

1
2
3
4
5
6

ADDENDUM F
PREPAREDNESS AND PREVENTION

DRAFT

1
2
3
4

This page intentionally left blank.

DRAFT

1
2
3
4

5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

ADDENDUM F
PREPAREDNESS AND PREVENTION

Contents

F.0	PREPAREDNESS AND PREVENTION	F.1
F.1	Preparedness and Prevention Requirements.....	F.1
F.1.1	Equipment Requirements	F.1
F.1.2	Internal Communications	F.1
F.1.3	Spacing Requirement	F.2
F.2	Preventive Procedures, Structures, and Equipment.....	F.2
F.2.1	Loading and Unloading Operations	F.2
F.2.2	Run-Off	F.2
F.2.3	Water Supplies	F.3
F.2.4	Equipment and Power Failures.....	F.3
F.2.5	Personnel Exposure	F.3
F.3	Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste.....	F.4
F.3.1	Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste	F.4
F.3.2	Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste.....	F.4

1
2
3
4

This page intentionally left blank.

DRAFT

1 **F.0 PREPAREDNESS AND PREVENTION**

2 This addendum discusses preparedness and prevention requirements, preventive procedures, structures,
3 and equipment, and prevention of reaction of ignitable, reactive, and incompatible waste for the
4 242-A Evaporator.

5 **F.1 Preparedness and Prevention Requirements**

6 The following sections document the preparedness and prevention measures taken at the
7 242-A Evaporator.

8 **F.1.1 Equipment Requirements**

9 The following sections describe the internal and external communications and emergency equipment
10 located at the 242-A Evaporator that can be activated by the 242-A Evaporator BED. Hanford Facility-
11 wide equipment is identified in Permit Attachment 4, *Hanford Emergency Management Plan*
12 (DOE/RL-94-02).

13 **F.1.2 Internal Communications**

14 The 242-A Evaporator is equipped with internal communication systems to provide immediate emergency
15 instruction to facility personnel. The onsite communication systems at the 242-A Evaporator include
16 telephones, hand-held two-way radios, a public address system, and alarm systems. The telephone and
17 radio systems provide for internal and external communication. Alarm systems allow facility personnel
18 to respond appropriately to various emergencies, including building evacuations, take cover events, fires,
19 and/or explosions. The locations of telephones, public address systems, and alarms are given in the 242-
20 A Evaporator Addendum J, Contingency Plan.

21 Immediate emergency instruction to personnel is provided by a public address system using speaker horns
22 and speakers located throughout the 242-A Evaporator and 242-AB Buildings and outside.

23 **F.1.2.1 External Communications**

24 The 242-A Evaporator is equipped with devices for summoning emergency assistance from the Hanford
25 Fire Department, the Hazardous Materials Response Team, and/or Hanford Patrol, as necessary. External
26 communication to summon emergency assistance is made by using a telephone communication system,
27 fire alarm pull boxes, or hand-held radio as described in Permit Attachment 4, *Hanford Emergency*
28 *Management Plan* (DOE/RL-94-02). These devices are provided through the 242-A Evaporator.

29 During certain periods, only one operator may be available within the 200 East plateau. This operator has
30 access to external communication using telephones located throughout the building.

31 **F.1.2.2 Emergency Equipment**

32 Emergency equipment is available throughout the 242-A Building. The locations of telephones, public
33 address systems, and alarms are given in the 242-A Evaporator, Addendum J, Contingency Plan.

34 Major fire damage is unlikely at the 242-A Evaporator because of the concrete construction and because
35 the amount of combustible material is minimized. Temperature-activated water sprinkler systems,
36 emergency lights, fire alarms pull boxes, and fire extinguishers are located throughout the facility. The
37 242-A Evaporator relies primarily on the Hanford Fire Department to respond to fires and other
38 emergencies as described in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-
39 02). The Hanford Fire Department is capable of providing rapid response to fires within the 200 East
40 Area.

41 Safety showers are located in the areas where personnel are most likely to have direct exposure of
42 hazardous materials: in the AMU room and on the first and fourth floors of the condenser room. Water
43 for these devices is supplied from the sanitary water system.

1 Respirators are located in the PPE storage room near the entryway to the condenser room. Other PPE,
2 such as hazardous material protective gear and special work procedure clothing, are located in cabinets in
3 the survey area. If required, PPE is donned before entry into the rooms containing mixed waste. The
4 level of personal protective equipment required depends on the level of contamination in the area being
5 entered and the activity being performed.

6 A spill control kit is located in a cabinet near the door to the PPE storage room. An inventory of the
7 equipment in the spill kit is included inside the cabinet. The spill kit cabinet door seal is checked monthly
8 to ensure the kit has not been used. The kit inventory is inspected annually.

9 The 242-A Evaporator operating personnel are trained in the use of emergency equipment (Addendum G,
10 Personnel Training).

11 **F.1.2.3 Water for Fire Control**

12 Water for fire protection is supplied from the 200 East Area raw water system. Columbia River water is
13 supplied to the fire control system from the 282-E Water Supply Reservoir. The water distribution
14 system is sized to provide adequate volume and pressure to supply fire-fighting needs under normal and
15 emergency conditions. A fire hydrant is located in the immediate proximity of the 242-A Building.

16 In the event that the sprinkler system at the 242-A Evaporator does not put out a fire, or the sprinkler
17 system is damaged during an accident, the Hanford Fire Department fire station will provide equipment as
18 described in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02).

19 **F.1.3 Spacing Requirement**

20 Sufficient space is maintained on the exterior of the 242-A Evaporator to allow access of personnel and
21 equipment responding to fires, spills, or other emergencies. Unobstructed fire lanes run from Fourth
22 Street and Canton Avenue to the 242-A Building main entrance to allow emergency vehicle access to the
23 main entrance and the nearby fire hydrant.

24 The 242-A Building interior space is designed to allow access by emergency response personnel while
25 maintaining barriers to contain releases of gaseous or liquid waste and hazardous material. Exit (egress)
26 paths in the rooms containing dangerous waste are checked daily to ensure the walkways have not been
27 obstructed.

28 **F.2 Preventive Procedures, Structures, and Equipment**

29 The following sections describe preventive procedures, structures, and equipment.

30 **F.2.1 Loading and Unloading Operations**

31 The feed transfer and slurry lines between the 242-A Evaporator and AW Tank Farm are constructed of
32 carbon steel piping with secondary containment and leak detection in a pipe-within-a-pipe arrangement.
33 Although the regulations exempt systems that serve as secondary containment from requiring secondary
34 containment, two of the drain lines from the 242-A Evaporator to AW Tank Farm also have outer
35 encasement piping and leak detection (Addendum C, §C.1.4, for information on these lines).

36 Waste transfers within the 242-A Building are contained by the secondary containment walls, floors and
37 drains (Addendum C, §C.1.4, for information on secondary containment at the 242-A Evaporator).

38 Mixed waste storage containers are not loaded or unloaded at the 242-A Evaporator. Unloading
39 operations occur when equipment contaminated with mixed waste exits the facility. Such materials are
40 fully sealed in plastic with absorbent material to absorb any free liquid present. Because of these
41 requirements, the likelihood of a spill outside the 242-A Building during this operation is extremely low.

42 **F.2.2 Run-Off**

43 Liquid waste handling at the 242-A Evaporator occurs within tank systems with secondary containment.
44 Rooms containing mixed waste have drains that route to either the pump room sump or the feed tank,

1 241-AW-102. The pump room sump overflows to the feed tank as well. Therefore, run-off from a major
2 leak, such as a break in a large water line within the 242-A Building, would be contained within the
3 facility or drained to the feed tank (Addendum C, §C.1.4 for information on secondary containment and
4 drain systems).

5 **F.2.3 Water Supplies**

6 Raw and sanitary Columbia River water are supplied to the 242-A Evaporator via separate underground
7 lines from the 282-E Water Supply Reservoir. Raw water is filtered to prevent organisms and other
8 debris from clogging valves, fire hydrants, and other equipment. Sanitary water is filtered and treated
9 before distribution through a piping system separate from the raw water system.

10 The raw water supply to the 242-A Evaporator enters the 242-A-81 Water Service Building, passing
11 through a strainer and backflow preventer before entering the facility. The backflow preventer ensures
12 contaminated water cannot flow back into the raw water system. A second backflow preventer is
13 installed in the 242-A Building on the raw water supply line connecting with the condensate recycle line.
14 This system allows either raw water or process condensate to be used for the pump seal water and
15 deentrainment pad spray water without risk of contamination of the raw water system.

16 The sanitary water system provides water to the lunchroom, drinking fountains, men's and women's
17 change rooms, safety showers, and supply ventilation system air washers. There are no connections
18 between sanitary water and any system or piping containing mixed waste.

19 **F.2.4 Equipment and Power Failures**

20 A diesel generator provides backup power. The diesel motor starts automatically on loss of electrical
21 power and has sufficient fuel to operate the generator, if needed, to shut down safely the evaporator
22 process. An uninterruptible power supply system also is provided to allow continued operation of the
23 MCS computer to ensure uninterrupted monitoring until the backup generator is fully on line.

24 The 242-A Evaporator is designed to mitigate the effects of failure of a major piece of equipment. In
25 general, the evaporator process can be shut down and the vapor-liquid separator gravity-drained to the
26 feed tank, 241-AW-102, in the event of equipment failure. The process condensate tank, TK-C-100, is
27 designed to overflow to feed tank 241-AW-102. This mitigates failure of the process condensate pump
28 used to transfer the process condensate to LERF.

29 Response to equipment and power failures are discussed in more detail in Addendum J, Contingency
30 Plan.

31 **F.2.5 Personnel Exposure**

32 Facility design, administrative controls, and personal protective equipment are used at the
33 242-A Evaporator to prevent undue exposure of personnel to mixed waste and other hazardous materials.
34 The following features were incorporated into the 242-A Evaporator design to minimize personnel
35 exposure.

- 36 • The facility is designed for remote operation of equipment containing highly radioactive solutions
37 such as waste feed and slurry. These solutions usually are present only in the pump room and
38 evaporator room, which are heavily shielded and routinely are not entered by operating personnel.
- 39 • The 242-A Building ventilation system is designed to provide airflow from uncontaminated zones
40 to progressively more contaminated zones.
- 41 • Emergency lighting devices are located strategically throughout the 242-A Building.
- 42 • Eyewash stations and safety showers are located in rooms containing mixed waste or other
43 hazardous materials that personnel routinely enter. For location of these, refer to the 242-A
44 Evaporator Addendum J, Contingency Plan.

- 1 • Continuous air monitors with audio and/or visual alarms to notify personnel of airborne
2 radioactive contamination are provided in rooms that contain mixed waste and that routinely are
3 entered.
- 4 • Methods for decontaminating vessels and equipment are available to reduce personnel exposure if
5 entry for maintenance activity is required.
- 6 • Offices, control room, change rooms, and lunchroom are situated to minimize casual exposure of
7 personnel.

8 All operations are conducted so employee exposure to mixed waste and other hazardous materials are
9 maintained ALARA. Exposures are minimized by engineering or administrative controls with protective
10 gear used where such controls are not practical. Before the start of any operation that might expose
11 personnel to the risk of injury or contamination, a review of the operation is performed to ensure the
12 nature of hazards that might be encountered are considered and that appropriate protective gear is
13 selected. Administrative procedures dictate the level of protective clothing worn and depend on the
14 location within the 242-A Building and the nature of the activity being performed. Personnel are trained
15 to wear personal protective equipment in accordance with approved work procedures.

16 **F.3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste**

17 The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

18 **F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste**

19 Administrative procedures are designed to prevent the ignition or reaction of waste at the
20 242-A Evaporator. The precautions include the following.

- 21 • Analysis is performed on candidate waste in the DST System to check that there are no
22 exothermic reactions when the waste is heated and that there will be no adverse effects due to
23 mixing the contents of different waste tanks in the feed tank and evaporator vessel (Addendum B,
24 Waste Analysis Plan).
- 25 • Sample analysis of the candidate waste in the DST System includes a surface sample to identify
26 the presence of a separable organic phase that might be ignitable. If a separate organic phase is
27 detected, the waste solution level in the feed tank is maintained above 2.54 meters to prevent
28 transfer of the organic phase to the 242-A Evaporator.
- 29 • The condensate tank, C-100, is equipped with instrumentation to detect the presence of a
30 separable organic phase. If a separate organic phase is detected, the tank is allowed to overflow,
31 transferring the organic phase to the feed tank, 241-AW-102.
- 32 • The condensate tank, C-100 is overflowed to the DST System during each campaign to prevent
33 the possibility of accumulating immiscible organics in the condensate waste tank.
- 34 • The vapor-liquid separator and the condensate tank are drained and flushed before any welding is
35 performed.
- 36 • Administrative safety controls have been established to control the use and quantities of
37 combustibles materials, fuels, and gases. Hot work activities such as cutting, welding, and
38 brazing are administratively controlled as part of the industrial safety program.

39 **F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible 40 Waste**

41 Waste received at the 242-A Evaporator is protected from materials or conditions that might cause the
42 waste to ignite or react. Much of the waste handling is done remotely to reduce the risk to operating
43 personnel. For precautions taken to prevent the ignition or reaction of waste, refer to Section F.3.1.

44 The constituents in the waste received at the 242-A Evaporator that are ignitable or reactive are not very
45 volatile. Therefore, the evaporation process renders the waste that is evaporated (i.e., the process
46 condensate) neither ignitable nor reactive.

1
2
3
4

This page intentionally left blank.

DRAFT