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# System Logic Description for High-Level Waste Facility - Melter Cave Support Handling System Decontamination Tank

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## Notice

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## History Sheet

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## Acronyms and Abbreviations

Reference the *P&ID Symbols and Legend Sheets*, as listed in the Applicable Documents section, for acronyms and abbreviations employed on the attached figures.

AEA	<i>Atomic Energy Act of 1954</i>
AI	analog input
Decon	decontamination
DOE	US Department of Energy
HLW	high-level waste
HSH	HLW melter cave support handling system
LAH	level alarm high
LAHH	level alarm high-high
LI	level indicator
LOL	lower operating limit
LSH	level switch high
LSHH	level switch high-high
LT	level transmitter
P&ID	pipng and instrumentation diagram
RLD	radioactive liquid waste disposal system
TK	tank
UOL	upper operating limit
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

## Glossary

Control system	This term refers to the electronic processors that perform regulatory and logic control functions necessary for normal operation of the plant.
High level	This term refers to a notification in the control system that is activated when the high level setpoint of the vessel has been reached.
High-high level	This term refers to a notification in the control system that is activated when the high-high level setpoint of the vessel has been reached.
Interlock	Predetermined system equipment connections so that action of one part of the system affects the action of another part of the system.
LOL	Lower operating limit - A low level set point used to stop a transfer-out batch operation from the vessel under normal plant operations.
Transfer-in	Coordinates the effluent transfer into a vessel by setting the appropriate valve alignment and facility communication.
Transfer-out	Coordinates the effluent transfer out of a vessel by setting the appropriate valve alignment and facility communication.
UOL	Upper operating limit - A high level set point used to stop a transfer-in batch operation to the vessel under normal plant operation.

# 1 Introduction

This document describes the instrument control logic for the high-level waste (HLW) facility decontamination tanks within the melter cave support handling system associated with the dangerous waste permit.

## 2 Applicable Documents

24590-HLW-M6-RLD-P0003, *P&ID - HLW Radioactive Liquid Waste Disposal System Decontamination Tank & Sumps.*

24590-HLW-M6-RLD-P20003, *P&ID - HLW Radioactive Liquid Waste Disposal System Decontamination Tank & Sumps - Melter 2.*

24590-HLW-PER-J-02-003, *System Logic Description for HLW Facility Radioactive Liquid Waste Disposal System.*

WAC 173-303, *Dangerous Waste Regulations. Washington Administration Code, as amended.*

## 3 Description

### 3.1 System

The radioactive liquid waste disposal (RLD) system is the receipt system for the HLW melter support handling system (HSH) decontamination tank liquid. Instruments for the decontamination tank level and density are tagged with the RLD system tag numbers. Decontamination tank level measurement will not always be based on water pressure differential. The tank headspace is considered a constant pressure and the density of the liquid will be variable. Tank liquid density changes are used to sense and compensate the tank level measurement. Density compensation is via a calculation within the control system.

The decontamination tanks control system instruments have tag numbers with the HSH system designator. The ancillary equipments in the dangerous waste permit are:

- HSH-TK-00001 decontamination tank melter cave 1
- HSH-TK-00002 decontamination tank melter cave 2

### 3.2 Transfer Control Logic

The decontamination tanks (HSH-TK-00001 or HSH-TK-00002) are used to decontaminate equipment prior to hands on repair. Liquid waste may be periodically transferred from the HSH decontamination tanks (HSH-TK-00001 or HSH-TK-00002) to the RLD plant wash and drains vessel (RLD-VSL-00008). Liquid waste transfers between the decontamination tanks (HSH-TK-00001 or HSH-TK-00002) and the RLD plant wash and drains vessel (RLD-VSL-00008) will be controlled by the control system. Level instrumentation and control to prevent overflow of the RLD receipt vessel are provided in System Logic

Description for High Level Waste Facility - Radioactivity Liquid Waste Disposal System. Transfers will be limited to one decontamination tank volume transfer from one of the two decontamination tanks at a time.

When a decontamination tank for melter 1 (HSH-TK-00001) or for melter 2 (HSH-TK-00002) is available to transfer waste effluent out of a decontamination tank, the operator initiates the transfer-out sequence. The transfer-out sequence is stopped by the control system when the level in the decontamination tank (HSH-TK-00001 or HSH-TK-00002) reaches the lower operating limit (LOL), the specified transfer amount has been transferred, or the receiving vessel reaches its upper operating limit (UOL). When the transfer-out sequence is complete, the control system will alert the operator that the transfer is complete.

Table 1 shows the level and density instruments associated with the decontamination tanks (HSH-TK-00001 and HSH-TK-00002). Figure 1 shows the typical control system (UOL and LOL) for the level instruments associated with the decontamination tanks (HSH-TK-00001 and HSH-TK-00002). The decontamination tank effluent will be transferred out when equipment decontamination is completed. The decontamination tank level signal will alert the operator if level goes above the normal desired control range. A level alarm high-high (LAHH) can activate the control system to automatically stop the fluid being added to the decontamination tank that is in use.

**Table 1      Instruments for HLW HSH Decontamination Tank (HSH-TK-00001), Melter 1  
and Decontamination Tank (HSH-TK-00002), Melter 2.**

<b>Instrument Tag Number</b>	<b>Associated Vessel</b>	<b>Description</b>
RLD-DT-3329	HSH-TK-00001	density measurement sensor
RLD-LT-3307	HSH-TK-00001	level measurement sensor
RLD-DT-3379	HSH-TK-00002	density measurement sensor
RLD-LT-3357	HSH-TK-00002	level measurement sensor

Figure 1 Typical Level Measurement for HLW HSH Decontamination Tank HSH-TK-00001) for Melter 1 and Decontamination Tank (HSH-TK-00002) for Melter 2.

