



CNG Storage Vessel Pressure Relief Valve (PRV) Removal Energy Control Procedure (ECP)

General Information			
Location		Asset Number(s)/ Equipment ID(s)	All CNG Storage Vessels
Manufacturer or Equipment Name	CNG Storage Vessel PRV		
Hazardous Energy Identification			
<input type="checkbox"/> Chemical	<input checked="" type="checkbox"/> Electrical	<input type="checkbox"/> Gravitational potential	<input type="checkbox"/> Hydraulic potential
<input checked="" type="checkbox"/> Mechanical	<input checked="" type="checkbox"/> Pneumatic potential	<input type="checkbox"/> Radiation	<input type="checkbox"/> Kinetic <input type="checkbox"/> Thermal
Personal Protective Equipment Required (Beyond Basic PPE)			
Hard Hat, Gloves, Eye Protection, Hearing Protection, Safety Toe Boots, and High Vis Vest.			
ONLY TRAINED AND AUTHORIZED PERSONNEL SHALL CONDUCT LOCKOUT/TAGOUT.			
Shutdown Overview (Isolation Overview)			
<p>This Energy Control Procedure (ECP) outlines the standardized method for safely removing Pressure Relief Valves (PRVs) from CNG storage vessels. It ensures complete isolation of mechanical, pneumatic, and electrical energy sources in compliance with OSHA Lockout/Tagout (LOTO) and NFPA 52 standards. The procedure applies to all Chevron CNG fueling stations and must be executed only by trained and authorized personnel. It includes detailed steps for site notification, PPE requirements, tool usage, and verification of zero-energy state. This ECP is critical for maintaining technician safety and operational integrity during PRV maintenance or replacement activities.</p>			

Depressurization and De-energization ECP for Service Instructions

1. Preparation & Safety

- Required Tools & Equipment
 - Lockout/Tagout kits (locks, tags, hasps)
 - Wrenches, CNG Compatible Pipe Tread Sealant, O-ring Lubricant
 - Leak detection solution (Soapy water or Portable Methane Detector)
- Call Chevron Call Center (**877-872-3966**) to notify them of your arrival on site and the type of work that will be performed.
- Ensure all personnel are trained in CNG hazards and LOTO procedures.
- Use intrinsically safe tools in classified areas.
- Maintain fire extinguishers and emergency shutoff access.
- Complete Chevron Start Work Check

2. Lockout/Tagout Procedure

Identify Energy Sources

- 2.1 High-pressure gas in storage vessels
- 2.2 Electrical control systems (compressors and monitoring)

Notify Affected Personnel

- 2.3 Inform your supervisor, Chevron Reliability Engineers, and nearby workers of maintenance activity.

Lock Out Compressors

- 2.4 Turn off all compressors supplying the CNG Storage Vessels.
- 2.5 Apply locks and tags to prevent unplanned startup.

Shut Down System

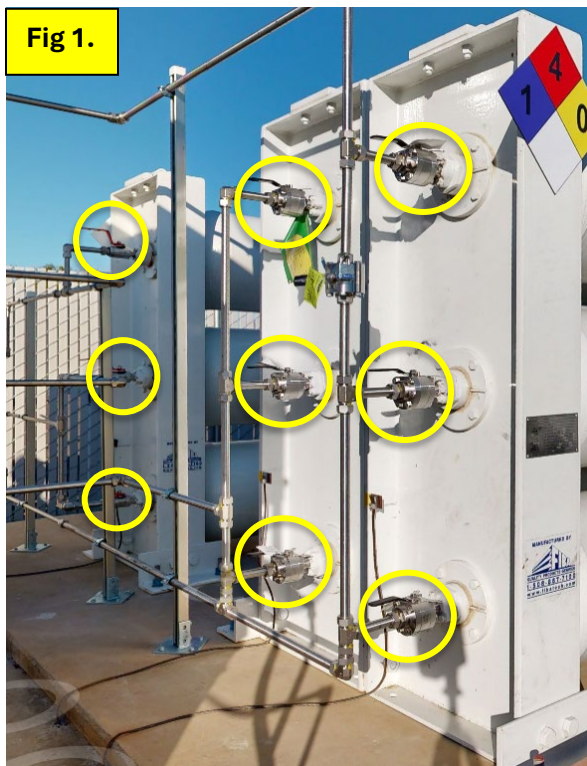
- 2.6 Isolate the CNG storage vessels from the rest of the system. Close inlet and outlet ball valves to the storage vessels on priority panel

Apply Locks and Tags

- 2.7 Lock closed all isolation ball valves. Tag each lock with the technician name, date, and purpose.
- 2.8 Lock out electrical panels if applicable.

Storage Vessel Supply Isolation

- 2.9 Close and lock all isolation ball valves located on the gas supply side of the storage vessel. This refers to gas entering and exiting the CNG Storage Vessels shown in **Fig 1. (Tube)** and **Fig 2. (Sphere)**.



PRV Isolation

- 2.10 Remove padlock (typically Red) from PRV and close the isolation ball valve. Replace lock to the isolation ball valve using lockout tag out procedure.
- 2.11 If a relief vent stack is connected to multiple vessels, you will need to lock out all vessels on the connected vent stack to prevent any possible gas release from the open vent stack.
- 2.12 Do not leave any storage vessels without a relief valve in service. Changes in temperature could cause the vessel to become over pressurized while not in use. If the vessel is out of service for more than 8 hours, please contact your supervisor or Chevron Reliability Engineer to discuss.

Verify Isolation

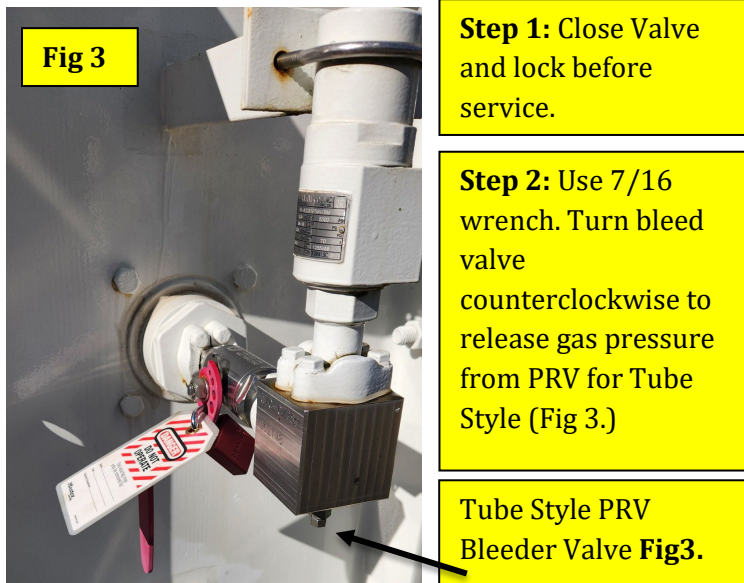
- 2.13 Verify and confirm that the relief valves on the storage vessel are locked out and that the system is properly isolated.
- 2.14 Verify and confirm compressor(s) are locked out and the system is properly isolated.
- 2.15 Contact Supervisor or Chevron Reliability Engineer to video verify that lockout/tag out procedure has properly been applied, and safe work practices are being performed. Once verification has been approved, work can start.

3. PRV Removal Procedure

Bleed Down via Bottom Block Valve

- 3.1 Open the bleed valve located on the bottom block of the PRV mounting (Tube Style PRV Mounting **Fig 3.**) or Open the Needle Bleed Valve on the (Sphere Style PRV Mounting **Fig 4.**). Allow residual pressure to vent safely. Confirm zero pressure.
- 3.2 In the case of no bleeder valve contact Chevron Reliability Engineer to discuss plans for depressurization.

CAUTION: Ensure that the CNG gas being released is not directed toward your face. Also, be prepared to capture any condensate or oil if necessary.



PRV Inspection

- 3.3 Check for signs of corrosion, leaks, or damage.

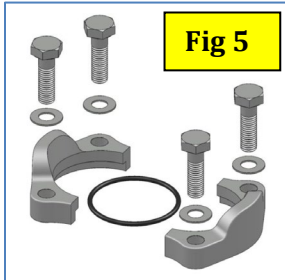
PRV Removal

- 3.4 Use appropriate tools to loosen and remove the PRV. Cap or plug the PRV port if replacement is delayed.

Code 62 Flange Style New PRV Installation, if pipe style PRV, skip to section *Pipe threaded Style Installation of New PRV*)

- 3.5 Make sure the PRV complies with NFPA 52 standards
- 3.6 Verify that PRV setpoint complies with ASME storage vessel requirements at the site. If you have any questions or concerns about the set points, contact your supervisor or the Chevron reliability specialist for confirmation.
- 3.7 Using a vice to hold the PRV, clean the male and female pipe threads on both the valve and the system piping with a lint-free cloth to remove debris, oil, or old sealant.
- 3.8 Apply an appropriate amount of thread sealant (PTFE tape or pipe dope) to the male threads of the relief valve or system pipe, following the sealant manufacturer's instructions.
- 3.9 Do not apply sealant to the first thread to prevent contamination inside the system.
- 3.10 Thread the relief valve into the female pipe connection by hand. Ensure the pipe is not cross-threaded.
- 3.11 Ensure the flange area is clean and free of debris, dirt, or old lubricant.
- 3.12 Remove O-ring.
- 3.13 Wipe the groove where the O-ring will be seated with a clean, lint-free cloth.
- 3.14 Apply O-Ring Lubricant to O-ring before installation.
- 3.15 Do not overlubricate, as excess lubricant can attract dust or debris.

- 3.16 Install new Replacement O-Ring
- 3.17 Carefully place the O-ring into the groove of the Code 62 Flange, making sure it sits evenly and is not twisted.
- 3.18 Remove the Split Flange Clamps (two-piece clamp halves) (see **Fig 5**). Ensure that the surface is thoroughly cleaned and free from any debris.



- 3.19 Carefully align the PRV valve with the vent piping – Hand-tighten.
- 3.20 Install Split Flange Clamps (2-Piece Clamp Halves).
- 3.21 Hand-tighten the bolts to seat the O-ring against the port face, following a star pattern for even pressure
- 3.22 Torque to manufacturer specifications (see **Fig 6**.) Tighten the bolts gradually in a star pattern (e.g., 1, 3, 2, 4 for a four-bolt pattern).

Fig 6 Torque specifications for SAE Code 62 four-bolt split flanges			
Dash Size	Bolt Size	Torque (ft-lbs)	Torque (Nm)
-8	5/16 – 18 × 1 – 1/4	15 – 19	20 – 25
-12	3/8 – 16 × 1 – 1/2	25 – 33	34 – 45
-16	7/16 – 14 × 1 – 3/4	42 – 50	56 – 68
-20	1/2 – 13 × 1 – 3/4	62 – 75	85 – 102
-24	5/8 – 11 × 2 – 1/4	117 – 133	158 – 181
-32	3/4 – 10 × 2 – 3/4	200 – 217	271 – 294

- 3.23 Clean the male and female pipe threads on both the valve and the system piping with a lint-free cloth to remove debris, oil, or old sealant.
- 3.24 Use a vise to hold PRV to install piping before installing on storage
- 3.25 Use a pipe wrench or adjustable wrench to further tighten the PRV vent piping.

CAUTION: There is still storage pressure at the ball valve, so do not apply any torque to that area. Use the proper technique with multiple wrenches to avoid transferring any torque to the pressure side

Pipe threaded Style Installation of New PRV

- 3.26 Make sure the PRV complies with NFPA 52 standards
- 3.27 Verify that PRV setpoint complies with ASME storage vessel requirements at the site. If you have any questions or concerns about the set points, contact your supervisor or the Chevron reliability specialist for confirmation.

- 3.28 Using a vice to hold the PRV, clean the male and female pipe threads on both the valve and the system piping with a lint-free cloth to remove debris, oil, or old sealant.
- 3.29 Apply an appropriate amount of thread sealant (PTFE tape or pipe dope) to the male threads of the relief valve or system pipe, following the sealant manufacturer's instructions.
- 3.30 Do not apply sealant to the first thread to prevent contamination inside the system.
- 3.31 Thread the PRV valve into the female pipe connection by hand. Ensure the valve is not cross-threaded.
- 3.32 Using pipe or adjustable wrench, further tighten the PRV. Do not overtighten—typically, 2–3 additional turns past hand-tight is sufficient. (Try to match the number of threads showing before removal). If a torque specification is provided by the valve manufacturer, use a torque wrench accordingly.
- 3.33 Carefully align the PRV with the vent piping – hand tighten.
- 3.34 Use a pipe wrench or adjustable wrench to further tighten the PRV vent piping.

CAUTION: There is still storage pressure at the ball valve, so do not apply any torque to that area. Use the proper technique with multiple wrenches to avoid transferring any torque to the pressure side.



Apply Natural Gas compatible sealant tape and liquid sealant to treads before assembly.



MS-PTS-50 Swagelok
SWAK® Anaerobic Thread



Blue Monster PTFE
Thread Sealant Tape



Parker-Hannifin O-ring Lubricant
MPN #: SLUBE-884-2-TFD

NOTE: Check that the bleed valve has been closed before removing the lock and opening the PRV isolation valve.

Re-energization (After Service)

4. Restoration Procedure

- 4.1 Confirm all tools are removed and PRV is secure.
- 4.2 Remove lockout devices from the PRV ball valves and slowly open them until you hear gas coming from the bleeder valve. Close the bleeder valve and check for leaks, then continue to slowly open the ball valve fully and check for leaks again. If you find any leaks, repeat the procedure to vent the gas pressure.

- 4.3 Notify all affected personnel that locks have been removed, and the CNG Storage Vessels are ready to be put in service.
- 4.4 Remove lockout devices on Storage vessels, priority panel and compressors
- 4.5 Restart compressors according to the standard procedure.
- 4.6 Confirm system is operating normally. Document PRV replacement (Make, Model, Serial, Set PSI and Date of the Recertification on the PRV Tag and LOTO steps in maintenance log.

5. Notify Affected Personnel

- Contact Chevron Call Center (**877-872-3966**) to make them aware of the Station/Equipment status.
- Contact the Supervisor and Chevron RE for a Equipment status update.
- Complete ALL paperwork pertaining to the work before leaving the station.

6. Documentation

- PRV removal/replacement form
- Pressure test results
- Technician sign-off

7. References

- OSHA 29 CFR 1910.147 (LOTO Standard)
- 8 CCR 3314 (Cal OSHA LOTO Standard)
- NFPA 52: Vehicular Natural Gas Fuel Systems Code
- Manufacturer PRV specifications
- The Manufacturers Manual can be found in the Files Section on Aetos searching for “9100-Series-Model-20-IOM-Manual.pdf”

Version History and Approvals			
Version #	Date:	Name and Position:	Status: (Created/Approved/Annual Review*)
1.0	10/01/25	Harlan Brodie (Reliability Engineer)	Created
1.0	11/18/25	Brent Tesla (Renewables Project Manager)	Approved
1.1	4/21/26	Harlan Brodie (Reliability Engineer) Added steps 3.18 & 3.20	Created
1.1	4/21/26	Brent Tesla (Renewables Project Manager)	Approved

**Procedure must be annually reviewed*