Attachment to
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PROCESS CONTROL PROGRAM FOR DEWATERING
WET RADIOACTIVE SOLID WASTE
PRCP-A

Duane Arnold Energy Center

Iowa Electric Light and Power Company

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Introduction

This Process control Program describes the dewatering of wet radioactive waste solids from liquid systems at the Duane Arnold Energy Center and packaging the waste in a high integrity container (HIC).

Wet wastes are those wastes produced from the liquid radwaste treatment system. These wastes may typically be described as resins (bead and powdered), filter material, waste sludges, and filter precoat media. The wastes included in this program are specifically those containing nuclides with a radioactive half-life greater than 5 years and a concentration in the resin of greater than 1Ci/m^3. The dewatering process removes liquid from the waste in a HIC to meet the criterion in 10 CFR Parts 61.56 (a)(3) and 61.56 (b)(2) for free-standing liquid. Stability is provided by the high integrity container as authorized by Part 61.56 (b)(1).

Vendor

Westinghouse Hittman Nuclear and Development Corporation of Columbia, Maryland, is the vendor of the dewatering and packaging services and of the RADLOK™ high integrity containers used at the DAEC. Hittman personnel perform the dewatering and packaging operations described herein.

Dewatering System Description

The Hittman dewatering system employs dewatering equipment to dewater the wet radioactive waste solids in a HIC. The Hittman system consists of an overflow drum, a container level indicators, and interconnecting piping and valves. Figure 1 is a diagram of the dewatering system as it is typically configured. A waste-filled HIC is dewatered in the radwaste building loading bay using dewatering equipment which is located in the radwaste building. The dewatering system uses service air supplied by the DAEC and exhausts air into the DAEC Radwaste Building Ventilation System.

Water removed from the HIC, during dewatering, is returned to the DAEC radwaste system and is treated as liquid radwaste.

The Hittman dewatering system is equipped with instruments to provide information about the dewatering process. These include mechanical and electrical liquid level indicators with sensors in the HIC and vacuum receiver tank. Vacuum gauges indicate amount of vacuum in the vacuum receiver tank and HIC. Drainable liquid tests are performed using a vacuum pump and vacuum bottle (VB-1 in Figure 1.) to verify liquid content of the HIC prior to shipment.

Operation

The radioactive wastes that are dewatered and packaged in a HIC for disposal are normally, but not limited to, wastes from the condensate phase separators, reactor water cleanup phase separators, waste sludge tank, spent resin tank, or concentrated waste tank.

Wastes from any of the above mentioned systems are piped to a waste holding tank which is piped directly to the vendor's equipment. The wastes are transferred to the HIC using the vendor's equipment as shown in Figure 1. A conductivity probe near the top of the HIC interior that actuates an audible alarm and light provides an indication of the waste level during HIC filling and after dewatering.

After a HIC is filled with waste, dewatering is performed by pulling a suction on an underdrain manifold in the HIC until loss of suction occurs. Loss of suction is indicated by a decrease in vacuum in the vacuum receiver tank to 10 inches Hg or less on the vacuum gauge. Pump down by suction on the bottom underdrain manifold is continued for a specified time with the dewatering pump and the vacuum pump.

A drainable liquid test is performed by allowing the HIC to rest for a stated time, then siphoning from the bottom underdrain manifold for a

specified time to remove any liquid that has drained into it. The drainable liquid test is passed if the volume of water removed is less than a volume demonstrated by the vendor to indicate less than 1% free-standing liquid in the waste for the HIC being tested.

In the event the waste in the HIC does not pass the drainable liquid test, a cycle of waiting a specified time, operating the dewatering and vacuum pumps, waiting a specified time, and then performing a drainable liquid test is repeated until the free-standing liquid criterion is met. Specific times appropriate for the HIC and waste being dewatered that have been determined by the vendor are stated in the dewatering procedure.

Essential Waste Characteristics and Verification

The requisite characteristics of the radioactive waste addressed by this Process Control Program are stated in 10 CFR Part 61.56.

The wastes subject to the process control plan are from sources within the DAEC that are well characterized and generally recognized as meeting the essential qualities of Part 61.56 (a), other than (a)(3). By knowing the source and kind of each of the subject wastes, IELP is able to ensure that the qualities of the wastes continue to meet the requirements of Part 61.56 (a), other than (a)(3), and are compatible with the HIC itself. In addition, the DAEC's chemical control program helps prevent listed substances from being admitted into the waste streams that are deposited into the HIC.

10 CFR Part 61.56 (b) includes provisions for stability of radioactive waste after its disposal. For the wastes covered by this PCP, Iowa Electric intends to provide that stability by placing the waste in a high integrity container that will be stable after disposal as authorized in Part 61.56 (b)(1).

Both 10 CFR Parts 61.56 (a)(3) and 61.56 (b)(2) require as little free-standing and noncorrosive liquid as is reasonably achievable and no more than 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability. Iowa Electric intends to accomplish this by dewatering as described herein and to perform surveillance to assure that it has been done. For a given type of waste, the operating procedure requires the vacuum pump be operated for stated time interval(s). Dewatering is considered complete when the volume of liquid that can be suctioned from the HIC during a defined time is no greater than an amount stated in the operating procedure pertaining to that kind of waste. The conditions stated in the procedure will have been demonstrated by the vendor of the dewatering service to achieve less than 1% free-standing water in the waste.

High Integrity Container

Wastes covered by this PCP will be packaged in RADLOK™ high integrity containers. The containers have been certified by the South Carolina Bureau of Radiological Health for the intended use.

Each container will be visually inspected before use for acceptable condition of:

1. Sealing components,
2. Exterior surface,
3. Dewatering tubes, and
4. Dewatering verification tube.

After filling and dewatering has been completed, the fill port opening in the container is closed in accordance with written procedures. The procedure requires verification that the closure gasket is in place and that the threaded fill port lid is tightened to a specified torque value.

Quality Assurance

Control of the dewatering and packaging processes is maintained by conducting these operations according to written procedures addressing HIC inspection before filling, dewatering, HIC closure, and cask loading. The vendor verifies and documents that key steps have been performed.

Iowa Electric maintains assurance that dewatering and packaging is performed as intended by separately verifying and documenting that the key steps were performed.

Iowa Electric's quality assurance program is subject to 10 CFR Part 50, Appendix B, as applied to dewatering and packaging of radioactive waste.

Administration

The Radiation Protection Department maintains or requires the vendor to maintain procedures which will ensure that all applicable requirements are met prior to shipment of radioactive waste. IELP will review applicable vendor's operating procedures before authorizing the vendor to dewater radioactive waste. The Radwaste Group of the Radiation Protection Department is responsible for ensuring compliance with the PCP, for Vendor oversight, and for recordkeeping.

At least once every 24 months, IELP will audit the radwaste Process Control Program and operating procedures that implement it (in accordance with technical specification 6.5.2.8.j.) Any change to the Process Control Program will be made in accordance with Technical Specification 6.15, approved by the Plant Superintendent-Nuclear, reviewed by the Operations Committee, and submitted to the NRC in the next Semi-Annual Radioactive Material Release Report after the change is made.

Training

Before a vendor employee performs a dewatering or packaging procedure that is subject to this PCP, they must have received relevant training, and Iowa Electric must have received documented confirmation of their training along with a statement of their qualifications.

References

1. DAEC Radwaste Handling Procedures

2. Westinghouse Hittman Nuclear Incorporated procedure STD-P-03-008, "Transfer and Dewatering Powdered Resin in Hittman RADLOK™-100 or -200 Containers with a Flexible Underdrain Assembly to Less Than 1% Drainable Liquid".

3. Westinghouse Hittman Nuclear Incorporated procedure STD-P-03-010, "Transfer and Dewatering Bead Resin in Hittman RADLOK™-100 or -200 Containers with Single Layer Underdrain Assembly to Less Than 1% Drainable Liquid".

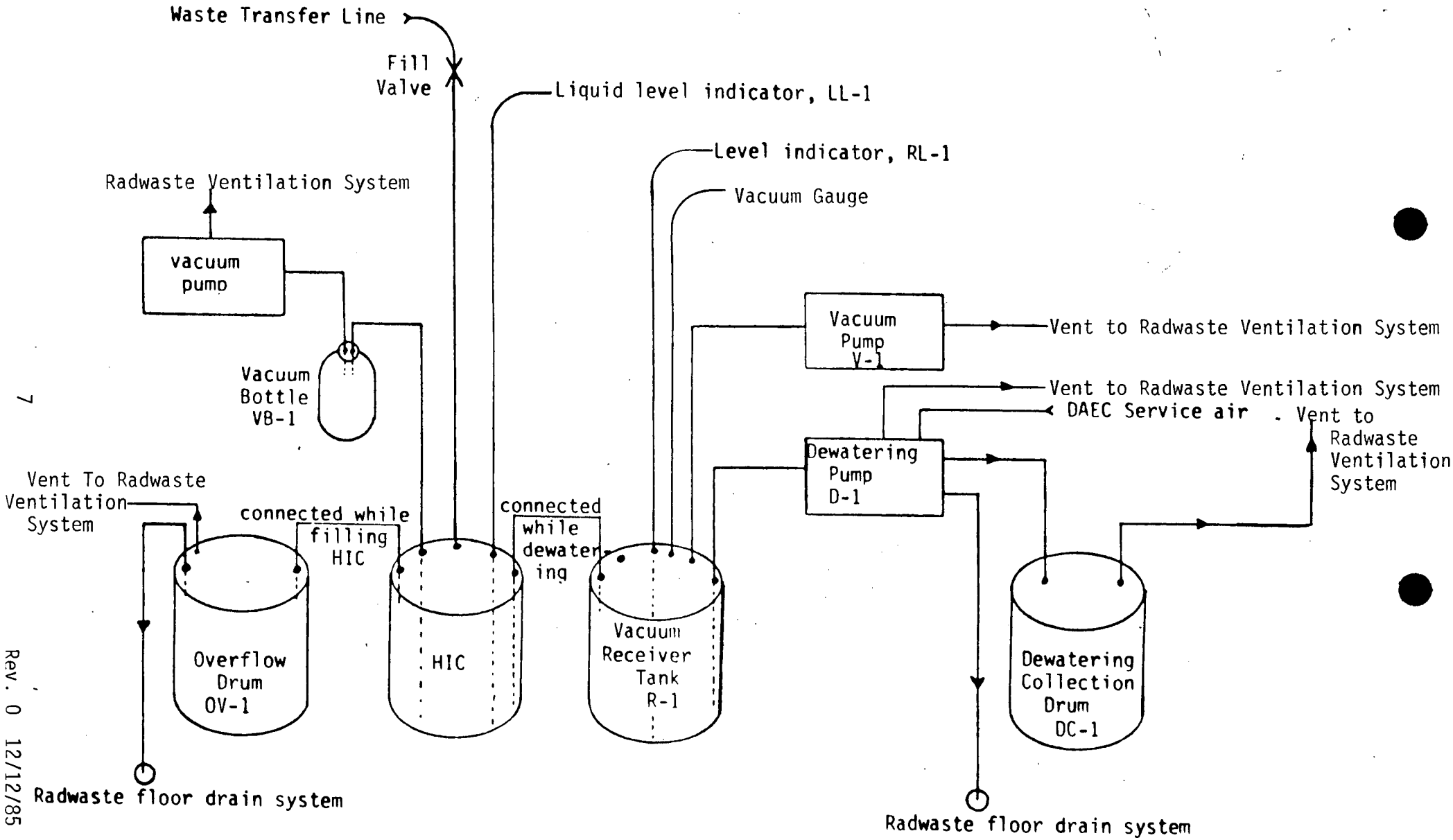

Figure 1. Dewatering Process, Typical Configuration