

Liberty Utilities CNG Facility – 43 Production Ave Keene, NH

CNG Skid Operating Procedures

Liberty Utilities OQ & O &M requirements & References

1. Document stored in Liberty Utilities online library labeled “NH Keene Division Compressed Natural Gas Facility Operation and Maintenance Manual”
2. OQ Requirements #3LU and 70 for connecting and disconnection of hose from trailer.
3. References
 - a. Apex-P & ID Decompression Skid and CNG Skid Components
 - b. Lincoln Hexagon CNG Trailer
 - c. Quantum Fuel System Trailer

1. Trailer Arrival and Connection to Liberty Site

a. Arrival

- i. Call into Liberty Gas Control to notify that you are on-site and will be opening gates (603-216-3617)
- ii. Ensure Liberty Keene Technician is present before opening gates
- iii. Open truck gate fully and secure in open position.
- iv. Turn on site lighting using site lighting on front of LIBERTY regulation building (decompression skid)
- v. Enter site and back into empty bay Back into position, set brakes, chock trailer wheels.

b. Trailer Preparation.

- i. Drop landing gear, disconnect brake line, open kingpin, pull tractor forward.
- ii. Open and secure trailer doors. Verify type of trailer delivering to site (see below).

*Lincoln Hexagon T4 & T53	*Quantum Fuel Systems
Check fire protection system pressure gauge and ensure that pressure is 90-110 psig. If it is not, notify XNG Dispatch (857-366-7981) to log in trailer maintenance record.	Check motive gas regulator for frosting condition. If frosted, notify XNG Dispatch (857-366-7981) to log in trailer maintenance record.
Check motive gas regulator for frosting condition. If frosted, notify XNG Dispatch (857-366-7981) to log in trailer maintenance record.	Verify that all both unload manifold valves are closed
Verify that all 4 cylinder valves are closed and both manifold valves are closed	Verify that the hose manifold pressure gauge is at 0 psig. If it is not, open trailer hose vent to vent pressure to 0 psig. Close trailer hose vent
Verify that the hose manifold pressure gauge is at 0 psig. If it is not, open trailer hose vent to vent pressure to 0 psig. Close trailer hose vent	Verify trailer hose vent is closed
Verify trailer hose vent is closed	Remove cap and inspect trailer nozzle for cleanliness
Unlatch brake interlock and rotate arm around to lowest position	
Remove cap and inspect trailer nozzle for cleanliness	

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- c. Hose Station Preparation. See Apex Design Drawing P003 for part numbers reference.
 - i. Verify the ID of the bay the new full trailer was delivered to in the Truck Station - Unload Station (A/B) of the decompression skid
 - ii. Verify that line valve V-100 A or B on the Truck Module – Unload Station (A/B) of the decompression skid is closed in the bay with the new delivery
 - iii. Verify PIT-201 A or B is at 0 psig (which ever bay is not feeding the system). If not, slowly open the correct V-101 A/B to vent hose pressure to 0 psig. Close V-101 A/B when at 0 psig. Monitor to ensure pressure does not rise.
 - iv. Verify hose station vent valve (V-101 A and B) is closed.
 - v. Inspect hose condition and ground wire/clamp condition.
 - vi. Remove hose from holder and inspect hose-end coupling for cleanliness.
- d. Trailer Connection. See Apex Design Drawing P-003 for part numbers reference.
 - i. Confirm trailer pressure does not exceed 4250 psig (Do not connect hose if greater than 4250 psig).
 - ii. Connect static ground to trailer grounding ball.
 - iii. Connect hose to trailer and verify HC-308 (C-100A and B) collar is fully seated and locking mechanism is engaged.
 - iv. Re-verify trailer manifold vent valve is closed.
 - v. Re-verify that hose station vent valve (V-101 A and B) is closed.
- e. Valve Opening.
 - i. Slowly open manual station valve V-100 A or B See Apex Design Drawing P-003

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Slowly open each trailer manifold valve (2 total). This will pressurize the hose	Slowly open each trailer unload manifold valve (2 total). This will pressurize the hose
Inspect hose and connections for leaks	Inspect hose and connections for leaks
Slowly open each tank's manual valve (4 total). Use handle extension bar, as needed	Place the unloading switch/knob in the on position. <u>Pressure must rise 80-120 psig on the gauge directly above it.</u>
Verify pressure in trailer equals hose station pressure (PIT-201 A/B) and the pressure indicators located next to PIT-201 A/B (Apex-P-003)	Verify actuated valves are in the open position by viewing the yellow valve position indicators being in the horizontal position
Verify all 6 trailer valves are fully open	Verify pressure in trailer equals hose station pressure (PIT-201 A/B) and the pressure indicators located next to PIT-201 A/B (Apex-P-003)
	Verify both trailer manifold valves are fully open

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- ii. Verify that V-100 truck station valve is fully open.
- iii. Inspect piping/valves for leaks.

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2. Control System Acknowledgement of Full Trailer. See Apex design drawing M-102 for control panel reference.
 - a. Go to Control Panel – Skid Door combo 2+4, then 3
 - b. Go to **Truck Queue page**
 - i. Verify the “Add” Button is indicated at the trailer station being delivered.
 - ii. Hit the “add” button on the bay the full delivery is in.
 - iii. Enter the Trailer ID #100-150 on the number pad and hit enter.
 - iv. Check truck queue in the upper left of the page to verify the newly entered station has been added to the queue.
 - c. Take delivery photos of rear of trailer and truck station valving, send to OCC. Call OCC operator to approve confirmed delivery.
 - d. See step 7 for trailer disconnection procedure

 3. System Re-pressurization. See Liberty Utilities and XNG Emergency Plans for 43 Production Ave, Keene (Appendix J)
 - a. If PIT-214 (Apex P-004) is less than 150 psig, then:
 - i. Open N2 cylinder valve.
 - ii. Check pressure on N2 cylinder to ensure we have motive gas present. Ensure manual valve downstream of SOV-504 (Apex P-004) is open.
 - b. Test run heaters 700A/B (Apex M-102) and verify storage tank is at temperature.
 - i. Adjust set point 5 °F above current tank temperature to start boiler. Monitor boiler start sequence, operation, and shutdown to confirm operation.
 - ii. Dis-able HTP controller on heater that just operated.
 - iii. Adjust set point to desired operational temperature or 5 °F above current temperature in order to get boiler to fire. Monitor boiler start sequence, operation, and shutdown to confirm operation.
 - iv. Re-enable first tested boiler.
 - v. Reset PLC temperature controller to desired temperature.
 - c. Test run P-600A/600B to heat up piping and heat exchanger. Apex M-102
 - d. Ensure all pressures in skid (PIT-203) Apex P-004 (PIT-214) Apex P-004 (PIT-232) Apex P-005 are “low” and matching the customer line pressure.
 - i. If pressures are not low:
 1. Close manual valves upstream of FCVs-205A/B (V-204A/B) Apex P-004
 2. Close manual valves upstream of FCVs-219A/B (V-246A/B). Apex P-005
 3. Close manual valves downstream of PRV-222A/B (V-223A/B). Apex P-005
 4. Close valves upstream of flow meter (V-251 & V-234). Apex P-004
 5. Open SOV-504 Apex P-004 to pressurize motive gas (nitrogen) system, which will cause FCV-205A/B Apex P-004 and FCV-219A/B Apex P-005 to open.
 6. Slowly open V-246A/B Apex P-005 to allow regulator to lock-up.
 7. Slowly open V-204A/B Apex P-004 to allow regulator to lock-up.
 - ii. If the pressures are low, open SOV-504 Apex P-004 to apply motive gas to valves which will cause them to open.
 1. Close manual valves downstream of PRV-222A & PRV 222B labeled (V-223A/B). Apex P-005
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2. Close valves upstream of flow meter (V-251 & V-234). **Apex P-005**
- e. On control panel, press “Re-pressurization” button.
 - i. By-pass SOV opens and pressurizes the system at a controlled rate.
 - ii. Ensure pressures upstream, downstream of 1st cut, and downstream of 2nd cut equalize to their normal pressure.
- f. Quickly and partially crack open the valves downstream of PRV-222A/B **Apex P-005** to allow regulator to fully lock-up with operating gas pressures.
- g. Slowly open valve upstream of flow meter and allow downstream pressure to equalize without over-spinning the meter.
4. Shutdown Procedure. **See Liberty Utilities and XNG Emergency Plans for 43 Production Ave, Keene (Appendix J)**
 - a. To put CNG system into “Shutdown Status”: **See control panel in boiler room.**
 - i. Remove trucks from waiting Queue.
 - ii. Verify LIBERTY is ready for CNG system to shut down.
 - iii. Close operating trailer(s) cylinder valves and allow CNG system to depressurize into LIBERTY’s system. System should end up at 45 psig.
 - iv. CNG system will shut down on “Truck Queue Empty”.
 - v. LIBERTY close the high and low pressure sense lines.
 - vi. LIBERTY close the regulator hut isolation valves.
5. **To remove a trailer running in dual unload mode- See control panel in boiler room.**
 - a. On the Truck queue page press the blue “Remove Single Truck” button
 - b. A window will pop up and ask for you to enter the pressure of the truck you would like to remove, press the 0 in the box and a pin pad will pop up. Enter pressure and hit the green enter arrow
 - c. Buttons will pop up next to trailer slots asking which trailer you would like to remove, select the desired trailer to be removed
 - d. An “Action is Protected” will pop up, confirm by pressing the green arrow.
 - e. Truck will be removed and system will only run off of one truck.
6. **Force Swap- See control panel in boiler room.**
 - a. Truck Queue page, make sure 1st in queue has a full truck and is present in the queue.
 - b. Press “GO TO NEW TRUCK” (This starts normal truck swap preheat sequence.)
 - c. Once the swap is confirmed complete, disconnect the truck.
7. **Trailer Disconnection and Removal from Site. See Apex P003 for part numbers reference.**
 - a. Verify condition of trailer to be disconnected. Normally, pressure in trailer is low (near 200 psig) and that station is not flowing/valve closed.

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Close all 4 cylinder valves on trailer. Use handle extension bar, as needed. Tank valves must be closed during transportation	Place the unloading switch/knob in the off position. <u>Pressure will decrease to 0 psig on the gauge directly above it.</u>
Close both manifold valves on trailer	Verify actuated valves are in the closed position by viewing the yellow valve position indicators being in the vertical position
	Close both unload manifold valves on trailer

***See Lincoln Hexagon and Quantum Fuel System documents for component information**

- b. Close hose station valve V-100 A or B for trailer being removed from the site.
- c. Slowly crack open hose station vent valve V-101 A or B to depressurize hose and piping between the trailer manifold and V-100 A or B. Vent until pressure at PIT-201 A or B is at 0 psig.
- d. Disconnect hose by disengaging locking mechanism.
- e. Disconnect ground cable reel and walk it back to truck.
- f. Place hose in hose caddy to protect from weather.
- g. Close V-101 A or B.

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Rotate brake interlock bar into position and securely clip with pin	Visually inspect condition of rear of trailer
Check fire protection system pressure gauge and ensure that pressure is 90-110 psig. If it is not, notify dispatch to log in trailer maintenance record	
Visually inspect condition of rear of trailer	

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- h. Disconnect and stow door securing chains.
- i. Close and secure trailer doors.
- j. Perform walk-around on trailer to make sure unit is ready for connection and removal.
- k. Back tractor in, connect kingpin, connect brake line, and raise landing gear.
- l. Conduct pre-trip inspection.
- m. Remove wheel chocks and hang on bollards
- n. Pull trailer out of site.
- o. Turn off site lighting using switch on front of LIBERTY regulation building (decompression skid)
- p. Close and lock gate.
- q. **Call into Liberty Gas Control to notify that you have closed gates and are off-site (603-216-3617)**