FACT SHEET

PART III, OPERATING UNIT GROUP 4, 242-A EVAPORATOR
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UNIT DESCRIPTION

The 242-A Evaporator, Operating Unit Group 4, is a mixed waste treatment and storage unit. It is in Hanford’s 200 East Area. It is a conventional forced-circulation, vacuum evaporation system to reduce waste volume. It began operations in March 1977.

The evaporator treats the waste by removing water and most volatile organics. This creates a concentrated slurry waste stream that is routed back to the Double-Shell Tank (DST) System, and a process condensate stream routed to the Liquid Effluent Retention Facility (LERF). Off-gases from the treatment process are routed through a de-entrainment unit, a pre-filter, and high-efficiency particulate air filters before being discharged to the environment.

Tank C-A-1, the evaporator vessel, is in the evaporator room. It consists of two sections:

- A lower (liquid) section, a 4.3 meter (14-foot) diameter stainless steel shell.
- An upper (vapor) section, a 3.5 meter (11.6-foot) diameter stainless steel shell. The upper section contains two wire-mesh de-entrainment pads for the removal of liquids and solids that could be carried into the vapor header.

Process slurry from the reboiler discharges to Tank C-A-1. Concentrated process slurry exits the lower section of Tank C-A-1 through a 28-inch recirculating line. Vapor flows out of Tank C-A-1 through a 42-inch vapor line at the top. The maximum design capacity of Tank C-A-1 is 103,217 liters (27,267 gallons).

Tank C-100, the condensate collection tank, is in the condensate room. It is a stainless steel 4.3 meter (14-foot) diameter by 5.9 meter (19-foot) high tank in the condensate room. It has a maximum design capacity of 67,380 liters (17,800 gallons). Process condensate from the primary condenser, inter-condenser, and after-condenser drain by gravity to Tank C-100. Tank C-100 also receives potentially contaminated drainage from the vessel vent system via a seal pot.

Concentrated slurry is pumped back into the DST System. The process condensate is routed through condensate filters before release to LERF.

TYPE AND QUANTITY OF WASTE

Waste going to the 242-A Evaporator is regulated as a mixed waste. The 242-A Evaporator receives waste (slurry) from the DST System feed tank 241-AW-102. The 242-A Evaporator can treat up to 870,642 liters (230,000 gallons) of dangerous and mixed waste per day. It produces two waste streams. The first stream is concentrated slurry. The concentrated slurry is routed back to the DST System for storage pending further treatment. The second stream is process condensate. The Permittees pump the process condensate from Tank C-100 through the PC-5000 encased underground pipeline (pipe-within-a-pipe) to LERF.

BASIS FOR PERMIT CONDITIONS

This permit is intended to protect human health and the environment while ensuring proper management of waste at the 242-A Evaporator. The permit addenda are incorporated into this permit and are enforceable by reference.

The Department of Ecology bases the conditions and addenda for the 242-A Evaporator on:

- The Hanford Facility Dangerous Waste Permit, Revision 8C.
- Permit modifications to Revision 8C of the permit.
- Comment resolution meetings with the Permittees.
The permit includes requirements for complying with environmental standards and maintaining and modifying the permit. The permit conditions address specifics such as personnel training, adequate staffing, process controls, and inspection requirements.

**GENERAL WASTE MANAGEMENT STANDARDS**

Condition III.4.B.1 authorizes the Permittees to accept dangerous and mixed waste into the 242-A Evaporator according to Addendum B, Waste Analysis Plan (WAP). The waste must satisfy the waste acceptance criteria of Addendum B.

Condition III.4.B.2 authorizes the Permittees to treat the waste.

Condition III.4.B.3 requires the Permittees to maintain the evaporator as described in Addendum C. This addendum describes the current design, construction, and configuration. The purpose of this condition is two-fold. First, this condition establishes a baseline of the facility configuration for inspection and modification. Any changes from this baseline require authorization through the permit modification process. Second, in establishing this condition, we find the evaporator is in compliance with the applicable requirements of Washington Administrative Code (WAC) WAC.173-303.

Condition III.4.B.4 governs operation of 242-A Evaporator. It requires the Permittees to comply with the operating procedures in Addendum C. This condition requires that the systems be operated in compliance with permit conditions and in a manner that protects human health and the environment. This condition clarifies that the monitor and control system (MCS) described in Addendum C is considered to include all indicators, sensors, transducers, actuators, and other control devices connected to, but remote from, the centralized MCS computer.

**WASTE ANALYSIS REQUIREMENTS**

Conditions III.4.C require the Permittees to perform all sampling and analysis for compliance with the permit according to the waste analysis plan (WAP) in Addendum B. The Permittees also must follow recordkeeping requirements to comply with WAC.173-303-350. The WAP defines all sampling and analysis procedures to accept and manage wastes in the 242-A Evaporator.

**RECORDKEEPING AND REPORTING**

Condition III.4.D follows the requirements of WAC.173-303-330 and WAC.173-303-810(16) to ensure proper recordkeeping and reporting. The Permittees will comply with the requirements of Condition II.I.3.

**SECURITY**

The 242-A Evaporator is within Hanford’s secured area. Access to the operating area of the facility is subject to the general security provision of Permit Attachment 3 and Condition II.L. Security requirements applicable to the 242-A Evaporator are in Condition III.4.E and Addendum E, and are based on WAC.173-303-310(2).

**PREPAREDNESS AND PREVENTION**

Condition III.4.F.1 and Addendum F contain the 242-A Evaporator’s preparedness and prevention requirements. The requirements are based on WAC.173-303-340. Addendum F includes:

- Internal and external communication systems used to communicate with 242-A Evaporator personnel and emergency responders (Hanford Fire Department, Hanford patrol).
- Emergency equipment in the event of releases, fire, or other emergency.
- Preventive procedures, structures, and equipment.
- Prevention of reaction of ignitable, reactive, and incompatible wastes.
CONTINGENCY PLAN

Condition III.4.G.1 requires the Permittees to comply with the contingency plan in Addendum J and
Condition II.A. Addendum J requires the Permittees to immediately implement the plan when
emergencies arise.

INSPECTIONS

Conditions II.X, III.4.H, and Addendum I define inspection requirements. Condition II.X requires the
Permittees to establish a written inspection schedule and conduct periodic inspections following the
schedule. [WAC 173-303-320(2)(a)-(c)] Addendum I has a written schedule for inspecting monitoring,
safety, emergency, and security equipment. The inspections are to detect and prevent malfunctions,
deterioration, operator error, or discharges that could harm human health or the environment.

Condition II.X requires the Permittees to take action to correct problems revealed during these inspections
[required under WAC 173-303-320(3)]. It also requires the Permittees to follow inspection recordkeeping
requirements [required under WAC 173-303-320(2)(d)].

TRAINING

The Permittees must have written training plan to ensure employees have the skills and knowledge they
need to do their work safely. The Permittees must maintain the training requirements in Addendum G in
a training plan prepared according to Conditions II.C and III.4.I.1. The training program and written
training plan must meet the requirements of WAC 173-303-330.

OTHER GENERAL REQUIREMENTS

Condition III.4.J.1 requires the Permittees to comply with WAC 173-303-395(1) for the management of
ignitable or reactive wastes. The Permittees must take precautions to prevent risks from
management of any potentially reactive or ignitable wastes.

The 242-A Evaporator is hard-piped to both the DSTs and LERF, so it does not have a load-in/load out
area. No separate permit condition is necessary to ensure compliance with WAC 173-303-395(4).

Permit conditions for waste management in tanks require appropriate labels and markings for individual
containers and tanks, and satisfy WAC 173-303-395(6).

CLOSURE

Condition III.K.1 requires the Permittees to implement the practices in Addendum H and Condition II.J
when closing the 242-A Evaporator. The 242-A Evaporator will be clean closed. Closure performance
standards are based on closure by removal or decontamination standards of WAC 173-303-610(2)(b), as
well as the general closure performance standards of WAC 173-303-610(2)(a).

TANK MANAGEMENT STANDARDS

Tank management conditions generally follow the requirements of WAC 173-303-640. They either
incorporate WAC regulations by reference or closely parallel those requirements, or refer to applicable
sections of Addendum C, satisfying the requirements of WAC 173-303-815(2).

Conditions III.4.P.1.a and b are based on WAC 173-303-640(3). Ecology is establishing an additional
requirement through Permit Condition III.4.P.1.c to review and update, as necessary, the integrity
assessment program whenever circumstances contradict or cast in doubt assumptions or recommendations
in the initial integrity assessment program. Ecology has determined this is necessary to prevent
unexpected corrosion and possible vessel failure. The basis for Condition III.4.P.1.c is the omnibus
authority of WAC 173-303-815(2)(b)(ii) to protect human health and the environment.

Condition III.4.P.2.h.1 authorizes the Permittees to use alternative leak detection inspection methods to
perform inspections in the condenser room per Addendum 1, Section I.1.2.3, during facility electrical or
ventilation outages. The Permittees must notify Ecology before they use the alternative leak detection
inspection method. Use of the alternative method must be documented in the operating record.

The main bases for Permit conditions for operating and inspection are WAC 173-303-640(5) and (6). We
have not set a specific condition based on the requirements of overfill controls in WAC 173-303-
640(6)(a), because Condition III.4.B.4 addresses them adequately.

REQUESTED VARIANCES OR ALTERNATIVES

Daily operational inspections are impacted during facility electrical or ventilation outages. The
Permittees may use an alternative leak detection inspection method to perform inspections in the
condenser room during outages. The basis of this alternative is that it is too hazardous for workers to
enter those areas when the electrical and ventilation systems are not operational.

The inspection will be performed with a camera placed above the floor drain in the condenser room.

STATE ENVIRONMENTAL POLICY ACT (SEPA)

The SEPA determination for the 242-A Evaporator is in the Hanford-Wide Permit Fact Sheet.
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