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FACT SHEET
PART V, CLOSURE UNIT GROUP 24, B PLANT COMPLEX

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1 **FACT SHEET**

2 **PART V, CLOSURE UNIT GROUP 24, B PLANT COMPLEX**

3 **UNIT DESCRIPTION**

4 B Plant was a plutonium recovery facility located in the 200 East Area. It operated from 1945 to 1952.

5 In the late 1950s, concern grew about the heat from radioactive waste in the single-shell tanks. Some of
6 the waste was hot enough to make the liquid waste boil. The Permittees decided to remove some of the
7 high-heat isotopes. After some experimentation and process development, the Permittees chose B Plant
8 for the large-scale separating mission.

9 B Plant upgrades started in 1962 and ended in 1967. Between 1968 and 1983, B Plant separated isotopes
10 from the single-shell tank waste. More than 100 million curies of strontium-90 and cesium-137 were
11 recovered and put it in capsules. Since 1974, the Permittees have stored strontium and cesium capsules at
12 the Waste Encapsulation and Storage Facility (WESF) which is located adjacent to B Plant.

13 In 1984 and 1985, the Permittees prepared B Plant for a new mission, pre-treating Hanford tank waste. In
14 1990, the Permittees dropped plans to use B Plant as the pre-treatment facility because it could not meet
15 modern safety, seismic or secondary containment criteria.

16 Between 1990 and 1995, B Plant continued to support operations at WESF, and limited facility
17 stabilization, cleanup, and cleanout activities began.

18 On October 5, 1995, the U.S. Department of Energy issued a shutdown order for B Plant. This order
19 included separating the WESF from the B Plant Building so that WESF could function independently.
20 WESF is included in this permit as Operating Unit Group 14.

21 The Permittees decommissioned B Plant Complex and put it in surveillance and maintenance on
22 September 28, 1998.

23 The B Plant Complex has dangerous waste management units in four areas.

- 24 • 221-B Building.
- 25 • 221-BA Interim Organic Storage Facility.
- 26 • 221-BB Process and Steam Condensate Building.
- 27 • 221-BF Process Condensate Effluent Discharge Facility.

28 **221-B Building**

29 The 221-B Building is a canyon-type building built between 1943 and 1945 to recover plutonium using a
30 bismuth-phosphate chemical separation process. The building is a steel-reinforced concrete structure
31 247.04 meters long with a maximum width of 20.18 meters and a height of 23.53 meters. It is supported
32 on a 1.83-meter thick concrete foundation.

33 The crane way, operating gallery, pipe gallery, and electrical gallery are on the north side of the structure.
34 The hot pipe trench and the wind tunnel are along the south side of the structure. The lower portion of the
35 canyon, between the two interior walls, is divided into a series of individual process cells. The process
36 cells and the hot pipe trench are covered with removable concrete cover blocks. The canyon deck is the
37 area on top of the cover blocks.

38 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
39 longer, deeper, or both. The process equipment in a cell was designed for remote handling and
40 maintenance. Jumpers were used to make connections between the different pieces of process equipment.
41 The jumpers provided piping, electrical, or air connections.

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1 **276-BA Interim Organic Storage Facility**

2 The 276-BA Facility is in the northeast portion of the B Plant Complex. The 276-BA Facility consists of
3 the secondary containment structure for two storage tanks. The secondary containment structure is
4 9.4 meters long, 10.5 meters wide and 0.6 meters deep. The structure is divided into two separate
5 compartments, each holding a storage tank. The Permittees have closed and removed one of the tanks.
6 The remaining tank is part of the Organic Mixed Waste Storage System.

7 **221-BB Process and Steam Condensate Building**

8 The 221-BB Building is on the south side of the 221-B Building. It consists of a below-grade concrete
9 vault (referred to as the condensate pit) and an above-grade metal building.

10 The condensate pit is made of poured concrete. It is 5.28 meters long, with a maximum width of
11 1.83 meters and a depth of 2.59 meters. On top of the pit is a steel-framed building with metal sides and
12 roof. The two vessels in the 221-BB Building condensate pit are part of the Miscellaneous Tank Storage
13 System.

14 **221-BF Process Condensate Effluent Discharge Facility**

15 The 221-BF Facility is in the southwest portion of the B Plant Complex. It is a below-grade concrete
16 vault. The vault has a sample room, a monitor room, and a tank room. There is also an above-grade stair
17 building, constructed of steel frame and sheet metal. The two vessels in the 221-BF Process Condensate
18 Effluent Discharge Facility are part of the Miscellaneous Tank Storage System.

19 **TYPE AND QUANTITY OF WASTE**

20 **B Plant Complex Dangerous Waste Management Units**

21 The B Plant Complex has three waste management systems. They are waste treatment or storage in tank
22 systems, waste storage in containers, and waste storage in a containment building.

23 **Tank System Dangerous Waste Management Units**

24 There are five separate sets of dangerous waste tank systems. They contain a total of 55 vessels. The
25 Permittees use the tank systems for treatment or storage of dangerous and mixed waste. Each tank system
26 includes storage vessels, ancillary equipment, and secondary containment. Addendum A summarizes
27 each tank system and its location. Table 2-3 of the *B Plant Complex Preclosure Work Plan* ([DOE/RL-98-](#)
28 [12, Rev. 1](#)) documents other tank system characteristics, including ancillary equipment.

29 The permit does not authorized receipt of any additional waste in any of the B Plant Complex tank
30 systems.

31 **Container Storage Dangerous Waste Management Units**

32 Beginning in 1987, dangerous, mixed, and radioactive-only wastes have been stored in Cell 4. The
33 maximum design capacity for container storage is 51,008 liters, or a maximum of 245, 208-liter
34 containers. The permit does not authorize receipt of any additional waste into Cell 4.

35 **Containment Building Dangerous Waste Management Units**

36 Each of the process cells and the canyon deck in the 221-B Building are considered containment buildings
37 for storage of discarded or failed process equipment and lead shielding materials. Process equipment,
38 including jumpers, may contain lead used as weights, counterweights, or shielding. Lead shielding may
39 be in the form of sheets, bricks, blanks, and shielding integral to various pieces of equipment. Process
40 equipment and shielding may be contaminated with tank waste residues. The permit does not authorize
41 receipt of any additional waste into the B Plant containment building.

42

1 **BASIS FOR PERMIT CONDITIONS**

2 B Plant is currently storing mixed waste in tank systems, container storage, and a containment building.
3 All of this mixed waste is subject to the land disposal restrictions in [WAC 173-303-140\(2\)\(a\)](#). (This
4 WAC incorporates the LDR restrictions in the federal RCRA regulations, 40 C.F.R. Part 268.)
5 Dangerous waste that is land-disposal restricted must be treated to prescriptive standards before it can be
6 disposed in landfills or other land-based units. (See 40 CFR §268.30-.39.)

7 Both state and federal laws have a “storage prohibition” that prohibits any storage of LDR waste in tanks,
8 containers, or containment buildings unless such storage is “*solely for the purpose of the accumulation of*
9 *such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal*
10 *...*” [[WAC 173-303-140\(2\)\(a\)](#)]. This prohibition is to discourage the continued accumulation of untreated
11 waste.

12 A permitted treatment, storage, and disposal unit may store LDR wastes for up to one year unless the state
13 can demonstrate that such storage is not solely for accumulating such quantities of hazardous waste “as
14 necessary to facilitate proper recovery, treatment, or disposal.” If such storage extends beyond one year,
15 the facility must prove that the storage is solely for the purpose of accumulating sufficient quantities to
16 facilitate proper recovery, treatment, or disposal.

17 In 1992, Congress passed the Federal Facility Compliance Act (FFCA, codified in RCRA). Among other
18 things, it drives USDOE facilities like Hanford to address their backlogs of untreated mixed waste.

19 The FFCA required USDOE to develop plans and schedules for developing “treatment capacities and
20 technologies” to address mixed waste backlogs. Once a state approves and incorporates the plan into a
21 state order, a “site treatment plan” becomes an enforceable compliance schedule. (See 42 US Code,
22 Section 6939C: Mixed waste inventory reports and plan.) So long as USDOE complies with an approved
23 plan, it will not be subject to fines or penalties for storage prohibition violations.

24 At Hanford, the Tri-Party Agreement satisfies the site treatment plan requirement. In particular, the LDR
25 report developed and maintained under Milestone M-26 is the site treatment plan.

26 The Tri-Party Agreement agencies have addressed B-Plant’s waste in a remedial action under Milestone
27 M-85-10A.

28 **CLOSURE**

29 The B Plant Complex is undergoing a phased decommissioning and closure process. The process has
30 three distinct phases:

- 31 1. Transition.
- 32 2. Surveillance and maintenance.
- 33 3. Disposition.

34 The Permittees use a phased approach because development of closure performance standards and a
35 complete closure plan during the transition phase is impractical, and future land use determinations are
36 not final.

37 The transition phase is complete for B Plant.

38 Facility decommissioning began on October 5, 1995. The Permittees removed, stabilized, disposed of, or
39 excessed major radioactive sources, dangerous chemicals, and waste. They flushed and removed
40 dangerous waste constituents from regulated vessels. B Plant is in a safe and environmentally secure
41 configuration for a long-term surveillance and maintenance program.

42 The B Plant complex is now in the surveillance and maintenance phase. The Permittees follow the
43 *Surveillance and Maintenance Plan for the 221-B Facility (B Plant)* [[DOE/RL-99-24, Rev. 3](#)]. The plan

1 outlines work needed to ensure protection of human health and the environment. It also provides a
2 defensible basis for the Permittees to start the final closure during the disposition phase.

3 A CERCLA feasibility study reviewed alternatives for the final disposition of Hanford's waste processing
4 facilities. B Plant is one of those facilities.

5 B Plant is classified as a Tri-Party Agreement "Tier 1 Facility" now in the surveillance and maintenance
6 mode pending final disposition. A 1996 Agreement in Principle stated, "The CERCLA process will be
7 utilized to determine the preferred alternative for U Plant, and on a case-by-case basis for the other
8 canyon facilities." (*Agreement in Principle Including Path Forward for Canyon Disposition Initiative*,
9 DOE-RL Letter 038471.)

10 The CERCLA process will evaluate disposition options specific to B Plant, considering factors such as:

- 11 • The nature and extent of radionuclide and chemical contamination within the structure.
- 12 • The structural integrity of the building.
- 13 • The structural design of the building.

14 B Plant's preferred alternative must address both CERCLA and dangerous waste closure requirements.

15 The B Plant complex is in a safe and stable configuration. The Permittees have removed, reduced, or
16 stabilized chemical hazards, and have reduced or eliminated the potential for dangerous waste to enter the
17 environment. The plant will be in long-term surveillance and maintenance until final closure during the
18 decommissioning phase.

19 In addition, dangerous waste closure requirements are a subset of B Plant's overall disposition. Ecology
20 finds the preferred approach for B Plant's final closure is to base both the final closure performance
21 standards and closure activities on the CERCLA process. This will ensure that both radiological and
22 chemical aspects of the dangerous waste management units are addressed and that full integration of
23 requirements and activities can be achieved. (The radiological component of dangerous waste
24 management unit closure must be addressed by USDOE through its authority under the *Atomic Energy*
25 *Act*.)

26 This leads Ecology to:

- 27 1. Establish the current safe and stable configuration of B Plant dangerous waste management tank
28 systems as an interim closure performance standard. Since all tank systems are now in this
29 configuration, no additional work is needed.

30 This interim closure performance standard is based on [WAC 173-303-610\(2\)](#) and
31 [WAC 173-303-640\(8\)](#). Since B Plant is safe and stable, and the Permittees manage B Plant under
32 the Tri-Party Agreement Action Plan, Section 8 [(*B Plant Complex Preclosure Work Plan*
33 ([DOE/RL-98-12, Rev. 1](#))], no other closure requirements are needed.

- 34 2. Establish operating authorization to store containerized waste in the B Plant container storage unit
35 under [WAC 173-303-630](#), and dangerous/mixed debris in the B Plant Containment Building
36 under 40 CFR 1100, incorporated in [WAC 173-303-695](#).

- 37 3. Establish a compliance schedule under [WAC 173-303-815\(3\)](#) for the Permittees to submit a
38 closure plan and closure performance standards to be incorporated into Addendum H. The
39 Permittees must submit a closure plan outline when they submit the remedial action work plan to
40 U.S. EPA under the CERCLA Record of Decision (ROD) for final disposition of B Plant. (The
41 schedule for finishing the B Plant CERCLA ROD will be established through the Tri-Party
42 Agreement). The closure performance standards and closure activities would be documented in a
43 Permit modification when the Permittees submit a remedial action implementation plan.

1 The actual closure activities could be carried out through Permit requirements, CERCLA
2 requirements, or some combination of the two. The closure must satisfy closure performance
3 standards established through a permit modification. A permit modification to add a closure plan
4 is usually a Class 2 or Class 3 permit change. In this instance, Ecology will accept notice and
5 comment through the CERCLA process at the proposed plan stage. This will satisfy the notice
6 and comment requirements under [WAC 173-303-830](#).

7 The schedule of compliance for satisfying closure requirements will be based on the current safe
8 and stable configuration of the various dangerous waste management units, and acceptance of the
9 inspection and maintenance requirements of the *Surveillance and Maintenance Plan for the*
10 *221-B Facility (B Plant)* ([DOE/RL-99-24, Rev. 3](#)), as being protective of human health and the
11 environment during the compliance period. The same surveillance and maintenance requirements
12 can also be accepted as satisfying the applicable operating requirements of the dangerous waste
13 regulations for storage of containerized waste and dangerous/mixed debris.

- 14 4. Establish Cell 4 as a container storage unit subject to dangerous waste closure requirements.
15 Similarly, the Permit establishes the remaining process cells in the 221-B Building and the
16 canyon deck as a containment building¹. Note that the Canyon Disposition Initiative has allowed
17 for consideration of use of canyon facilities as disposal units, provided the appropriate CERCLA
18 and dangerous waste Permit authorizations are in place.

19 GENERAL WASTE MANAGEMENT

20 Condition V.24.B.1 provides overall authorization to store existing dangerous and mixed waste in the
21 B Plant container storage unit and the B Plant Containment Building. (All conditions this Fact Sheet
22 refers to are in the Permit.)

23 Condition V.24.B.2 requires the Permittees to operate the B Plant Complex according to Addendum C,
24 Process Information. The references to the *B Plant Complex Pre-closure Work Plan*, [DOE/RL-98-12,](#)
25 [Rev. 1](#) and the *Surveillance and Maintenance Plan for the 221-B Facility (B Plant)*, [DOE/RL-99-24, Rev.](#)
26 [3](#) document the design, construction, and configuration as of the date of this draft Permit. Ecology finds
27 that all dangerous waste management units and associated physical equipment comply with
28 [WAC 173-303](#).

29 WASTE ANALYSIS

30 Information about all the waste now at the two B Plant dangerous waste management units is in the
31 Hanford Facility operating record. This satisfies [WAC 173-303-300](#) requirements for waste analysis.
32 Since the permit does not allow the Permittees to accept or manage any other waste, there is no need for
33 waste analysis requirements or waste acceptance processes.

34 Condition V.24.C.1 establishes requirements to maintain the current waste information. Waste profile
35 sheets, which must be maintained in the facility operating record, are used to comply with the
36 recordkeeping requirements of [WAC 173-303-380](#)(1)(a) through (c). Condition V.24.C.2 ensures that
37 these waste profiles are maintained in the facility operating record.

38 RECORDKEEPING AND REPORTING

39 Condition V.24.D is based on Condition II.I.2, [WAC 173-303-380](#), and [WAC 173-303-810](#)(16) to ensure
40 that proper recordkeeping and reporting requirements procedures are followed.

41 SECURITY

42 B Plant is within the secured area of Hanford. Access to the unit is subject to the general security
43 provision of Condition II.L. Security provisions, access controls, and signage specific to this unit will
44 comply with the requirements of [WAC 173-303-310](#).

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1 **PREPAREDNESS AND PREVENTION**

2 Condition V.24.F covers preparedness and prevention requirements, which are based on [WAC 173-303-](#)
3 [340](#). Specific requirements are established in the Permit to control ignition sources and to manage
4 ignitable and reactive wastes. The Permittees will ensure that ignitable and reactive wastes are not
5 exposed to excessive heat and sources of ignition. The Permittees must store incompatible wastes in
6 approved separate secondary containment to prevent mixing.

7 **CONTINGENCY PLAN**

8 Contingency plan requirements are in Conditions II.A.

9 **INSPECTIONS**

10 Conditions II.X, Condition V.24.H, and Addendum I contain inspection requirements, based on the
11 requirements of [WAC 173-303-320](#).

12 Condition II.X requires the Permittees to establish a written inspection schedule. The Permittees must
13 conduct periodic inspections following this schedule. Addendum I includes a written schedule for
14 inspecting monitoring equipment, safety and emergency, and security systems. The inspections are to
15 detect and prevent malfunctions, deterioration, operator error, or discharges from the unit that could harm
16 human health or the environment.

17 Condition II.X also requires the Permittees to correct problems revealed during these inspections and
18 defines overall inspection recordkeeping requirements.

19 **TRAINING**

20 The Permit requires the Permittees have a training program that ensures dangerous waste management
21 employees have the skills and knowledge to do their work safely. The Permit requires that the training
22 requirements established in Addendum G be maintained in a Dangerous Waste Training Plan prepared
23 according to Condition II.C.1. The training program and written training plan must meet the requirements
24 of [WAC 173-303-330](#).

25 **REQUESTED VARIANCES OR ALTERNATIVES**

26 There are no requested variances or alternatives for B Plant.

27 **STATE ENVIRONMENTAL POLICY ACT (SEPA)**

28 The SEPA determination for this unit is in the Hanford-Wide Permit Fact Sheet.

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