

**CNG Maintenance Procedures
43 Production Ave-Keene NH
Liberty Utilities Decompression Skid
Updated: January 2019**

Table of Contents

1. Introduction
2. Purpose
3. Operator Qualifications
 - 3.1. Covered Tasks - CNG Decompression Skid – Keene
4. Maintenance Schedules
 - 4.1. Code requirements and station identification
 - 4.2. Additional inspections required by XNG with Liberty Utilities present
5. Records and Documentation
6. System Description
 - 6.1. Design Data Table
 - 6.2. Relief Capacity
7. Key Components
8. Maintenance Activities
 - 8.1. Boiler (700A/B)
 - 8.2. Expansion Tank (ET-700)
 - 8.3. Maintaining Glycol Level
 - 8.4. Flow switch
 - 8.5. Fuel gas train for boilers
 - 8.6. PLC/HMI Cabinet
 - 8.7. Fuel gas in processing room inside skid and trailer station outside skid
 - 8.8. Gas Meter (FE-233)
 - 8.9. Relief Valve (PSV-232)
 - 8.10. Relief Valve (PSV-213)
 - 8.11. Transmitter Maintenance (PIT and TIT)
 - 8.12. Nitrogen check
 - 8.13. Titeflex Hoses (H-100 A/B)
 - 8.14. Quick Release Oasis fittings @ CNG Hose (C-100 A/B)
 - 8.15. Proximity switch at truck unloading station
 - 8.16. Flame detector
 - 8.17. Gas detector

1. Introduction

- 1.1. This is the general maintenance guide for the XNG decompression skid located at 43 Production Ave Keene, NH 03431. This guide will lead you to the necessary information needed for general maintenance activities.

2. Purpose

- 2.1. The purpose of the maintenance manual is to act as a quick reference for pertinent information regarding equipment within the skid. This manual will be the basis for planning, scheduling, and executing schedule maintenance. The goal of this guide is to minimize equipment breakdowns and ensure compliance with state and federal requirements with regards to inspections and maintenance.

3. Operator Qualifications

3.1. Covered Tasks - CNG Decompression Skid – Keene

Covered Tasks - CNG Decompression Skid – Keene			
Leak Survey and Leak Investigation			
	XNG	EnergyNorth	Keene
18 Conducting gas leakage surveys		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
19 Patrolling and inspecting pipeline		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
20 Investigating leak/odor complaints		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pressure Regulation			
	XNG	EnergyNorth	Keene
59 Controlling and monitoring gas pressures and flows	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
60 Operation of remote control valves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
61 Inspect recording gauge	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
62 Inspect and test pressure regulator station	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
63 Testing overpressure protection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
64 Inspect telemetering equipment at a pressure limiting or regulator station	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
65 Bypass a regulator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
66 Field interpretation of pressure recording charts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
67 Inspecting a pressure regulator vault	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Abnormal Operating Conditions			
	XNG	EnergyNorth	Keene
70 Properties of natural gas and abnormal operating conditions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3LU Connection and Disconnection of CNG Trailer at CNG Decompression Skid	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Legend XNG: <ul style="list-style-type: none"> Maintenance personnel shall have tasks 59, 60, 61, 62, 63, 64, 65, 66, 67, and 70. Drivers making the hose connection shall have tasks #3LU and 70. Liberty Utilities EnergyNorth: <ul style="list-style-type: none"> I & R Maintenance personnel shall have the operator qualifications listed above. Liberty Utilities Keene: <ul style="list-style-type: none"> Keene Maintenance personnel shall have the operator qualifications listed above. S.Furey 1/20/2019			

4. Maintenance Schedules

4.1. The CNG Decompression skid shall be treated as a City Gate Station and shall follow Liberty Utilities O & M section 12-Maintenance-12G-Pressure Limiting and Regulating-Procedures, 49 CFR Part 192 Subpart M, and PUC 500 rules.

4.2. In addition to 4.1 additional maintenance for the decompression skid is required by XNG as specified in sections 5 through 8 of this document.

4.2.1. Liberty Utilities personnel shall be present for the first 6 months (up to 1 year from day 1 of flowing gas to customers) for all maintenance activities performed by XNG. Liberty personnel shall verify qualifications of XNG technicians prior to XNG working at the site.

5. Records and Documentation

5.1. XNG will perform, document, and create a record of maintenance performed. Inspection sheets shall have dates and signatures. Liberty personnel to sign all XNG inspections. XNG shall provide all documentation to Liberty Utilities I & R.

5.2. Liberty Utilities I&R group will collect and maintain documentation of all required maintenance performed under 49 CFR Part 192, Subpart M and PUC 500.

6. System Description

The decompression skid regulates pressure from bulk CNG trailers down to Liberty Utilities required pressure and temperature at 105 PSIG MAOP at 50 degrees. The system has two unloading bays for New Hampshire compliant Titan IV trailers. There are 3 open bays and two hose hookups.

6.1 Design Data Table

	Min	Max
Trailer Inlet Condition	200 PSIG @ -70 DEGF	4250 PSIG @ 120 DEGF
Required Outlet Condition	60 PSIG @ 28 DEGF	90 PSIG @ 150 DEGF
Required Flow	2 MCFH	40 MCFH
Required Enthalpy Rise	35.5 BUT/LBM	69.7 BTU/LBM
Required Heat Load	4,680 BTU/H	103,680 BTU/H
Estimated Boiler Size (Assuming 65% Efficiency of overall system)	7,200 BTU/H	160,000 BTU/H
Boiler Selection	20,000 BTU/H (W/20% turndown)	2 x 150,000 BTU/H
Glycol Loop Flowrate	1 GPM	9.5 GPM

Note: Table reflects outlet of XNG Decompression Skid to inlet of Liberty Utilities regulators

6.2- Relief Capacity

6.2.1- PSV-213 is set at 1350 psig and is a Anderson Greenwood 81 series valve
See Apex drawing # P-004

6.2.2- PSV-232 is set at 100 psig and is a Team Ferminite relief valve- See Apex drawing # P-005

7. **Key Components:**

7.1. **See “Apex-P & ID Decompression Skid and CNG Skid Components” for information referenced below**

- Regulator (PRV-211 A/B)
 - Swagelock RSH4 Regulator
 - Size- ½ inch
 - Apex drawing # P-004
 - Part information found on Apex pages 174 to 184
- Relief Valve (PSV-213)
 - Anderson Greenwood 81 series
 - Size- 2 inch
 - Apex drawing # P-004
 - Part information found on Apex pages 219 to 223
- Air Separator/Buffer Tank (T-700)
 - Boiler Buddy
 - Size-Not applicable
 - Apex drawing # P-006
 - Part information found on Apex pages 812 to 821
- Boiler (700A/B)
 - HTP Elite Premier Residential and Commercial Boilers
 - Apex drawing # P-006
 - Part information found on Apex pages 578 to 669
- Heat exchanger (HX-400A-F)
 - Exergy
 - Size-3/4 inch
 - Apex drawing # P-003
 - Part information found on Apex pages 141 to 147
- Regulator (PRV-222 A/B)
 - Swagelok RDH15 Regulator
 - Size- 1 inch
 - Apex drawing # P-005
 - Part information found on Apex pages 198 to 208
- Relief Valve (PSV-232)
 - Team Ferminite Relief Valve
 - Size- 1.5 to 3 inch

- Apex drawing # P-005
 - Part information found on Apex pages 217 to 218
- Expansion Tank (ET-700)
 - Pro Flex 2 Flexcon Hydronic expansion tank
 - SXH90
 - Apex drawing # P-006
 - Part information found on Apex page 675
- Gas Meter (FE-233)
 - FMG Rotary Gas Meter Type FMR
 - Size-4 inch
 - Apex drawing # P-005
 - Part information found on Apex page 55 to 70
- PLC/HMI
 - Fitch Controls
 - Apex drawing # Apex M-102 (CP1 and P1)
- Quick Release Oasis fittings @ CNG Hose (C-100 A/B)
 - Oasis HC-308
 - Size- 1 inch
 - Apex drawing # P-003
 - Part information found on Apex pages 34 to 35
- Titeflex Hoses (H-100 A/B)
 - R147-16
 - Size- 1 inch
 - Apex drawing # P-003
 - Part information found on Apex page 36
- Truck Station Valves on Decompression Skid (V-100A/B, V-102 A/B, & V-101A/B)
 - Swagelok valves
 - Size- ½ and 1 inch
 - Apex drawing # P-003
 - Additional information found on Apex pages 26 to 29

8. **Maintenance Activities**

8.1. Boiler (700A/B)

- 8.1.1. HTP Elite Premier Residential and Commercial Boilers (reference part 4)
- 8.1.2. Apex drawing # P-006
- 8.1.3. Part information found on Apex pages 578 to 669
- 8.1.4. **Frequency-Annual**

8.2. Expansion Tank (ET-700)

- 8.2.1. Pro Flex 2 Flexcon Hydronic expansion tank
- 8.2.2. SXH90
- 8.2.3. Apex drawing # P-006
- 8.2.4. Part information found on Apex page 675

- 8.2.5. Frequency-Annual
- 8.3. Maintaining Glycol Level
 - 8.3.1. Apex drawing # P-006
 - 8.3.2. Freeze point should not be above -20 degrees. Ideally the system should run at -27 degrees
 - 8.3.3. Frequency-Annual
- 8.4. Flow switch
 - 8.4.1. Apex drawing # P-006
 - 8.4.2. Series FS-250 General Purpose Liquid Flow Switch
 - 8.4.3. McDonnell & Miller
 - 8.4.4. Visual inspection
 - 8.4.5. Replace flow switch every 5 years or 100,000 cycles, whichever occurs first
 - 8.4.6. Frequency-Annual
- 8.5. Fuel gas train for boilers
 - 8.5.1. Apex drawing # P-006
 - 8.5.2. Sizing- See Apex drawings for sizing
 - 8.5.3. Visual inspection and leak check
 - 8.5.4. Frequency-Annual
- 8.6. PLC/HMI Cabinet
 - 8.6.1. Apex drawing # M-102
 - 8.6.2. Verify cabinet heater is working on the HMI
 - 8.6.3. Check PLC cabinet for blown fuses
 - 8.6.3.1. Check for red lights. All lights should be green
 - 8.6.4. Verify backup battery charge on PLC (DCPS1)
 - 8.6.4.1. In the PLC cabinet, check the Phoenix contact. If a DCUPS alarm, alarms on the HMI the battery needs to be replaced or serviced
 - 8.6.5. Check the heater in the PLC cabinet
 - 8.6.5.1. Make sure the Hoffman heater is warming the cabinet
 - 8.6.6. Verify cabinet heater is working on the HMI
 - 8.6.7. Frequency-Annual
- 8.7. Fuel gas in processing room inside skid and trailer station outside skid
 - 8.7.1. Apex drawing #'s P-003, P-004, P-005, P-006
 - 8.7.2. Sizing-See Apex drawings for sizing
 - 8.7.3. Visual inspection and leak check
 - 8.7.4. Frequency-Annual
- 8.8. Gas Meter (FE-233)
 - 8.8.1. FMG Rotary Gas Meter Type FMR
 - 8.8.2. Size-4 inch

- 8.8.3. Apex drawing # P-005
- 8.8.4. Part information found on Apex page 55 to 70
- 8.8.5. No maintenance or inspection needed while the meter is under pressure
- 8.8.6. Frequency-None
- 8.9. Relief Valve (PSV-232)
 - 8.9.1. Team Ferminite Relief Valve
 - 8.9.2. Size- 1.5 to 3 inch
 - 8.9.3. Apex drawing # P-005
 - 8.9.4. Part information found on Apex pages 217 to 218
 - 8.9.5. Visual inspection and leak check
 - 8.9.6. Frequency-Annual
- 8.10. Relief Valve (PSV-213)
 - 8.10.1. Anderson Greenwood 81 series
 - 8.10.2. Size- 2 inch
 - 8.10.3. Apex drawing # P-004
 - 8.10.4. Part information found on Apex pages 219 to 223
 - 8.10.5. Visual inspection and leak check
 - 8.10.6. Frequency-Annual
- 8.11. Transmitter Maintenance (PIT and TIT)
 - 8.11.1. Apex drawing # P-003, P-004, P-005,
 - 8.11.2. Clean the exterior of the meters, make sure the cleaning agent used does not corrode the housing surface and the gaskets
 - 8.11.3. Frequency-Annual
- 8.12. Nitrogen check
 - 8.12.1. Apex drawing #P-004
 - 8.12.2. Visual inspection and leak check
 - 8.12.3. Check Nitrogen pressure. Make sure the tank reads above 200 psig. If the tank is below 200 psig, replace immediately
 - 8.12.4. Frequency-Annual
- 8.13. Titeflex Hoses (H-100 A/B)
 - 8.13.1. R147-16
 - 8.13.2. Size- 1 inch
 - 8.13.3. Apex drawing # P-003
 - 8.13.4. Part information found on Apex page 36
 - 8.13.5. Visual inspection and leak check
 - 8.13.6. Frequency-Annual
- 8.14. Quick Release Oasis fittings @ CNG Hose (C-100 A/B)
 - 8.14.1. Oasis HC-308

- 8.14.2. Size- 1 inch
- 8.14.3. Apex drawing # P-003
- 8.14.4. Part information found on Apex pages 34 to 35
- 8.14.5. Visual inspection and leak check. Clean oasis fittings with a rag and inspect internal for wear
- 8.14.6. Frequency- Annual
- 8.15. Proximity switch at truck unloading station
 - 8.15.1. Apex drawing # P-003
 - 8.15.2. Check proximity switch to make sure it is making contact and the contact is confirming on the HMI
 - 8.15.3. Frequency- Annual
- 8.16. Flame detector
 - 8.16.1. Sanborn Head drawing # SS 1
 - 8.16.2. Visual inspection
 - 8.16.3. Frequency- Annual
- 8.17. Gas detector
 - 8.17.1. Sanborn Head drawing # SS 1
 - 8.17.2. Visual inspection
 - 8.17.3. Frequency- Annual