


MEMORANDUM

To: John "Joe" Gay, E.I.
From: Brian Beaudoin 
File: 1003.19
Date: June 9, 2021
Re: North Country Environmental Services, Inc. (NCES) Landfill (Site) – May 2021
Leachate Management System Audit
cc: Kevin Roy, Tim White, P.G., Donald Kelsey II, Dan Rondeau, Ron Gehl

In accordance with your request, a full system on-site audit (Audit) of the Site's supervisory control and data acquisition (SCADA) system for the leachate management system was completed by Sanborn Head on May 26 and May 27, 2021. This Memorandum summarizes the Audit process, findings, and recommendations of the Audit.

Each leachate management system is comprised of sumps, piping, pumps, and controls that collect and transfers leachate and landfill gas condensate to the on site storage tanks. Leachate generated by the landfill is collected from the Stage III, Stage IV Phases I and II (Stage IV Phase II collects leachate from Stage VI), and Stage V pump stations and conveyed through dual contained piping to underground storage tank (UST) A for temporary storage. The landfill gas collection system is equipped with two gas condensate knockout pots that collect and convey gas condensate to UST A and UST B through dual containment pipes. The facility is also equipped with a collection system on the leachate loadout pad so that any spills or drips would be contained and allowed to drain by gravity to UST A. Leachate from UST A is pumped to UST B which is then pumped to a valve distribution box (Valve Box 403) and then to the leachate above ground storage tank (AST). Leachate can be stored in the AST until it is pumped to a leachate tanker truck that hauls the leachate to a permitted wastewater treatment facility for disposal. A tanker truck can be loaded directly from UST B to allow for cleaning and maintenance of the AST when needed.

The leachate management system's sumps, tanks, leak detection manholes, and condensate knockout pots are equipped with floats and pressure transducers that can shut off pumps. Enclosed is a plan, titled "May 2021 Leachate Management System Audit Plan" (Plan) that identifies the location of leachate management system components.

Management of the system includes testing and replacement of telemetry equipment including float switches and transducers, maintenance and replacement of pumps, cleaning of leachate piping, and training of site staff.

Audit Process

The following personnel were on site and completed the Audit:

- Don Kelsey, II, (Sanborn Head and Associates, Inc.)
- Ron Gehl, (EOS Research, LTD)
- Dan Rondeau, (Gates Electric, LLC)

The Audit was completed on May 26th except for testing the switches for the AST high-high level alarm and AST leak alarm which were tested on May 27th by Dan Rondeau and reported to Sanborn Head.

The process involved manually testing each level switch/high-high level transducer set points and observing that the pump turned on and off for each of the leachate supply pump systems as designed and managed by the SCADA system.

There are a total of 24 devices that have shut off switches to control upstream pumps associated with the leachate management system. There are also two manholes and a valve box that may need to have switches replaced and re-connected depending on their current use.

Audit Findings and Recommendations

A summary of the Audit findings is provided in the enclosed "Table 1 - NCES Leachate Management System Pump Interlock Switch and Setpoint Test Summary." Overall, NCES' leachate management system meets standard industry practices. As shown in the table, all but one of the existing pump interlock switches functioned as intended. We recommend installing seven additional control switches to further improve and provide additional safeguards for the leachate management system pump shut off interlocks as further described below.

The following is a list of the findings of the Audit and recommended improvements and/or maintenance items to the leachate management system:

1. Finding – The Flare Condensate Knockout Pot transfer pump does not have an UST A high level float or level transducer high-high level alarm interlock to prevent condensate flow to UST A (like the three pumps stations).

Recommendation – Install an interlock circuit for the Flare Condensate Knockout pump to prevent the Flare Condensate Knockout Pump from pumping when an UST A high-level float or high-level transducer alarm is initiated.

2. Finding – The North Condensate Knockout Structure transfer pump is connected to an independent controller and not the master control panel. An interlock for the pump should be connected to the master panel to prevent flow when the high-level alarm conditions are activated at UST B.

Recommendation – Install an interlock circuit for a condensate pump at the master panel. This will prevent the North Condensate Knockout Pot Pump from pumping when a UST B high-level float or high-level transducer alarm is activated.

3. Finding - AST Leak Alarm located in the secondary tank of the AST does not prevent UST B from pumping to the AST.

Recommendation – Add an interlock control at the master panel for the AST secondary level alarm to prevent UST B from transferring leachate to the AST when a leak is detected in the secondary containment space of the AST.

4. Finding – The UST A pump does not appear to be sized appropriately or is fouled. This is based on the observation of the pump that conveys leachate from UST A to UST B operating continuously while not keeping up with flow rates from the three landfill stages supplying leachate to UST A.

Recommendation – Inspect the existing pump and possibly increase the pump size so transfer of leachate to UST B matches or exceeds the flow rate from the three upstream pump stations.

5. Finding – The Stage III leachate manhole was buried. It was unearthed by NCES personnel and opened by Gates Electric for inspection.

Recommendation – The manhole cover should be raised to grade so that the manhole is easily accessible for testing.

6. Finding – The Leachate Loadout volume batch controller does not have a reset when a partial load is transferred to the tanker truck. If the tanker driver does not activate the emergency stop switch upon a partial load removal the loadout pump could activate when a truck is not present.

Recommendation – Install a stop timer in the control logic or a stand-alone reset switch so that loadout pump does not activate without a tanker truck present.

7. Finding – The Former Evaporator Leak Detection Manhole float switch was not connected to the master panel.

Recommendation – Evaluate if this manhole is still needed and remove the manhole if it is not. If the manhole is needed it should be equipped with a leak detection switch.

8. Finding – The Stage III Leak Detection Manhole switch was not connected to the master panel.

Recommendation – Connect the Stage III Leak Detection Manhole to the master control panel.

9. Finding – Stage IV Phase II radio signal loss.

Recommendation – Disable the pump run enable interlock switch from the master control panel upon loss of radio signal and/or hard wire the locations together via the RS-485 network.

10. Finding – The existing Hand/Off/Auto switches from leachate source pumps do not have a HAND switch position safety interlock.

Recommendation – Apply a HAND switch power timer via control logic and add a hand power interlock relay to disable potential long term inadvertent HAND switch pump run operation from any leachate pump station.

11. Finding – Valve Box 403 gravity drains to UST A. The leak detection float in Valve Box 403 only activates a light on the control panel and does not interlock the UST B or AST Loadout pumps.

Recommendation – Update control interlock to prevent pumping from UST B and AST to Valve Box 403.

Items Completed During Audit

There were two repairs made while performing the Audit on May 26, as noted:

1. Finding – Stage IV Phase II did not have controls to prevent pumping from Stage IV Phase II to the Air Relief Manhole.

Remedy – The Air Relief Manhole leak detection switch was connected to the Stage IV Phase I control panel. EOS Research added networking logic to prevent pumping from Stage IV Phase II upon activation of the Air Relief Manhole float.

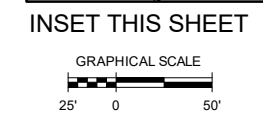
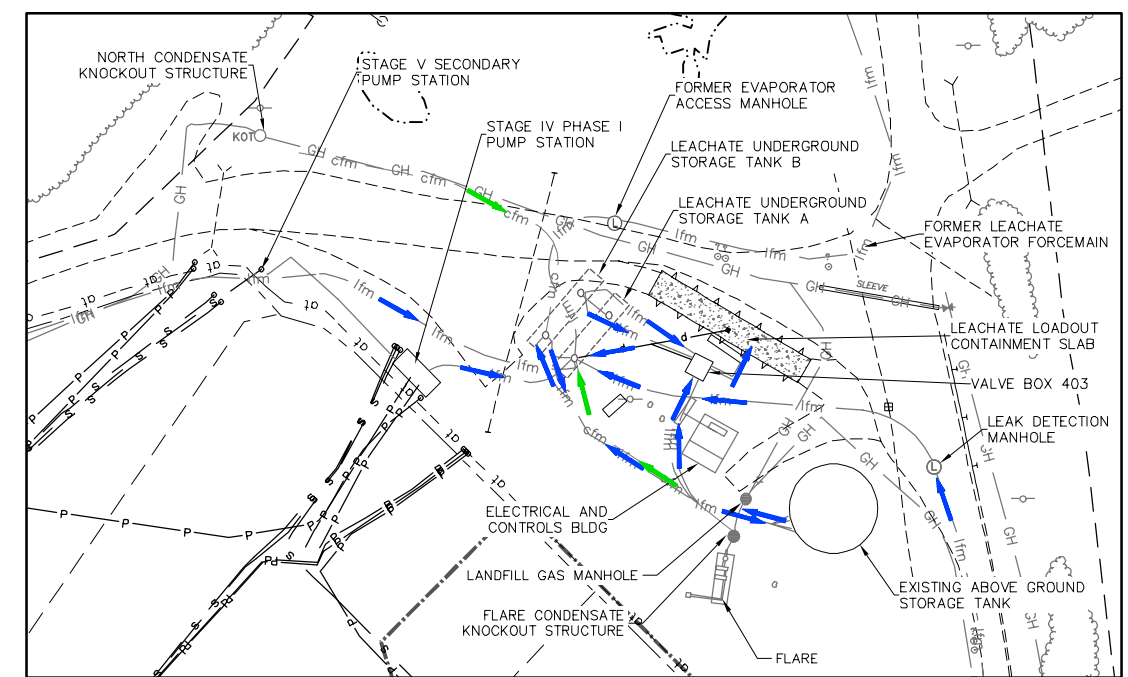
2. Finding – The leak detection float switch located in the Stage III Pump Station building did not function properly.

Remedy – The controls were repaired so the leak detection float switch provided the necessary pump off signal.

BJB/DK/TW: bjb

Encl. May 2021 Leachate Management System Audit Plan
Table 1 – May 2021 Leachate Management System Pump Interlock Switch and Setpoint Test Summary

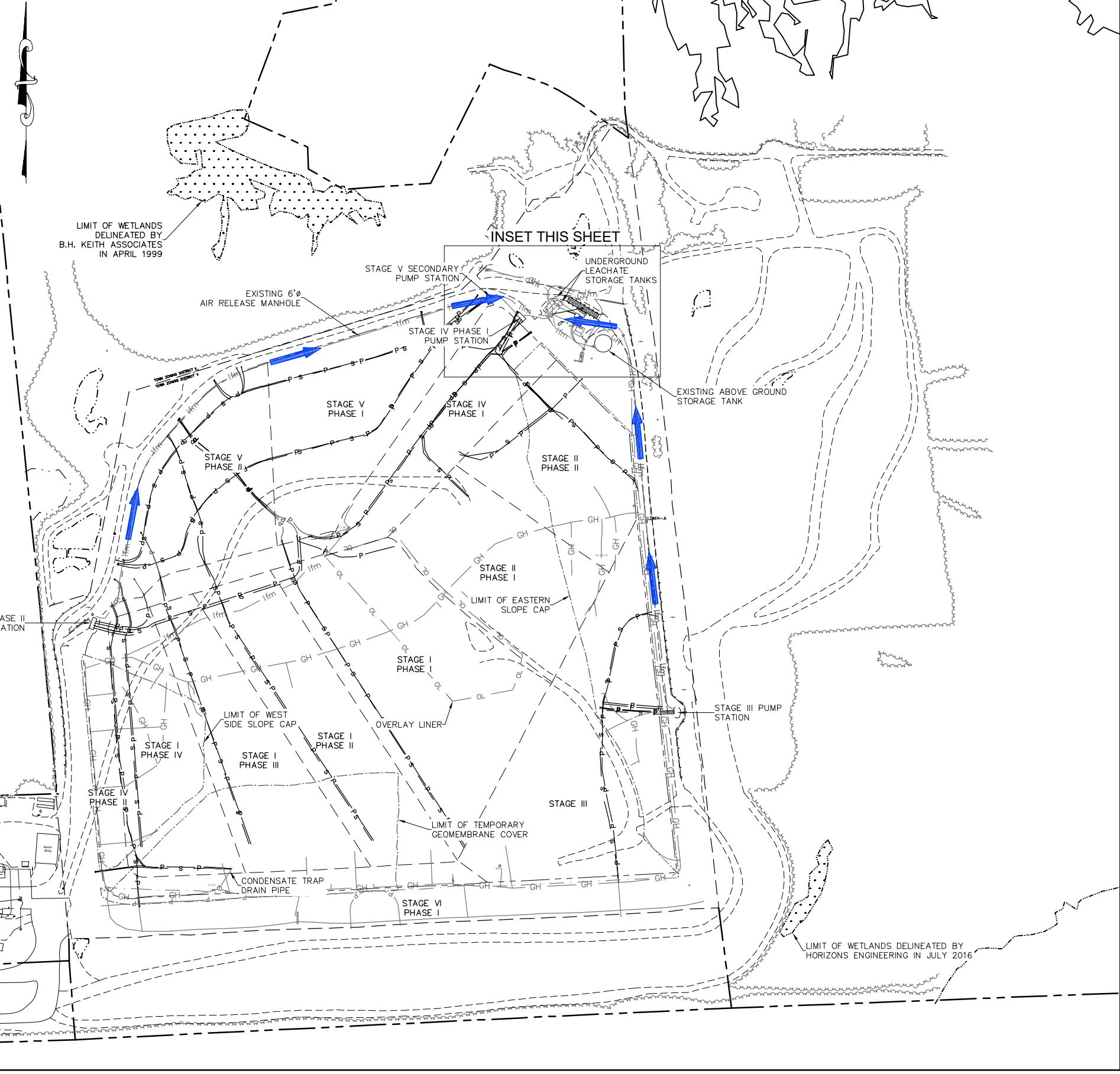
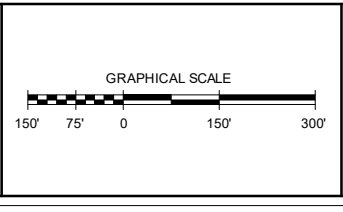
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 MAIZE
 30672
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 LAYOUT: 21034
 PLOT DATE: 6/18/21 10:20 AM



NOTES:

1. THE BASE MAP WAS CREATED FROM A FILE ENTITLED "665-ECOND 210524.DWG" PROVIDED BY CMA ENGINEERS OF PORTSMOUTH, NEW HAMPSHIRE ON MAY 25, 2021.

- LEGEND:**
- PRIMARY LEACHATE COLLECTION PIPE
 - LOADOUT GRAVITY DRAIN PIPE
 - SECONDARY LEACHATE COLLECTION PIPE
 - LEACHATE FORCEMAIN PIPE
 - LEACHATE FLOW DIRECTION
 - CONDENSATE FLOW DIRECTION
 - CONDENSATE FORCE MAIN
 - GAS HEADER PIPE
 - STAGE/PHASE LIMIT
 - LIMIT OF WASTE
 - LIMIT OF OVERLAY LINER
 - LIMIT OF CAP
 - GRAVEL ROAD
 - PAVED ROAD
 - TREE LINE

NO.	DATE	DESCRIPTION	BY

DRAWN BY: E. WRIGHT
 DESIGNED BY: T. PETIT
 REVIEWED BY: B. BEAUDOIN
 PROJECT MGR: T. WHITE
 PIC: B. BEAUDOIN
 DATE: JUNE 2021

LEACHATE MANAGEMENT SYSTEM
NORTH COUNTRY ENVIRONMENTAL SERVICES, INC.
 BETHLEHEM, NEW HAMPSHIRE
MAY 2021 LEACHATE MANAGEMENT SYSTEM AUDIT PLAN

PROJECT NUMBER:
 1003.19
 SHEET NUMBER:
 1 OF 1

Table 1 - May 2021 Leachate Management System Pump Interlock Switch and Setpoint Test Summary
North Country Environmental Services
Bethlehem, New Hampshire

Location of Leachate Shut-off Float Switch/Pressure Transducer/Inhibit	Date Tested	Pumps to be Shut off by Leachate Shut-off Switch/Pressure Transducer Activation														
		Stage III Pump Station Primary Pump (Pass/Fail)	Stage III Pump Station Secondary Pump (Pass/Fail)	Stage IV Phase 1 Pump Station Primary Pump (Pass/Fail)	Stage IV Phase 1 Pump Station Secondary Pump (Pass/Fail)	Stage IV Phase II Pump Station Primary Pump (Pass/Fail)	Stage IV Phase II Pump Station Primary Pump 2 (Pass/Fail)	Stage IV Phase II Pump Station Secondary Pump (Pass/Fail)	Stage V Secondary Pump Station (Pass/Fail)	Flare Condensate Knockout Pot Pump (Pass/Fail)	North Condensate Knockout Structure Pump (Pass/Fail)	UST A Pump (Pass/Fail)	UST B Pump 1 (Pass/Fail)	UST B Pump 2 (Pass/Fail)	UST B Pumps (2) Transfer to AST via Switch (Pass/Fail)	AST Leachate Storage Tank Loadout Pump (Pass/Fail)
Stage III Pump Station - Building Float Switch	5/26/2021	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage III Pump Station - Inhibit UST A	5/26/2021	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage III Pump Station - Primary Sump Level Transducer - Inhibit ON	5/26/2021	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage III Pump Station - Secondary Sump Level Transducer - Inhibit ON	5/26/2021	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase 1 Pump Station - Building Float Switch	5/26/2021	N/A	N/A	PASS	PASS	N/A	N/A	N/A	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage V Secondary Pump Station - Sump Float Switch	5/26/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase I Pump Station - Primary Sump Level Transducer - Inhibit ON	5/26/2021	N/A	N/A	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase I Pump Station - Secondary Sump Level Transducer - Inhibit ON	5/26/2021	N/A	N/A	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Pump Station - Building Inhibit UST A	5/26/2021	N/A	N/A	PASS	PASS	N/A	N/A	N/A	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II Pump Station - Building Float Switch	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II - Air Release Manhole Float Switch	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II Pump Station - Building Inhibit UST A	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II Pump Station - Primary Pump 1 Level Transducer	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II Pump Station - Primary Pump 2 Level Transducer	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stage IV Phase II Pump Station - Secondary Overlay Pump Level Transducer	5/26/2021	N/A	N/A	N/A	N/A	PASS	PASS	PASS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flare Condensate Knockout Pot - High-High Level Float Switch	5/26/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/E	N/A	N/A	N/A	N/A	N/A	N/A
Loadout Control Panel	5/26/2021	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	N/E	N/E	PASS	PASS	PASS	PASS	N/A
UST A High-Level Float Switch	5/26/2021	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	N/E	N/A	N/A	N/A	N/A	N/A	N/A

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UST A High-High Level Transducer Set-Point	5/26/2021	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	N/E	N/A	N/A	N/A	N/A	N/A
UST B High-Level Float Switch	5/26/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PASS	N/A	N/A	N/A
UST B Level Transducer High-High Set-Point	5/26/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PASS	N/A	N/A	PASS
AST High-High Level Inhibit	5/27/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PASS
AST Leak Alarm	5/27/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	FAIL
Stage III Leak Detection Manhole	Could Not Be Tested ¹	N/E	N/E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Former Evaporator Leak Detection Manhole	Could Not Be Tested ²															
Valve Box 403 Leak Detection	5/26/2021 ³	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/E	N/E	N/E
Tanker Truck Overfill Alarm	5/26/2021	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PASS	PASS	PASS

Notes:

- 1- The Stage III Leak Detection Manhole switch could not be tested. It is not connected to the loadout control panel.
- 2- The Former Evaporator Leak Detection Manhole switch could not be tested. If this manhole is needed then it should be equipped with a leak detection switch. If the manhole is not needed, it and the connected leachate forcemain should be removed.
- 3- Valve Box 403 currently only turns alarm light on. The interlock switch needs to be updated to inhibit pumps from the AST and UST B.
- 4- N/A = not applicable, N/E = interlock switch non-existing