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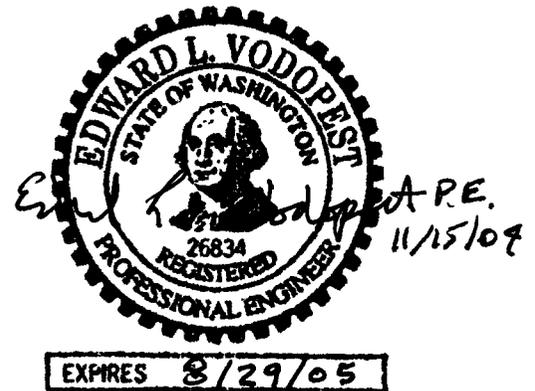
Document title: **System Logic Description for the
Low-Activity Waste Facility –
LAW Secondary Offgas (LVP)
System**

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Notice

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History Sheet

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Glossary

Acquire	A command, under batch control, that reserves a group of equipment for that particular batch control.
Actual Volume	Volume of waste/process fluid in any vessel in gallons.
Available Space	Volume of waste/process fluid that any vessel can accommodate and still be lower than the upper operating limit (UOL), in gallons. Available space can be calculated as follows: $Available\ Space = UOL - Actual\ Volume$.
Available Volume	Volume of waste/process fluid that any vessel can transfer to another vessel and still be above the lower operating limit (LOL), in gallons. Available volume can be calculated as follows: $Available\ Volume = Actual\ Volume - LOL$.
Batch	The material that is being produced or that has been produced by a single execution of a batch process.
Batch Control	Control activities and control functions that provide a means to process (that is, an ordered set of processing activities) finite quantities of material over a finite period of time using one or more pieces of equipment.
Batch Process	A process that leads to the production of finite quantities of material by subjecting quantities of input material to an ordered set of processing activities over a finite period of time using one or more pieces of equipment.
Exception Handling	Those functions that deal with plant or process contingencies and other events that occur outside the normal or desired behavior of batch control.
Permissive	Interlock that allows a device to change state or a sequence to start. Once a device has changed state or a sequence has started, permissives have no further effect on the device or sequence.
Release	A command under a batch control that opens up a group of equipment for any batch control to acquire.
Trip	Interlock that does not allow a device to change state or a sequence to start. Once a device has changed state or a sequence has started, trips continue to have an effect on the device or sequence.

Acronyms and Abbreviations

AEA	Atomic Energy Act of 1954
AI	analog input
DOE	US Department of Energy
DC	density controller
DT	density transmitter
FT	flow transmitter
HEPA	high efficiency particulate air filter
LAHH	level alarm high high
LALL	level alarm low low
LAW	low-activity waste
LI	level indicator
LSHH	level switch high high
LSLL	level switch low low
LT	level transmitter
LVP	LAW secondary offgas system
LY	level relay
PCJ	process control system
PMP	pump
PSW	process service water system
RLD	radioactive liquid waste disposal system
SCB	scrubber
SDJ	stack discharge monitoring system
TK	tank
VSL	vessel

1 Introduction

This document describes the instrument control logic for regulated plant items and associated ancillary equipment in the low-activity waste (LAW) facility for the LAW secondary offgas (LVP) system associated with dangerous waste management. This document focuses on tank and ancillary equipment for the LVP system for the melters offgas caustic scrubber located at the +48ft elevation in the LAW facility and the caustic collection tank located at the +28ft elevation in the LAW facility. The melter offgas HEPA filters will be included later.

2 Applicable Documents

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

3 Description

The plant items and ancillary equipment associated with dangerous waste management in the LAW system and the LVP system consist of the following:

- LVP-SCB-00001 Melters offgas caustic scrubber
- LVP-TK-00001 Caustic collection tank

The LAW primary melter offgas system (combined melter 1 and melter 2 offgas streams and selected vessel vents) passes through to the LVP system for further treatment.

3.1 Melters Offgas Caustic Scrubber LVP-SCB-00001

The melters offgas caustic scrubber (LVP-SCB-00001) is at the 48 ft elevation in the secondary offgas equipment room L-0304F. The melters offgas caustic scrubber (LVP-SCB-00001) treats the stream for acid gases such as SO_x and CO₂.

The stream flows countercurrent to the scrubbing liquid fed via offgas caustic scrubber recirculation pumps (LVP-PMP-00001A/B) at the 28 ft elevation in the caustic scrubber blowdown pump room L-0218. Contaminants in the stream are absorbed into the scrubbing liquid. The scrubbing liquid gravity drains into the caustic collection tank (LVP-TK-00001). High level is interlocked to bypass the melters offgas caustic scrubber (LVP-SCB-00001) and stop offgas caustic scrubber recirculation pumps (LVP-PMP-00001A/B).

Liquid level accumulation during normal operations is not expected. For the melters offgas caustic scrubber (LVP-SCB-00001), the PCJ system alarms at high-high level setpoint, and alerts the operator. Figure 1 depicts the instrumentation associated with the melters offgas caustic scrubber (LVP-SCB-00001).

3.2 Caustic Collection Tank LVP-TK-00001

The caustic collection tank (LVP-TK-00001) is at the 28 ft elevation in the caustic scrubber blowdown pump room L-0218 and accumulates caustic scrubbing liquid. The scrubbing liquid is fed to the melters

offgas caustic scrubber (LVP-SCB-00001). The caustic blowdown transfer pumps (LVP-PMP-00002A/B) routinely pump the waste to the LAW pretreatment facility alkaline effluent vessel (RLD-VSL-00017A/B). Low level stops the offgas caustic scrubber recirculation pumps (LVP-PMP-00001A/B) and caustic blowdown transfer pumps (LVP-PMP-00002A/B).

During off-normal operation, any tank volume contents will overflow into the caustic scrubber blowdown pump room L-0218 berm. The condensate then gravity drains into the plant wash vessel (RLD-VSL-00003).

At high-high level setpoint, the PCJ system initiates an alarm and alerts the operator. Figure 2 depicts the instrumentation associated with the caustic collection tank (LVP-TK-00001).

Figure 1 LVP-LT-0090 for LVP-SCB-00001

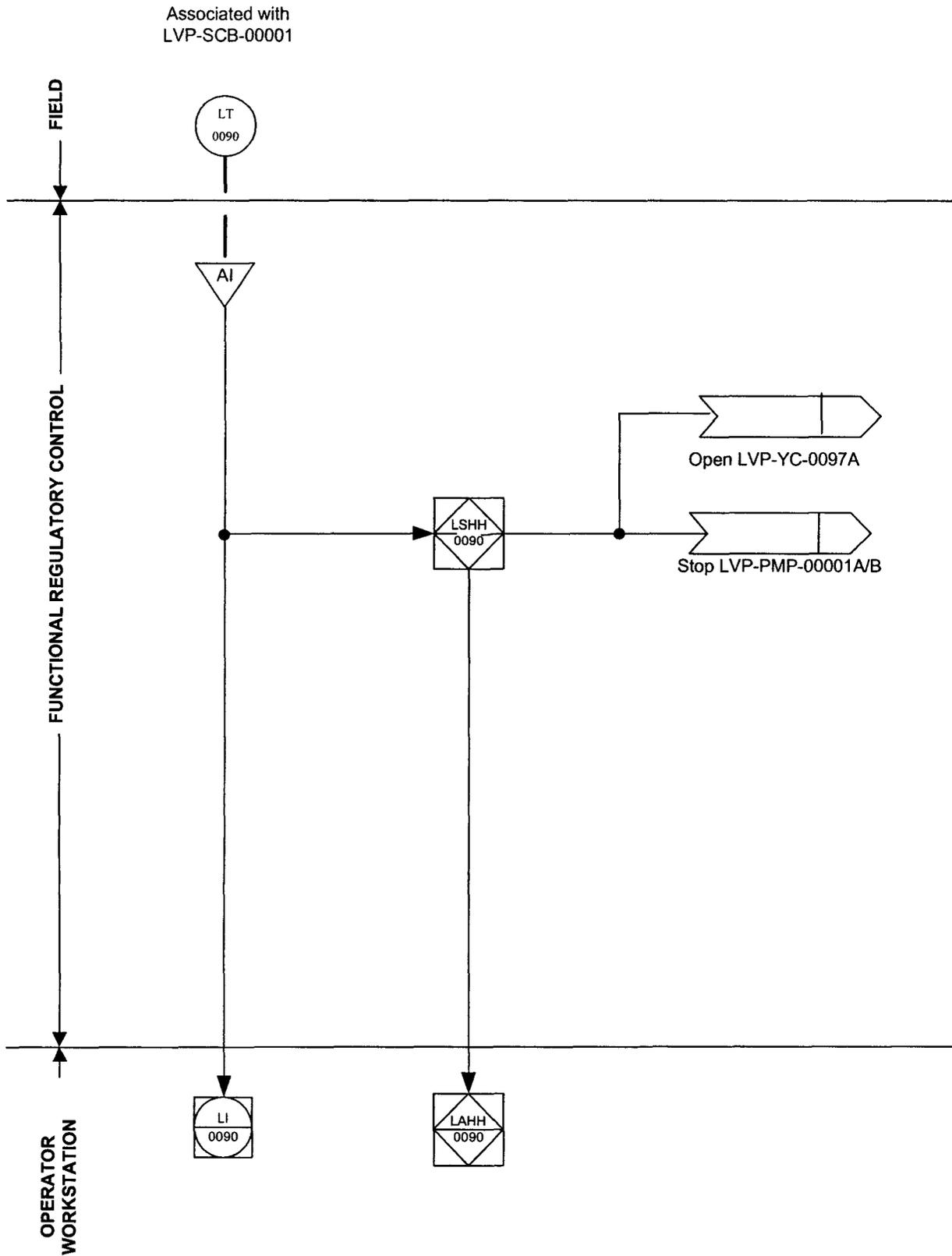
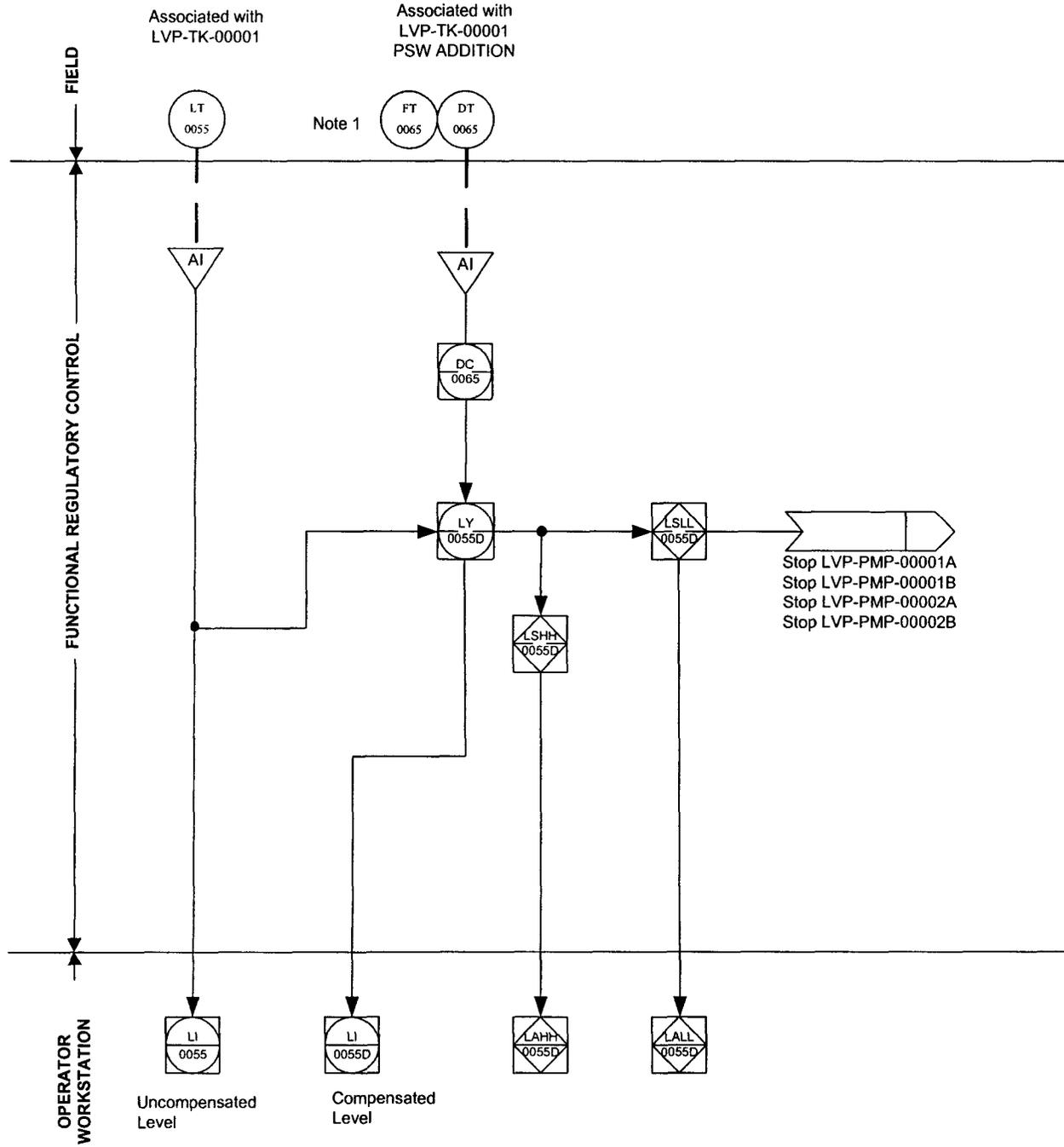


Figure 2 LVP-LT-0055 for LVP-TK-00001



Notes:

1. Multivariable transmitter; FT shown for reference only.