



STATE OF WASHINGTON

UTILITIES AND TRANSPORTATION COMMISSION

1300 S. Evergreen Park Dr. S.W., P.O. Box 47250 • Olympia, Washington 98504-7250

(360) 664-1160 • TTY (360) 586-8203

*Sent Via Email and Electronic Return Receipt*

Sept. 7, 2017

Eric Martuscelli  
Vice President-Operations  
Cascade Natural Gas Corporation  
8113 W. Grandridge Blvd  
Kennewick, WA 99336

Dear Mr. Martuscelli:

**RE: 2017 National Response Center Incident No. 1178094 – Cascade Natural Gas Corporation, Mount Vernon District – (Investigation No. 7447)**

WUTC staff (staff) concluded an investigation of the May 10, 2017 incident which occurred at Gear Rd., east of Old Highway 99 in Burlington. This incident was reportable due to the unintentional estimated gas loss of more than 3MMcf of natural gas. Staff's investigation determined that this release was caused by metal shavings caught in the diaphragm of regulator #R-18. These shavings were the result of a hot tap that was performed nearby regulator #R-18.

Although no violations were found, staff is concerned with the number of Maximum Allowable Operating Pressure (MAOP) exceedances within Cascade Natural Gas Company's system within the last several years. Staff is aware of 39 MAOP exceedances since 2009, which is the highest total for any Local Distribution Company (LDC) in Washington during the aforementioned timeframe. Staff believes it would be prudent to address this issue which, if left uncorrected, could lead to more serious conditions in the future. Please confirm what steps CNG will take to address this concern.

**Please respond to this request within Thirty (30) days.** Staff thanks CNG's personnel for their cooperation and assistance during this investigation.

If you have any questions or if we may be of any assistance, please contact Scott Anderson at (360) 664-1297.

Sincerely,

Sean C. Mayo  
Pipeline Safety Director

Enclosure

cc: Mike Eutsey, Director, Operations Services, CNGC  
Jeremy Ogden, Director, Engineering Services, CNGC  
Ryan Privratsky, Director, System Integrity, CNGC  
Chris Grissom, Manager, Standards and Compliance, CNGC

# UTC Incident Investigation Form

<b>Notification ID:</b>	3156	<b>Investigation ID:</b>	7447
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<b>Inspector Name:</b>	Scott Anderson
<b>Date Report Submitted to Chief Engineer:</b>	Sept. 5, 2017
<b>Date Report Reviewed &amp; Approved by Chief Engineer:</b>	Sept. 7, 2017

<b>Operator:</b>	Cascade Natural Gas Company(CNGC)
<b>District/Unit:</b>	Mount Vernon
<b>Location:</b>	Old Highway 99 & Gear Rd. Burlington, WA
<b>Incident Date:</b>	May 10, 2017

<b>Description:</b>
<p>On May 8<sup>th</sup> a CNGC contract crew (Snelson’s) was in the process of constructing a new dual run regulator, R-116. The new station would be replacing the existing dual run axial flow regulator R-18 at Gear Rd. east of Old Hwy 99 in Burlington, WA (see attachment 1). In the process of construction a hot tap was performed on a 2” steel main by Eric Rex (see attachment 2). The 2” main was currently connected to R-18, but would later be connected to the new regulator once it was up and running. The metal shavings from the tap remained in the line due to the tap being done on a live gas main.</p> <p>On May 10<sup>th</sup> at approximately 23:41 CNGC was made aware by an outside source that the relief stack to R-18 was venting gas. Upon arrival CNGC maintenance staff found that the working run of the regulator, R1, was flowing at an operating pressure of 273.25 pounds per square inch gauge (psig). After bypassing R1 to the standby run, R2, CNGC staff were able to take apart R1 to find an excessive amount of the metal shavings from the nearby hot tap in the diaphragm (see attachment 3).</p> <p>According to CNGC maintenance records (see attachment 4): Inlet pressure of R1, 278 psig. Inlet MAOP of R1, 360 psig. Outlet MAOP was 249 psig. Lockup set pressure of R1 was set at 246 psig after the overpressure event. The relief blew at 270 pounds psig at the time CNGC staff arrived, and was later set to a lower pressure of 260 psig.</p>
<b>Facts/Chronology of Events:</b>

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- 05/08/17 – a CNGC contract crew was performing construction of a new regulator station that would be replacing regulator R-18. A hot tap was also performed near R-18 to tie in the piping to the new regulator station.
- 05/10/17 at 23:41 – An external report to CNGC made them aware that the relief valve at the regulator station in Burlington was blowing gas.
- 05/11/17 at 00:01 – CNGC staff arrived to the site and perform maintenance on the failed regulator and stop the blowing relief valve (see attachment 4).
- 05/11/17 during business hours – Electronic pressure recording data report is reviewed for the regulating station involved. It was found that intermittent pressure fluctuations were observed over a period of time (see attachment 5). CNGC staff recognized the intermitted pressure fluctuations could have also been associated with intermittent relief valve operation and probable gas loss. At 11:42, a representative from CNGC contacted WUTC staff to report a state reportable incident.
- When CNGC maintenance staff checked the operating pressure it was at 273.25 pounds per square inch gauge (PSIG).
- 05/11/2017 at 14:45 CNGC staff bypassed the operating regulator to the standby regulator so the operating regulator could be disassembled and cleaned. Once the diaphragm was cleaned and back to operating condition it was brought back online. The lockup set pressure was set to 246 psig.
- 05/11/17 at 15:50 – CNGC engineering reports to Standards and Compliance that the incident reporting criteria of more than 3 million cubic feet lost was likely (see attachment 6).
- 05/11/17 at 16:17 – CNGC Standards and Compliance completed reporting process to NRC within one hour of confirmed discovery. NRC 1178094.

## Causes/ Contributing Factors:

The release of gas was from the relief vent of R-18 and due to metal shavings in the regulator diaphragm. The shavings in the diaphragm would not let it re-seat which caused the regulator to go above the set MAOP and the relief to open.

## Regulatory Analysis/ Violations:

According to 480-93-200(2)(d), Each gas pipeline company must give notice to the commission by telephone using the emergency notification line within twenty-four hours of each incident or hazardous condition arising out of its operations that results in a gas pipeline pressure exceeding MAOP.

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According to 49 CFR 192.201(a)(2)(i), if the MAOP is 60 psig or more, the pressure may not exceed the MAOP plus 10 percent or the pressure that produces a hoop stress of 75 percent of SMYS, whichever is lower.

CNGC is not in violation of 192.201(a)(2)(i) because the overpressure condition only reached 273.25 psig. 273.9 psig is 110 percent MAOP. The company also reported the incident to pipeline staff within the proper timeframe.

Although they did not violate either rule, exceeding the MAOP at district regulator stations has become a reoccurring issue for CNGC. Since 2009, Cascade has had 37 MAOP exceedances. This is the highest in Washington State.

### **Follow up/ Recommendations:**

With the history of MAOP exceedances at regulator stations, staff strongly recommends CNGC review their processes and procedures to ensure that the company controls MAOP exceedances.

# UTC Incident Investigation Form

## Attachment 1



## Attachment 2

### MEA Qualifications as of 04/28/2017

### EnergyU Qualifications

Qualification	Name	Job Title	Qualification Date	Expiration Date
192-1426.01 Tapping Steel and Plastic Pipe: Manual (self-tapping)	Rex,Eric	Control Equipment Mechanic	9/6/2016	9/6/2019
192-1426.02 Tapping Steel and Plastic Pipe: Mechanical Tapping Equipment	Rex,Eric	Control Equipment Mechanic	9/6/2016	9/6/2019

# UTC Incident Investigation Form

## Attachment 3



# UTC Incident Investigation Form

## Attachment 4

CNG 287A  
REV 08/11

CASCADE NATURAL GAS

FACILITY NO. R-18

### FACILITY MAINTENANCE & INSPECTION RECORD REGULATOR STATION

FACILITY LOCATION Gear Road - East of Old 99  
TOWN Burlington DISTRICT St. Vernon STATE Vt

ANNUAL  REBUILD  NEW  RETIRE  SPECIAL

**TEST/SET**

M.A.O.P. INLET 360 M.A.O.P. OUTLET 249  
 OPERATING REG.: ESTABLISH FLOW  YES  NO LOCK UP PRESSURE 246  
 STANDBY REG.: ESTABLISH FLOW  YES  NO LOCK UP PRESSURE 241  
 RELIEF VALVE: OPENS FULL FLOW  YES  NO SET PRESSURE 260  
 STATION PRESSURE: INLET 278 OUTLET 270  
 OPERATING & STANDBY REGULATORS SWITCHED:  YES  NO  N/A

**EQUIPMENT CHECK**

OPERATING/WORKING RUN:  
 SIZE 2" MAKE American MODEL NUMBER 02H765174  
 ORIFICE SIZE 100% PILOT MAKE/MODEL 829.5 SPRING RANGE 125  
 STANDBY RUN:  
 SIZE 2" MAKE American MODEL NUMBER 02H765174  
 ORIFICE SIZE 100% PILOT MAKE/MODEL 829.5 SPRING RANGE 125  
 RELIEF VALVE:  
 SIZE 4" MAKE American MODEL NUMBER 02H765174  
 ORIFICE SIZE 100% PILOT MAKE/MODEL 829.5 SPRING RANGE 35-300

**INSPECTIONS**

RELIEF VALVE FLAG FOUND:  SET  TRIPPED  N/A SIGNS:  GOOD  BAD  N/A  
 VENT STACK CLEAR:  YES  NO  N/A GROUNDS:  GOOD  BAD  N/A  
 REG VENTS DOWNWARD:  YES  NO  N/A FENCE:  GOOD  BAD  N/A  
 WEATHER CAPS OPERABLE:  YES  NO  N/A WRAP:  GOOD  BAD  
 PILOT FILTER:  CHECKED  N/A PAINT:  GOOD  NP  Repair  
 VALVES OPERATE:  YES  NO  N/A VAULT LID:  GOOD  BAD  N/A  
 Proper VALVE POSITION Verified:  YES  NO  N/A VAULT:  GOOD  BAD  N/A  
 VALVES LUBE:  YES  NO  N/A  
 VALVE BOX:  GOOD  BAD  N/A

**CHECKED VALVE LOCKS**

RELIEF ISOLATION  BY-PASS  OPERATIONAL  N/A  
 GAUGE(S) SERIAL # 755 20 3056 GAUGE(S) CALIBRATION EXPIRES: 5/1/18

REMARKS: WHEN BAD IS MARKED AN EXPLANATION IS REQUIRED. (WHEN REPLACEMENT IS MADE OF REGULATOR, RELIEF VALVE, OR VALVES - LIST MAKE, MODEL, PILOTS, MARKERS OR SIGNS FOR NECESSARY REPAIRS).

PARTS REQUIRED:  YES  NO

2" Boot. AOC - Relief was venting. Metal shavings found in boot. Relief was set at 270#. Replaced. Boot is operating and set lockup at 246#. Set relief at 260. Standby run was OK.

FOLLOW-UP REQUIRED:  YES  NO

WORK ORDER NUMBER

INSPECTED BY John Crisp DATE 5/11/17 GENERAL MANAGER Michael DATE 5-11-17

ORIGINAL - DISTRICT

COPY - SHAREPOINT

# UTC Incident Investigation Form

## Attachment 5

Site Name	Date Time	650 P1 Int High
P-13 Burlington R-19	5/8/2017 0:00	244.97
P-13 Burlington R-19	5/8/2017 0:15	244.98
P-13 Burlington R-19	5/8/2017 0:30	244.98
P-13 Burlington R-19	5/8/2017 0:45	244.98
P-13 Burlington R-19	5/8/2017 1:00	244.98
P-13 Burlington R-19	5/8/2017 1:15	244.54
P-13 Burlington R-19	5/8/2017 1:30	244.55
P-13 Burlington R-19	5/8/2017 1:45	244.55
P-13 Burlington R-19	5/8/2017 2:00	244.55
P-13 Burlington R-19	5/8/2017 2:15	244.55
P-13 Burlington R-19	5/8/2017 2:30	244.55
P-13 Burlington R-19	5/8/2017 2:45	244.55
P-13 Burlington R-19	5/8/2017 3:00	244.11
P-13 Burlington R-19	5/8/2017 3:15	244.12
P-13 Burlington R-19	5/8/2017 3:30	244.12
P-13 Burlington R-19	5/8/2017 3:45	244.01
P-13 Burlington R-19	5/8/2017 4:00	244.03
P-13 Burlington R-19	5/8/2017 4:15	243.67
P-13 Burlington R-19	5/8/2017 4:30	242.79
P-13 Burlington R-19	5/8/2017 4:45	242.79
P-13 Burlington R-19	5/8/2017 5:00	242.79
P-13 Burlington R-19	5/8/2017 5:15	242.79
P-13 Burlington R-19	5/8/2017 5:30	242.35
P-13 Burlington R-19	5/8/2017 5:45	241.46
P-13 Burlington R-19	5/8/2017 6:00	241.46
P-13 Burlington R-19	5/8/2017 6:15	240.14
P-13 Burlington R-19	5/8/2017 6:30	238.81
P-13 Burlington R-19	5/8/2017 6:45	238.81
P-13 Burlington R-19	5/8/2017 7:00	238.36
P-13 Burlington R-19	5/8/2017 7:15	237.47
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P-13 Burlington R-19	5/8/2017 9:30	240.53
P-13 Burlington R-19	5/8/2017 9:45	240.55
P-13 Burlington R-19	5/8/2017 10:00	240.52
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P-13 Burlington R-19	5/8/2017 10:30	240.96
P-13 Burlington R-19	5/8/2017 10:45	240.07
P-13 Burlington R-19	5/8/2017 11:00	242.28
P-13 Burlington R-19	5/8/2017 11:15	242.22
P-13 Burlington R-19	5/8/2017 11:30	244.04

P-13 Burlington R-19	5/8/2017 11:45	243.59
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P-13 Burlington R-19	5/8/2017 15:00	266.78
P-13 Burlington R-19	5/8/2017 15:15	267.22
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P-13 Burlington R-19	5/8/2017 20:30	267.49
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P-13 Burlington R-19	5/8/2017 21:00	269.28
P-13 Burlington R-19	5/8/2017 21:15	269.28
P-13 Burlington R-19	5/8/2017 21:30	267.95
P-13 Burlington R-19	5/8/2017 21:45	268.85
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P-13 Burlington R-19	5/8/2017 22:15	269.44
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P-13 Burlington R-19	5/8/2017 23:15	270.2

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P-13 Burlington R-19	5/10/2017 6:00	259.39
P-13 Burlington R-19	5/10/2017 6:15	251.58
P-13 Burlington R-19	5/10/2017 6:30	241.91
P-13 Burlington R-19	5/10/2017 6:45	242.07
P-13 Burlington R-19	5/10/2017 7:00	240.96
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P-13 Burlington R-19	5/10/2017 7:30	241.85
P-13 Burlington R-19	5/10/2017 7:45	241.84
P-13 Burlington R-19	5/10/2017 8:00	242.72
P-13 Burlington R-19	5/10/2017 8:15	242.75
P-13 Burlington R-19	5/10/2017 8:30	242.27
P-13 Burlington R-19	5/10/2017 8:45	241.38
P-13 Burlington R-19	5/10/2017 9:00	242.25
P-13 Burlington R-19	5/10/2017 9:15	242.69
P-13 Burlington R-19	5/10/2017 9:30	244.1
P-13 Burlington R-19	5/10/2017 9:45	244.45
P-13 Burlington R-19	5/10/2017 10:00	249.76
P-13 Burlington R-19	5/10/2017 10:15	250.12
P-13 Burlington R-19	5/10/2017 10:30	255.06

P-13 Burlington R-19	5/10/2017 10:45	255.06
P-13 Burlington R-19	5/10/2017 11:00	262.58
P-13 Burlington R-19	5/10/2017 11:15	262.58
P-13 Burlington R-19	5/10/2017 11:30	262.57
P-13 Burlington R-19	5/10/2017 11:45	263.7
P-13 Burlington R-19	5/10/2017 12:00	265.67
P-13 Burlington R-19	5/10/2017 12:15	263.54
P-13 Burlington R-19	5/10/2017 12:30	263.9
P-13 Burlington R-19	5/10/2017 12:45	265.66
P-13 Burlington R-19	5/10/2017 13:00	265.21
P-13 Burlington R-19	5/10/2017 13:15	262.1
P-13 Burlington R-19	5/10/2017 13:30	266.08
P-13 Burlington R-19	5/10/2017 13:45	268.08
P-13 Burlington R-19	5/10/2017 14:00	267.41
P-13 Burlington R-19	5/10/2017 14:15	267.41
P-13 Burlington R-19	5/10/2017 14:30	266.97
P-13 Burlington R-19	5/10/2017 14:45	268.29
P-13 Burlington R-19	5/10/2017 15:00	268.95
P-13 Burlington R-19	5/10/2017 15:15	269.62
P-13 Burlington R-19	5/10/2017 15:30	268.73
P-13 Burlington R-19	5/10/2017 15:45	268.29
P-13 Burlington R-19	5/10/2017 16:00	267.85
P-13 Burlington R-19	5/10/2017 16:15	267.85
P-13 Burlington R-19	5/10/2017 16:30	267.85
P-13 Burlington R-19	5/10/2017 16:45	267.4
P-13 Burlington R-19	5/10/2017 17:00	266.95
P-13 Burlington R-19	5/10/2017 17:15	269.39
P-13 Burlington R-19	5/10/2017 17:30	269.17
P-13 Burlington R-19	5/10/2017 17:45	268.73
P-13 Burlington R-19	5/10/2017 18:00	268.74
P-13 Burlington R-19	5/10/2017 18:15	270.07
P-13 Burlington R-19	5/10/2017 18:30	270.07
P-13 Burlington R-19	5/10/2017 18:45	270.52
P-13 Burlington R-19	5/10/2017 19:00	270.08
P-13 Burlington R-19	5/10/2017 19:15	269.64
P-13 Burlington R-19	5/10/2017 19:30	268.96
P-13 Burlington R-19	5/10/2017 19:45	269.22
P-13 Burlington R-19	5/10/2017 20:00	269.69
P-13 Burlington R-19	5/10/2017 20:15	269.67
P-13 Burlington R-19	5/10/2017 20:30	268.78
P-13 Burlington R-19	5/10/2017 20:45	270.12
P-13 Burlington R-19	5/10/2017 21:00	270.57
P-13 Burlington R-19	5/10/2017 21:15	270.57
P-13 Burlington R-19	5/10/2017 21:30	271.3
P-13 Burlington R-19	5/10/2017 21:45	271.46
P-13 Burlington R-19	5/10/2017 22:00	270.58
P-13 Burlington R-19	5/10/2017 22:15	273.25

# UTC Incident Investigation Form

P-13 Burlington R-19	5/10/2017 22:30	273.25
P-13 Burlington R-19	5/10/2017 22:45	272.83
P-13 Burlington R-19	5/10/2017 23:00	272.37
P-13 Burlington R-19	5/10/2017 23:15	272.37
P-13 Burlington R-19	5/10/2017 23:30	272.37
P-13 Burlington R-19	5/10/2017 23:45	271.48
P-13 Burlington R-19	5/11/2017 0:00	272.37
P-13 Burlington R-19	5/11/2017 0:15	272.49
P-13 Burlington R-19	5/11/2017 0:30	235.64
P-13 Burlington R-19	5/11/2017 0:45	235.72
P-13 Burlington R-19	5/11/2017 1:00	235.72
P-13 Burlington R-19	5/11/2017 1:15	236.02
P-13 Burlington R-19	5/11/2017 1:30	236.08
P-13 Burlington R-19	5/11/2017 1:45	236.08
P-13 Burlington R-19	5/11/2017 2:00	240.05
P-13 Burlington R-19	5/11/2017 2:15	239.61
P-13 Burlington R-19	5/11/2017 2:30	238.29
P-13 Burlington R-19	5/11/2017 2:45	237.85
P-13 Burlington R-19	5/11/2017 3:00	237.41
P-13 Burlington R-19	5/11/2017 3:15	236.97
P-13 Burlington R-19	5/11/2017 3:30	236.96
P-13 Burlington R-19	5/11/2017 3:45	236.52
P-13 Burlington R-19	5/11/2017 4:00	236.77

# UTC Incident Investigation Form

## Attachment 6

Gas Sizing Equation:

$$Q = P_1 * C_g * 1.291$$

Q = Flow Capacity (CFH)

P<sub>1</sub> = Inlet Pressure (psia)

C<sub>g</sub> = Gas Sizing Coefficient

Operating Regulator: American Axial Flow, Model 02H7CS174, C<sub>g</sub> = 1513

$$Q = 292.7 * 1513 * 1.291 = 571,726 \text{ CFH}$$

Relief Regulator: American Axial Flow, Model 04H7CS174, C<sub>g</sub> = 5363

$$Q = 273.9 * 5363 * 1.291 = 1,896,383 \text{ CFH}$$

Gas Loss Calculation:

$$\text{Loss} = \text{Regulator Capacity} * \text{Duration} = 571,726 \text{ CFH} * 11.5 \text{ hours} = 6,574,849 \text{ Cubic Feet}$$