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ADDENDUM C
PROCESS INFORMATION

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ADDENDUM C
PROCESS INFORMATION

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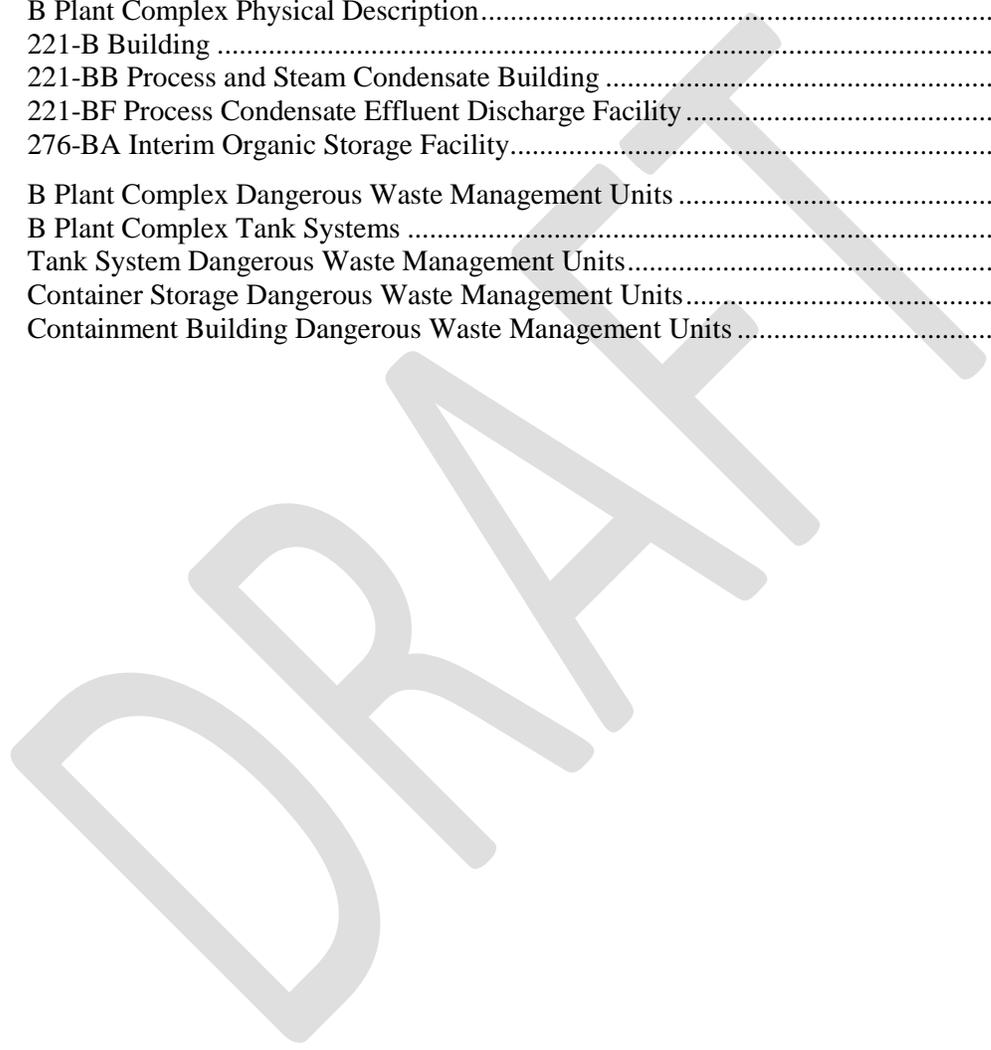
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1 **C. PROCESS INFORMATION**

2 **C.1 B Plant Description**

3 The B Plant Complex is located in the northwest portion of the 200 East Area of the Hanford Site. The
4 221-B Building, also known as B Plant, was designed and constructed between 1943 and 1945 to recover
5 plutonium using a bismuth phosphate chemical separation process. B Plant operated as a plutonium
6 recovery facility from 1945 to 1952. With newer and more efficient plutonium recovery facilities
7 becoming operational, B Plant was shut down in 1952.

8 In the late 1950s, there was a growing concern regarding the heat generated by high-activity radioactive
9 waste stored in the Hanford single-shell tanks. Some of the waste generated enough heat to cause the
10 liquid waste to boil. A program to partition the high-activity waste by removing some of the high-heat
11 isotopes was developed. After a period of experimentation and process development, B Plant was
12 selected to house the large-scale partitioning mission. Upgrades to B Plant started in 1962 and was
13 completed in 1967. Between 1968 and 1983, B Plant separated various isotopes from the waste. Since
14 1974, the strontium and cesium capsules have been stored at the Waste Encapsulation and Storage
15 Facility (WESF), Operating Unit Group 14, which is adjacent to the 221-B Building.

16 From 1984 through 1985, B Plant was prepared for a demonstration test in the pre-treatment or
17 preliminary separation of Hanford tank waste. Pre-treatment was to be the first step in processing the
18 onsite waste into a form compatible with long-term storage. In 1990, a determination was made that
19 B Plant could not meet modern safety, seismic, or secondary containment criteria. B Plant was eliminated
20 from consideration as the pre-treatment facility.

21 Between 1990 and 1995, B Plant continued to support the WESF, and commenced limited facility
22 stabilization, cleanup and cleanout activities. On October 5, 1995, the U.S. Department of Energy issued
23 a shutdown order. This order included separating the WESF from the B Plant Building so that WESF
24 would function independently. The B Plant Complex was decommissioned and placed in surveillance
25 and maintenance on September 28, 1998.

26 **C.2 B Plant Complex Physical Description**

27 **C.2.1 221-B Building**

28 The 221-B Building is a canyon-type building constructed between 1943 and 1945. It is a steel-
29 reinforced concrete structure 247.04 meters long, with a maximum cross-sectional width of 20.18 meters
30 and a height of 23.53 meters, supported on a 1.83 meter thick concrete foundation. The structure is
31 divided into 20 segments separated by interlocking expansion joints. Most segments are 12.2 meters
32 long, with three segments ranging from 13.1 to 13.4 meters long. The roof is of concrete construction.
33 The roof varies in thickness from 0.91 meter at the mid-span to 1.22 meters at the edges where the roof is
34 supported by exterior walls. The crane way, the operating gallery, the pipe gallery, and the electrical
35 gallery are located on the north side of the structure. The hot pipe trench and the wind tunnel are located
36 along the south side. The lower portion of the canyon, between the two interior walls, is divided into a
37 series of individual process cells. On top of both the process cells and the hot pipe trench are removable
38 concrete cover blocks. The canyon deck is the area on top of the cover blocks.

39 A typical process cell is 5.5 meters long by 3.9 meters wide by 8.5 meters deep. A few of the cells are
40 longer, deeper, or both. Each cell is covered with 1.88 meter thick concrete cover blocks. The process
41 equipment in a cell was designed for remote, handling and maintenance. Jumpers were used to make
42 connections between the different pieces of process equipment. The jumpers provided piping, electrical,
43 and/or air connections.

44 **C.2.2 221-BB Process and Steam Condensate Building**

45 The 221-BB Building is located on the south side of the 221-B Building between the R-13 and R-15
46 stairwells (Figure 2-2). The 221-BB Building consists of a below-grade concrete vault (referred to as the
47 condensate pit) and an above-grade metal building.

1 The condensate pit is constructed of poured concrete and has a length of 5.28 meters, a maximum width
2 of 1.83 meters, and a depth of 2.59 meters. On top of the pit is a steel-framed building with metal sides
3 and roof. The two vessels in the 221-BB Building condensate pit are part of the Miscellaneous Tank
4 Storage System.

5 **C.2.3 221-BF Process Condensate Effluent Discharge Facility**

6 The 221-BF Facility is located in the southwest portion of the B Plant Complex, and is a below-grade
7 concrete vault. The vault is divided into a sample room, a monitor room, and a tank room. There is also
8 an above-grade stair building, constructed of steel frame and sheet metal. The two vessels in the 221-
9 BF Process Condensate Effluent Discharge Facility are part of the Miscellaneous Tank Storage System.

10 **C.2.4 276-BA Interim Organic Storage Facility**

11 The 276-BA Facility is located in the northeast portion of the B Plant Complex. The 276-BA Facility
12 consists of the secondary containment structure for two storage tanks. One of the two tanks has been
13 closed and physically removed. The secondary containment structure 9.4 meters long, 10.5 meters wide,
14 and 0.6 meter deep. The structure is divided into two separate compartments, each holding one storage
15 tank. The one remaining tank is part of the Organic Mixed Waste Storage System.

16 **C.3 B Plant Complex Dangerous Waste Management Units**

17 There are three waste management systems at B Plant Complex. These include waste treatment and/or
18 storage in tank systems, waste storage in containers, and waste storage in a containment building.

19 **C.3.1 B Plant Complex Tank Systems**

20 Table C.1 provides a summary of each dangerous waste management unit and its location in the B Plant
21 Complex.

22 **Table C.1. B Plant Dangerous Waste Management Unit Classification and**
23 **Location¹**

Dangerous Waste Management Unit(s)	Currently Managing Waste?	Dangerous Waste Management Unit Classification	Location
Neutralized Current Acid Waste (NCAW) Storage and Treatment System	No	Tank Systems	221-B Building
Low-Level Waste (LLW) Storage and Treatment System	No	Tank Systems	221-B Building
LLW Concentrator	No	Tank Systems	221-B Building
Organic Mixed Waste Storage System	No	Tank Systems	276-BA and 221-B Buildings
Miscellaneous Tank Storage System	No	Tank Systems	221-B, 221-B Canyon Deck, 221-BB, 221-BF Building
Cell 4 Containerized Waste Storage	Yes	Container Storage	221-B Building
221-B Containment Building	Yes	Containment Building	221-B Building

¹ The Organic Mixed Waste Storage System consists in part of the 276-BA Interim Organic Storage Facility, which in turn originally consisted of a secondary containment structure with two tank systems. One of the original two tanks has been physically removed from the unit. The remaining tank and the secondary containment structure remain subject to closure requirements of the Permit.

1 **C.3.2 Tank System Dangerous Waste Management Units**

2 There are five separate sets of dangerous waste tank systems used for treatment and/or storage of
3 dangerous/mixed waste. Each tank system includes storage vessels, ancillary equipment and secondary
4 containment. Addendum A identifies the dangerous waste tanks. Table C.2 summarizes each tank
5 system and its location.

6 **Table C.2. B Plant Dangerous Waste Tank Systems**

Vessel ID	Vessel Type	Capacity ¹	Vessel Location
NCAW Storage and Treatment System			
TK-6-2	Storage	19,684	221-B Building, Cell 6
TK-7-1	Storage	19,306	221-B Building, Cell 7
TK-7-2	Storage	18,927	221-B Building, Cell 7
TK-8-1	Storage	19,684	221-B Building, Cell 8
Tk-8-2	Storage	19,684	221-B Building, Cell 8
TK-13-1	Storage	15,142	221-B Building, Cell 13
TK-14-2	Storage	14,763	221-B Building, Cell 14
TK-29-3	Storage	15,520	221-B Building, Cell 29
TK-39-2	Storage	6,814	221-B Building, Cell 39
TK-39-5	Storage	7,571	221-B Building, Cell 39
LLW Storage and Treatment System			
TK-9-1	Storage	19,684	221-B Building, Cell 9
TK-9-2	Storage	19,684	221-B Building, Cell 9
TK-10-1	Storage	37,839	221-B Building, Cell 10
TK-24-1	Storage	52,616	221-B Building, Cell 24
TK-25-1	Storage	18,548	221-B Building, Cell 25
TK-25-2	Storage	18,548	221-B Building, Cell 25
TK-26-3	Storage	9,922	221-B Building, Cell 26
TK-39-1	Storage	13,120	221-B Building, Cell 39
LLW Concentrator			
TK-23-1	Storage	2,990	221-B Building, Cell 23
E-23-3	Heat transfer equipment (concentrator)	11,356	221-B Building, Cell 23
E-23-3-1	Heat transfer equipment (tube bundle)	0	221-B Building, Cell 23
E-23-3-2	Heat transfer equipment (tube bundle)	0	221-B Building, Cell 23
E-23-4	Head transfer equipment (condenser)	0	221-B Building, Cell 23
D-023-2	De-entrainer	0	221-B Building, Cell 23

¹ No additional wastes will be accepted for management in any of the Closure Unit Group 24 tank systems.

Vessel ID	Vessel Type	Capacity ¹	Vessel Location
Organic Mixed Waste Storage System			
TK-26-1	Storage	14,763	221-B Building, Cell 26
TK-27-2	Storage	7,571	221-B Building, Cell 27
TK-27-3	Storage	14,385	221-B Building, Cell 27
TK-27-4	Storage	1,060	221-B Building, Cell 27
TK-28-3	Storage	14,385	221-B Building, Cell 27
TK-28-4	Storage	1,060	221-B Building, Cell 28
TK-29-4	Storage	492	221-B Building, Cell 29
TK-30-3	Storage	15,520	221-B Building, Cell 30
ISO West	Storage	N/A	276-BA Facility (Tank closed and physically removed)
ISO East	Storage	17,500	276-BA Facility
Miscellaneous Tank Storage			
E-5-2	Heat Transfer Equipment	1,639	221-B Building, Cell 5
TK-17-1	Storage	18,700	221-B Building, Cell 17
TK-17-2	Storage	18,908	221-B Building, Cell 17
T-18-2	Tower	11,761	221-B Building, Cell 18
TK-18-3	Storage	2,794	221-B Building, Cell 18
E-20-2	Heat Transfer Equipment	1,552	221-B Building, Cell 20
TK-21-1	Storage	53,272	221-B Building, Cell 21
TK-22-1	Storage	1,775	221-B Building, Cell 22
TK-28-1	Tower	2,642	221-B Building, Cell 28
TK-29-2	Storage	15,077	221-B Building, Cell 29
T-30-1	Tower	2,634	221-B Building, Cell 30
TK-32-1	Storage	15,024	221-B Building, Cell 32
TK-33-1	Storage	53,211	221-B Building, Cell 33
TK-34-2	Storage	15,520	221-B Building, Cell 34
TK-35-2	Storage	15,002	221-B Building, Cell 35
TK-36-1	Storage	15,547	221-B Building, Cell 36
TK-100	Storage	15,122	221-B Building, Canyon deck, trench side of Cell 34
BCP	Storage	2,271	221-BB Building, Condensate Pit
BCS	Storage	2,271	221-BB Building, Condensate Pit
221-BF-A	Storage	49,210	221-BF Facility, Effluent Control Pit
221-BF-B	Storage	49,210	221-BF Facility, Effluent Control Pit

1 Note that the cell drain header, which empties into Cell 10, is common to all 221-B Building cells which
2 serve as secondary containment to 221-B Building tank systems.

3 **C.3.3 Container Storage Dangerous Waste Management Units**

4 Beginning in 1987, both dangerous/mixed and radioactive-only containerized wastes have been stored in
5 Cell 4. There is no intent to receive additional waste in Cell 4. The maximum design capacity for
6 container storage is 51,008 liters, or a maximum of 245 208-liter containers. No additional containerized
7 wastes will be accepted for management in the Cell 4 container storage unit.

1 **C.3.4 Containment Building Dangerous Waste Management Units**

2 Each of the process cells and the canyon deck in the 221-B Building are considered containment buildings
3 for storage of discarded or failed process equipment, and lead shielding materials. Process equipment,
4 including jumpers, may contain lead used as weights, counterweights, or shielding. Lead shielding may
5 be in the form of sheets, bricks, blanks, and shielding integral to various pieces of equipment. Process
6 equipment and shielding may be contaminated with waste residues.

7 No additional wastes or debris will be accepted for management in the Closure Unit Group containment
8 building.

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