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System Logic Description for High-Level Waste Facility - Melter Feed (HFP) System

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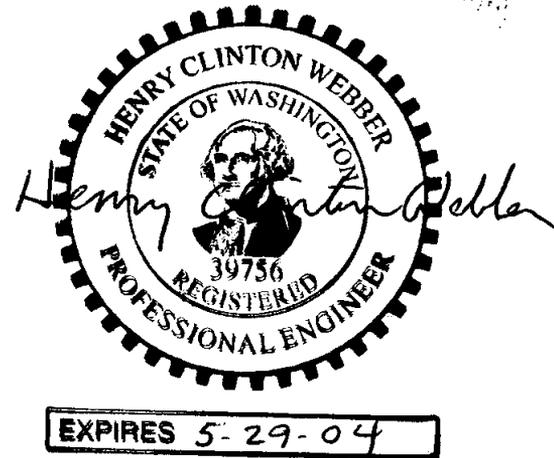
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Notice

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Glossary

Batch control	This term refers to control activities and control functions that provide an ordered set of processing activities to complete a batch process.
Batch process	A batch process leads to the production of a finite quantity of material by subjecting quantities of input material to an ordered set of processing activities over a finite period using one or more pieces of equipment.
Control system	This term refers to electronic processors that perform regulatory and logic control functions necessary for normal operation of the plant.
Exception handling	This term refers to those functions that deal with plant or process contingencies and other events that occur outside the normal or desired behavior of batch control.
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.
Low level	This term refers to a notification in the control system that is activated when the low level setpoint of the vessel has been reached.
Low-low level	This term refers to a notification in the control system that is activated when the low-low level setpoint of the vessel has been reached.

1 Introduction

This document describes the instrument control logic for dangerous waste vessels and ancillary equipment associated with the high level waste (HLW) facility melter feed process (HFP) system as they pertain to the dangerous waste permit.

2 Applicable Documents

24590-WTP-M6-50-P0001, *P&ID Symbols and Legend Sheet 1 of 6*

24590-WTP-M6-50-P0002, *P&ID Symbols and Legend Sheet 2 of 6*

24590-WTP-M6-50-P0003, *P&ID Symbols and Legend Sheet 3 of 6*

24590-WTP-M6-50-P0004, *P&ID Symbols and Legend Sheet 4 of 6*

24590-WTP-M6-50-P0005, *P&ID Symbols and Legend Sheet 5 of 6*

24590-WTP-M6-50-P0006, *P&ID Symbols and Legend Sheet 6 of 6*

24590-HLW-M6-HFP-P0001, *P&ID - HLW Melter Feed Process System Melter Feed Preparation Vessel HFP-VSL-00001 (Q)*

24590-HLW-M6-HFP-P0002, *P&ID - HLW Melter Feed Process System Melter Feed Vessel HFP-VSL-00002 (Q)*

24590-HLW-M6-HFP-P20001, *P&ID - HLW Melter Feed Process System Melter Feed Preparation Vessel HFP-VSL-00005 (Melter 2) (Q)*

24590-HLW-M6-HFP-P20002, *P&ID - HLW Melter Feed Process System Melter Feed Vessel HFP-VSL-00006 (Melter 2) (Q)*

24590-HLW-3YD-HFP-00001, *System Description for HLW Melter Feed (System HFP)*

3 Description

The HLW HFP system vessels and ancillary equipment included in the dangerous waste permit are the following:

- HFP-VSL-00001 melter 1 feed preparation vessel
- HFP-VSL-00002 melter 1 feed vessel
- HFP-VSL-00005 melter 2 feed preparation vessel
- HFP-VSL-00006 melter 2 feed vessel

3.1 Melters 1 and 2 Melter Feed Preparation Vessels

The melter feed preparation vessels (HFP-VSL-00001 and HFP-VSL-00005) receive waste concentrate from the HLW concentrate receipt system, mix it with glass formers from the HLW glass formers system, sample the resulting slurry, then transfer the slurry to the corresponding melter feed vessels. Each vessel is equipped with an agitator to keep the contents mixed, two mechanical pumps to pump the slurry to the sampling system or the melter feed vessel, and a steam-powered ejector that allows the contents to be transferred to the radioactive liquid waste disposal (RLD) system. Level instrumentation consists of a radar level transmitter. Table 1 lists the level transmitters.

Before any transfer into the melter feed preparation vessel, the available volume is checked by the control system. If it is not sufficient to receive the planned transfer, the operation does not begin. At all times, a high-high level interlock is active to stop all controlled streams coming into the vessel. An alarm alerts the operator that the interlock has activated. See Figure 1.

3.2 Melters 1 and 2 Melter Feed Vessels

The melter feed vessels (HFP-VSL-00002 and HFP-VSL-00006) receive waste slurry from the melter feed preparation vessels in batches and transfer the material to the corresponding melters in a continuous feed. The vessel transfers feed to the melter until a low-level setpoint is reached. While the feed to the melter continues, a new batch is transferred from the melter feed preparation vessel. This cycle continues as long as the melter is receiving feed. Each vessel is equipped with an agitator to keep the contents mixed, two air displacement slurry pumps to transfer slurry to the melter, one mechanical pump for sampling, and a steam-powered ejector that allows the contents to be transferred to the RLD system. Level instrumentation consists of a radar level transmitter. Table 2 lists the level transmitters.

Before any transfer into the melter feed vessel, the available volume is checked by the control system. If it is not sufficient to receive the planned transfer, the operation does not begin. At all times, a high-high level interlock is active to stop all controlled streams coming into the vessel. An alarm alerts the operator that the interlock has activated. See Figure 1.

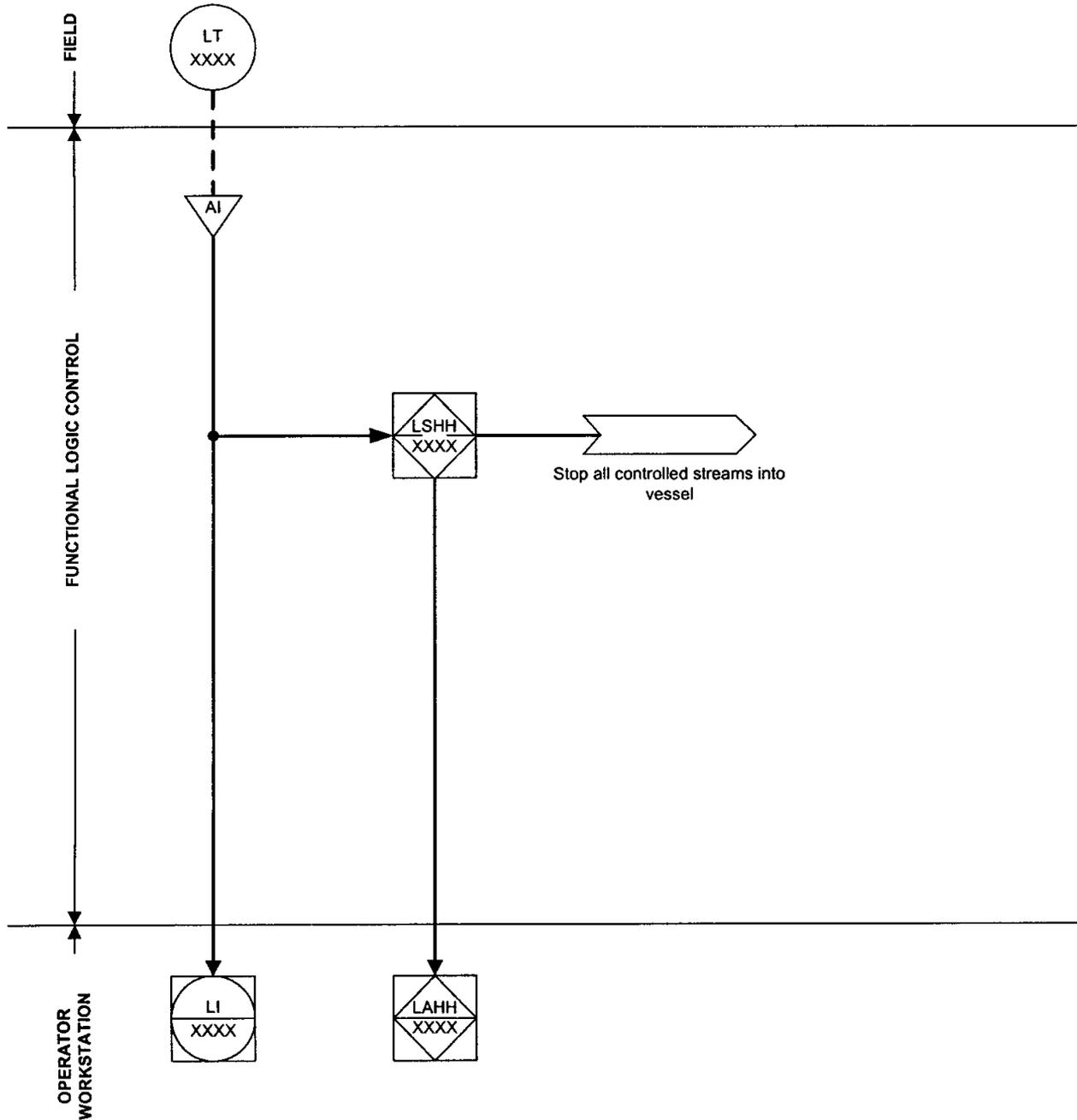
Table 1 Associated Instruments for Melters 1 and 2 Melter Feed Preparation Vessels

Instrument Number	Associated Vessel	Description
HFP-LT-0050	HFP-VSL-00001	Radar level transmitter
HFP-LT-2050	HFP-VSL-00005	Radar level transmitter

Table 2 Associated Instruments for Melters 1 and 2 Melter Feed Vessels

Instrument Number	Associated Vessel	Description
HFP-LT-0047	HFP-VSL-00002	Radar level transmitter
HFP-LT-2047	HFP-VSL-00006	Radar level transmitter

Figure 1 Typical Level Measurement for Melter Feed Preparation Vessels and Melter Feed Vessels



AI	analog input
LAHH	level alarm high high
LI	level indicator
LSHH	level switch high high
LT	level transmitter