassemble, and etch metal weapons parts. Associated with these efforts are special weapons assembly projects and the production of plutonium briquettes for use in the foundry in Building 707. Destructive and non-destructive testing, weighing, and inspection of parts and materials are conducted in support of production processes. The building also houses several production support laboratories, a tritium analysis laboratory, two organic solvent collection and filtration systems, and a decontamination laundry.

- Building 778 was placed into service in 1957. This building houses the plant's laundry facility for non-radioactive clothing along with personnel locker rooms and maintenance shops.

- Building 779 was placed into service in 1969. This building houses minor production and plutonium recovery operations, but is primarily a research and development facility. Some metal parts are assembled in this building and bulk plutonium residues are recovered in the hydride operations. The remainder of the operations conducted in Building 779 are research and development activities which include the following operations: pyrochemical technology, coatings, plutonium and non-plutonium physical metallurgy, chemical technology in support of plutonium recovery operations in Building 771, and product physical chemistry. The building also houses its own utilities, maintenance, custodial, and machine shop services as support for other operations.

- Building 788 is a pondcrete processing, repackaging, and reprocessing plant. This building is used to support the Solar Evaporation Pond clean-up project. Although Building 788 is geographically located in the 700 Area, it is addressed in the 000 Area of this report because the activities conducted in this area cross the arbitrary boundaries of several other areas designated for purposes of the HRR.

There are numerous other buildings located in the 700 Area. These are primarily support buildings such as cooling towers, emergency generator buildings, compressor buildings, and filter plenum buildings.

The following subsection contains detailed descriptions of PACs located in the 700 Area. These PACs are shown in Figure 700-1.

PAC REFERENCE NUMBER: 700-118.2

IHSS Reference Number: 118.2, Operable Unit 8

Unit Name: South End of Building 776 Solvent Spill (IAG Name: Multiple Solvent Spills South End of Building 776)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

June 1981[1]

Description of Operation or Occurrence

There is a 5,000-gallon aboveground carbon tetrachloride tank located within a bermed area between the north side of Building 707 and the alleyway south of Building 778.[2] In June 1981, the tank ruptured and leaked solvent onto the ground, contaminating the soil.[1]

Physical/Chemical Description of Constituents Released

An unknown amount of carbon tetrachloride was released to the environment.[1]

Responses to Operation or Occurrence

The tank and the area of the spill was cleaned up.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

It is unknown whether sampling and analysis was conducted to verify the complete removal of soil contamination.[1] This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location for IHSS 118.2 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

In discussing this site, the RCRA 3004(u) report states that there are a number of organic solvent tanks located inside the south end of Building 776 which overflowed in the 1970s.[3] The Draft RFI/RI Work Plan for Operable Unit No. 5 (now designated OU8) states that one of the organic solvent tanks inside the south end of Building 776 ruptured in June 1981. Carbon tetrachloride was released into a sump and some of the solvent was pumped out onto the ground.[1] This event was documented to have occurred to the north of Building 776 both in 1976 and again in 1981.[4,5] The occurrences associated with the carbon tetrachloride tank north of Building 776 are discussed as PAC 700-118.1. It is proposed that the indoor tank overflow incidents in Building 776 be discussed separately as indoor unplanned events.

Based on information found in documents reviewed for this study, it is proposed that the area of IHSS 118.2 presented in the IAG be reduced in size and relocated to the area of the aboveground carbon tetrachloride tank located adjacent to the north of Building 778 as described in the narrative above (PAC 700-118.2).

During installation of a drainage ditch adjacent to the northwest/west side of B707 in FY2000, sampling results showed significant toxic metal concentrations (above regulatory action levels).

PAC REFERENCE NUMBER: 700-123.1

IHSS Reference Number: 123.1, Operable Unit 8

Unit Name: Valve Vault 7

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

April 4, 1983[1]

Description of Operation or Occurrence

Valve Vault 7 is located to the southwest of Building 707, adjacent to the north side of the PSZ inner fence. Valve Vault 7 controls the 800 Area main process waste line.[1]

On April 4, 1983, a check valve in Valve Vault 7 malfunctioned allowing process wastewater to backflow into the sump. The vault filled with process wastewater and overflowed. The high water level alarm system in Valve Vault 7 was apparently inoperative at the time of the overflow. The process wastewater drained into an adjacent storm runoff collection system ditch near Eighth Street and Sage Avenue and flowed east toward South Walnut Creek and the B-Series drainage ponds.[2,3] Runoff was noticed flowing across the former 750 Parking Lot, through the Building 991 normal runoff drainage.[2]

Physical/Chemical Description of Constituents Released

The release consisted of process wastewater from the 800 and 400 Areas which typically contains uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride.[4]

Responses to Operation or Occurrence

The transfer of liquid waste from the holding tanks at Building 881 was discontinued after personnel verified that wastewater was flowing out of Valve Vault 7. Temporary dikes were constructed to contain the overflow.[2,3] A dam was constructed in the ditch east of the guard shack at Portal #1 and another dam was placed just west of Guard Shack 762.[2] Drainage from the area was diverted to Pond B-1.[2,3] Attempts were made to remove oil by using chemical absorbent bats.[3] Environmental samples were taken from the vault and other areas of concern. Water was pumped out of the vault and the containment dikes and transferred to Waste Processing by tanker truck. Snow melt water was retained in the ditch for several days and later transferred to Process Waste Storage. The malfunctioning check valve was repaired or replaced, the sump pump was replaced and repair of the electrical system was initiated. A new type of check valve was ordered for all the check valves in the waste transfer system.[2] The ditch along Sage Avenue between Valve Vault 7 and Ninth Street was cleaned of all visible contamination. The excavated material was stored for drying in the old Building 771 parking lot.[5]

Fate of Constituents Released to Environment

The runoff diversion activities were partially successful. Oil from the spill was visible in Pond B-1. A small amount of oil was observed in Pond B-4 and Pond B-5. All visible contamination was excavated from the ditch along Ninth Street.[2] No documentation was found which detailed the complete removal of release constituents from the site. Analysis of water samples from Pond B-1 and Pond B-4 one week following the incident indicated no abnormal concentration of oil, nitrate, pH, or radioactivity.[2] Evaluation of data for Pond B-5, the only pond that discharged off site, indicated no presence of material from the spill.[2,5] As of April 15, 1983, Pond B-5 water was to have been held for about two weeks before being released to Great Western Reservoir.[5] One reference indicated the environmental impact was negligible.[2]

This IHSS is being studied in accordance with the IAG schedule for OU8. However, the information developed on this unit for this study indicates that the location of IHSS 123.1 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

PAC 700-150.5 references the preceding discussion. This unit is part of the New Process Waste Line system. Based on information found in documents reviewed for the HRR, it is proposed that the boundaries defining IHSS 123.1 presented in the IAG be relocated approximately 380 feet to the south and enlarged to extend to the storm runoff collection system ditch along Sage Avenue to Eighth Street and continue to the extent of Pond B-1 (PAC 700-123.1)

One reference states that operating personnel surmise that Valve Vault 7 was partially filled before the overflow was observed on April 4, 1983. In addition, the intrusion of groundwater from leaky conduits was a recurring problem.[2] It is conceivable that if groundwater were able to flow into the valve vault, process waste liquid would have been able to breach the valve vault undetected without overflowing the valve vault, causing environmental contamination.

It is possible that the spilled process waste liquid flowed along the same storm runoff collection system route that the Antifreeze Discharge (PAC 000-192) traversed en route to the B-Series Ponds.

PAC REFERENCE NUMBER: 700-123.2

IHSS Reference Number: 123.2, Operable Unit 9

Unit Name: Valve Vault West of Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

December 1958[1]

Description of Operation or Occurrence

In December 1958, a leak occurred at a process waste line 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 at the time of this occurrence. Leaks occurred in the elbow connections of the process waste line 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.[1] In March 1973, this valve vault was replaced as part of an upgrading program for this section of the original process waste system. Interviewees for the CEARP report indicated that this vault overflowed a number of times prior to 1973.[2]

Physical/Chemical Description of Constituents Released

The liquid released contained uranium, solvents, oil, beryllium, nitric and hydrochloric acids, and fluoride.[3]

Responses to Operation or Occurrence

A soil sample collected at the valve vault west Building 707 in 1976 showed 54 milligrams/liter nitrate and 0.145 dpm plutonium.[1] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU9 (based on an April 21, 1992 letter from CDH to Frazer Lockhart of the Department of Energy). The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by September 6, 1994.

Comments

The original process waste line to the valve vault west of the present location of Building 707 serviced buildings such as Building 122, Building 123, Building 441, Building 444, Building 881, and Building 883.[1] These buildings handled both depleted and enriched uranium.

The narrative of PAC 700-150.5 references the preceding discussion. This unit is part of the OPWL system which is discussed as PAC 000-121.

PAC REFERENCE NUMBER: 700-150.4

IHSS Reference Number: 150.4, Operable Unit 8

Unit Name: Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

May 1969, 1980, and 1981

Description of Operation or Occurrence

Following the May 1969 fire, the tanks and pumps that handled the decontamination fluid were placed into the Building 750 courtyard. This area was later paved and used for parking lots. In 1980 and 1981, there were several leaks from the manholes in these parking lots. This area is suspected to have residual contamination.[1] Decontamination fluid storage tanks were located on the southeast side of Building 778 following the May 1969 fire. Since that time Building 778 has been extended the east.[2]

Physical/Chemical Description of Constituents Released

The probable contaminant in the area is plutonium.

Responses to Operation or Occurrence

No documentation was found which detailed response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU8. However, information developed on this unit for this study indicates the location for IHSS 150.4 presented in the IAG is inaccurate. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

It is proposed that the location of IHSS 150.4 be redefined as an area to the northwest of Building 750 (PAC 700-150.4)

PAC REFERENCE NUMBER: 700-150.5

IHSS Reference Number: 150.5, Operable Unit 8

Unit Name: Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

1953 - 1983

Description of Operation or Occurrence

All documented leaks in the area west of Building 707 are related to the overflow of Valve Vault 7 (PAC 700-123.1) and an original process waste line valve vault removed from the area in March 1973 (PAC 700-123.2).[1]

Physical/Chemical Description of Constituents Released

The primary constituent released was process wastewater from the 800 and 400 Areas which may contain uranium, solvents, oils, beryllium, nitric acid, hydrochloric acid, and fluoride.[1]

Responses to Operation or Occurrence

The responses to overflow incidents of Valve Vault 7 and the original process waste line valve vault are discussed in PAC 700-123.1 and PAC 700-123.2, respectively.

Fate of Constituents Released to Environment

This IHSS is being studied in accordance with the IAG schedule for OU8. The IAG activities will include site investigations, site characterizations, and possible site remediation. The Final Phase I RFI/RI Report is to be completed by July 12, 1994.

Comments

No documentation for occurrences at this site was found other than that relating to the overflows of Valve Vault 7 (PAC 700-123.1) and the original process waste line valve vault previously located west of Building 707 (PAC 700-123.2). It is proposed that this IHSS be deleted.

PAC REFERENCE NUMBER: 700-185

IHSS Reference Number: 185, Operable Unit 16

Unit Name: Solvent Spill

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 10, 1986[1,2,3]

Description of Operation or Occurrence

The fork of a forklift punctured a 55-gallon drum of trichloroethane on the southeast dock of Building 707, causing approximately 4 gallons of the solvent to leak onto the ground.[1,2,3]

Physical/Chemical Description of Constituents Released

The punctured drum contained trichloroethane.[1,2,3]

Responses to Operation or Occurrence

Four bags of absorbent were used to clean up the spill.[1,2,3] Material was cleaned up and placed in drums by the Fire Department and taken to Hazardous Storage.[3]

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This IHSS is being studied in accordance with the IAG schedule for OU16, Low Priority Sites. The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

None.

PAC REFERENCE NUMBER: 700-194

IHSS Reference Number: 194, Operable Unit 16

Unit Name: Steam Condensate Leak - 700 Area

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

September 26, 1979[1,2,3]

Description of Operation or Occurrence

A steam condensate line break occurred in the Building 707 area. The water from the line break flowed into the surface water drainage through Pond B-4 to Walnut Creek (PAC NE-142.5 - NE-142.9).[1,2,3]

Physical/Chemical Description of Constituents Released

The steam condensate contained tritium at approximately 1,000 pCi/l.[1,2,3]

Responses to Operation or Occurrence

On September 27, surface water drainage was diverted to Pond B-1 and the valve to Pond B-5 was closed.[1,2,3]

Fate of Constituents Released to Environment

Water samples from Pond B-4 ranged from less than or equal to 524 to approximately 926 pCi/l for tritium. Samples from Walnut Creek at Indiana showed 1,163 pCi/l for a 24 hour composite covering September 26, 1979 and approximately 700 pCi/l in a grab sample taken on September 27, 1979.[1,2]

This IHSS is being studied in accordance with the IAG schedule for OU16, Low Priority Sites. The Final No Further Action Justification Document for OU16 is to be completed by July 30, 1992.

Comments

None.

PAC REFERENCE NUMBER: 700-1104

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformer - Building 708

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 1986 - 1987

Description of Operation or Occurrence

In February 1987, concrete under the 708-1 transformer drain valve was found to be contaminated with polychlorinated biphenyls (PCBs).[1] Transformer 708-1 is located adjacent to the west side of Building 708. According to an interview with EG&G Utilities personnel, two of the four transformers located west of Building 708 leaked PCB containing oil prior to 1987.[2]

Physical/Chemical Description of Constituents Released

Smears taken from the concrete under the transformer drain valve were analyzed and found to contain 1,035 µg and 3,750 µg of PCBs.[1]

Responses to Operation or Occurrence

Four transformers were moved from this site and retro-filled in 1987. Rock and gravel fill was placed around the transformer pad west of Building 708.[2] No documentation was found which further details response to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents.

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.

Transformer 881-4 is located on the north side of Building 881. Utilities reported that it may have leaked prior to being retro-filled in 1987.[1] Visual inspection of the transformer on February 11, 1986 revealed a leak on the top and bottom valves, tap changer and pad.[2] Another document indicates that residual stains existed on the concrete in January, 1987.[3]

Presently, the transformer is located in a gravel filled berm with no indication of leakage. The previously mentioned concrete may exist beneath the gravel. There are no drains in the vicinity.[1]

PAC REFERENCE NUMBER: 700-1103

IHSS Reference Number: Not Applicable

Unit Name: Leaking Transformers - Building 707

Approximate Location: N750,000; E2,084,000

Date(s) of Operation or Occurrence

November 1986 - Present

Description of Operation or Occurrence

Transformers 707-1 through 707-6 are located on the southeast quarter of the Building 707 roof.[1] Concrete under the 707-1 through 707-6 transformer drain valves was found to be contaminated with polychlorinated biphenyls (PCBs) in November 1986.[2] A leak was discovered from Transformer 707-1 in 1987 during routine maintenance when the transformer was found to be low on fluid. Visible evidence of leaks was discovered at the valve area and weld seams. Analysis of soil and superficial swipe samples confirmed the pad on the roof and the soil on the ground immediately east of Building 707 are contaminated with PCBs. The soil contamination is due to a downspout delivering rainwater from the roof in the area of Transformer 707-1 to the ground.[1]

Physical/Chemical Description of Constituents Released

Smears taken from the concrete under the drain valves of the transformers were analyzed in November 1986 and found to contain 135 µg to 7,200 µg of PCBs.[2] In March 1991, surface soil samples taken immediately east of Building 707 measured from 9.7 to 1600 milligrams/kilogram PCBs. Subsurface soil samples taken at depths between 1.0 to 1.5 feet in the same area measured from <1 mg/kg to 180 mg/kg.[1]

Responses to Operation or Occurrence

No documentation was found which detailed responses to this occurrence.

Fate of Constituents Released to Environment

No documentation was found which detailed the fate of the constituents. This site is currently being addressed by EG&G with the building structure to be cleaned up under Toxic Substance Control Act.[1]

Comments

Appendix I contains detailed information on all RFP transformers that have leaked dielectric fluid containing PCBs.