

**Weymouth, Massachusetts Compressor Station (Isolated
Segment)
Restart Plan**

PHMSA Amended Corrective Action Order

CPF No. 1-2020-014-CAO

ALGONQUIN GAS TRANSMISSION, LLC

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November 9, 2020

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Executive Summary

Algonquin Gas Transmission, LLC (AGT), a subsidiary of Spectra Energy Partners, LP, which is in turn a wholly owned subsidiary of Enbridge Inc., owns and will operate the Weymouth Compressor Station located in Weymouth Massachusetts. The Weymouth Compressor Station (Isolated Segment) is the final piece of the Atlantic Bridge Project¹ that will provide needed natural gas capacity to the U.S. Northeast and Maritimes system. During activities associated with the commissioning of the Weymouth Compressor Station, two small releases occurred at the Compressor Station on September 11, 2020 (Event 1) and September 30, 2020 (Event 2) neither of which were reportable incidents under PHMSA 49 C.F.R. Part 191 regulations. On October 1, 2020, the Pipeline and Hazardous Materials Safety Administration (PHMSA) issued a Corrective Action Order (CAO), CPF No. 1-2020-014-CAO, in response to Event 1 and Event 2. The CAO was updated and superseded by an Amended CAO (ACAO) that PHMSA issued on October 30, 2020. The ACAO requires certain corrective actions, including the development and submission of a Restart Plan for PHMSA approval prior to resuming commissioning and eventual operation of the Weymouth Compressor Station (ACAO, Paragraph 2).

With respect to Event 1, on September 11, 2020 at approximately 8:50 AM Eastern Daylight Time (EDT) during pressurization of the Weymouth Compressor Station piping, a loss of containment occurred at a pressure of 579 psig at the sump of a horizontal filter separator (FS-01). AGT personnel closed the isolation valves for FS-01 (Valves FSI-01 and FSO-01) and manually opened Weymouth Compressor Station blowdown valves to vent the gas from the Compressor Station source control silencer, resulting in a controlled release of approximately 156 mscf of natural gas.² The preliminary direct cause of the leak leading to Event 1 was an improper O-ring that was installed on the sump closure door to FS-01. The installed O-ring was not designed for the operating environment of the filter separator.

With respect to Event 2, the Weymouth Compressor Station emergency shutdown (ESD) system was initiated at approximately 10:20 AM EDT, resulting in a release of approximately 195 mscf of natural gas. The preliminary direct cause of Event 2 was determined to be temporary loss of 129 volts, direct current (VDC) power to the ESD panel. Once the ESD system was initiated during Event 2, it functioned as designed and consistent with PHMSA regulation.

For PHMSA review and approval, AGT provides this Restart Plan to restart and pressurize the Isolated Segment to 80% of the actual operating pressure in effect immediately prior to Event 2. Pursuant to ACAO Paragraph 2, this Restart Plan describes those mitigative and preventive activities that AGT has already implemented and outlines additional activities that AGT plans to undertake in advance of pressurizing the Isolated Segment of the Weymouth Compressor Station and during the pressurization and start up process. As outlined below, AGT has taken a conservative approach to its review of the ESD system and AGT has included multiple additional assurance actions out of an abundance of caution for restart of the Weymouth Compressor Station.

¹ The [Atlantic Bridge project](#) was initiated in 2014 and consisted of adding additional horse power at existing compressor stations, installing 6.2 miles of 42-inch pipe, and the new compressor station in Weymouth.

² An additional 13 mscf was released at ground level, for a total release of 169 mscf.

The Restart Plan includes the following actions specific to the Isolated Segment: (1) a records review for conditions similar to those surrounding both events (Event 1 and Event 2), including a review of construction and commissioning records, and measures to address the findings as appropriate prior to restart; (2) a management of change plan; (3) a pressurization plan that provides for (i) daylight restart; (ii) advance communications with local emergency responders; (iii) adequate patrolling during restart and incremental pressure increases to be held for a minimum of 2 hours; and (iv) sufficient surveillance during pressure increase increments to confirm that no leaks are present. The mitigative and preventive actions that AGT has completed for purposes of restart and in compliance with ACAO Paragraph 2 are documented in this Restart Plan and appendices and/or have already been provided to PHMSA.

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Relevant Standard Operating Procedures

| SOP | Title | Revision |
|------------|---|-----------------|
| 4-2160 | Gas Leakage Survey – Compressor Station | 01/01/18 |
| 4-3040 | Station and Unit Control Systems | 06/26/18 |
| 5-3070 | Hazardous Energy Control LO/TO | 06/26/18 |
| 5-3010 | Purging | 12/14/17 |
| 5-6010 | Overpressure Protection & Capacity Verification | 01/01/18 |
| TG-50 | Winter Operations Preparations | 06/29/20 |

| Construction Specification | Title | Revision |
|-----------------------------------|--------------------------------------|-----------------|
| UDS-CM1.0 | Commissioning of Compressor Stations | 09/20/16 |
| USC-BT1.3 | Bolt Torqueing & Tensioning | 01/29/2018 |
| UDG-SD1.2 | Station Design Basis Memorandum | 06/24/20 |
| UDS-AFH1.3 | Arc Flash Hazard Assessment | 09/18/18 |

| Reports | Title | Revision |
|----------------|---|-----------------|
| 7T-116 | Purge Report | 12/13/16 |
| 7T-65 | Leak Survey | 05/30/07 |
| C-20-5920 | Gas Handling Procedure for Purge and Pack | N/A |
| MOC | Management of Change | N/A |
| Pack Report | Pack Report | N/A |
| Form 762 | Winter Preparation Checklist | N/A |

1. Introduction and Background

1.1. Introduction

Algonquin Gas Transmission, LLC (AGT),³ a subsidiary of Spectra Energy Partners, LP, which is in turn a wholly owned subsidiary of Enbridge Inc., owns and will operate the Weymouth Compressor Station located in Weymouth Massachusetts. The Weymouth Compressor Station (Isolated Segment) is the final piece of the Atlantic Bridge Project⁴ that will provide needed natural gas capacity to the U.S. Northeast and Maritimes system.

With respect to Event 1, on September 11, 2020 at approximately 8:50 AM Eastern Daylight Time (EDT) during pressurization of the Weymouth Compressor Station piping, a loss of containment occurred at a pressure of 579 psig at the sump of a horizontal filter separator (FS-01). AGT personnel closed the isolation valves for FS-01 (Valves FSI-01 and FSO-01) and manually opened Weymouth Compressor Station blowdown valves to vent the gas from the Compressor Station source control silencer, resulting in a controlled release of approximately 156 mscf of natural gas.⁵ The preliminary direct cause of Event 1 was an improper O-ring that was installed on the sump closure door to FS-01. The installed O-ring was not designed for the operating environment of the filter separator.

On September 30, 2020, at approximately 10:20 AM EDT, the Weymouth Compressor Station emergency shutdown (ESD) system was initiated (Event 2), resulting in a release of approximately 195 mscf of natural gas. The preliminary direct cause of Event 2 was determined to be the temporary loss of 129 volts, direct current (VDC) power to the ESD panel. Once the ESD system was initiated during Event 2, it operated as intended and consistent with applicable PHMSA regulations. Neither event qualified as a reportable incident under Pipeline and Hazardous Materials Safety Administration (PHMSA) 49 C.F.R. Part 191 regulations.

In response to Events 1 and Event 2, PHMSA issued a Corrective Action Order (CAO), CPF No. 1-2020-014-CAO, dated October 1, 2020. The CAO was superseded by an Amended CAO issued on October 30, 2020 that PHMSA issued to clarify preliminary facts, update definitions and relevant corrective actions. The ACAO applies to the entirety of the Weymouth Compressor Station (defined in the ACAO as the "Isolated Segment") in Weymouth, Massachusetts.

The ACAO imposes various corrective actions, including the submission of a Restart Plan⁶ for PHMSA approval prior to resuming operation of the Isolated Segment (Restart Plan). This

³ PHMSA has assigned operator identification number (OPID) 00288 to AGT.

⁴ The [Atlantic Bridge project](#) was initiated in 2014 and consisted of adding additional horse power at existing compressor stations, installing 6.2 miles of 42-inch pipe, and the new compressor station in Weymouth.

⁵ An additional 13 mscf was released at ground level, for a total release of 169 mscf.

⁶ A letter requesting the restoration of the domestic gas system, although outside the scope of the ACAO, was delivered to PHMSA Eastern Director (Robert Burrough) on October 7, 2020 and approved via email on October 9, 2020.

document contains the Restart Plan for the Isolated Segment required in advance and during restart under ACAO Paragraph 2(a)-(g).

1.2. Background

The Weymouth Compressor Station is a green-field natural gas compressor station located in Weymouth, Massachusetts. The Compressor Station is driven by a 7,700 HP turbine and serves to boost pipeline pressures and transport gas from the AGT I-9 pipeline into the AGT Hub Line I-10 pipeline. The main gas piping of the facility consists of 16" and 30" pipe, which has a maximum allowable operating pressure (MAOP) of 1,440 psig. Construction of the facility began in December 2019, and the facility was expected to be in-service in October 2020.

2. Objective

The objective of this Restart Plan is to implement the requirements of PHMSA ACAO Paragraph 2(a)-(g), in order to resume commissioning and operations of the Isolated Segment at a restricted pressure⁷ of eighty percent (80%) of 683 psig (i.e., 546 psig), and subsequently not to exceed MAOP pursuant to ACAO Paragraph 5.

3. Approach

In order to meet the objective, AGT prepared this Restart Plan to ensure pipeline safety of the Isolated Segment prior to and during restart of the Weymouth Compressor Station to resume operations through a phased approach at the restricted pressure of 546 psig and subsequently not to exceed MAOP.

4. Activities in Advance of Restart

4.1. Preliminary Direct Cause [ACAO Paragraph 6]

Pursuant to ACAO Paragraph 6, AGT has commenced with a direct cause investigation and a Root Cause Failure Analysis (RCFA) of Event 1⁸ and Event 2. AGT contracted with DNV GL (DNV)⁹ to facilitate the direct cause investigation and RCFA as an independent third party and document the decision-making process and all factors contributing to Event 1 and 2.

AGT and DNV have identified a preliminary direct cause for each event.

- Event 1, which occurred on September 11, 2020, was caused by an improper O-ring that was installed on the sump closure door of the bottom portion of a horizontal filter separator (FS-01). The installed O-ring was not designed for the operating

⁷ ACAO Paragraph 3(a) limits the Restart operating pressure to eighty percent (80%) of the actual operating pressure in effect immediately prior to Event 2.

⁸ ACAO Paragraph 6 does not require AGT to complete a RCFA for Event 1. AGT nevertheless elected to retain the same third party consultant, DNV, to perform an independent RCFA of both Event 1 and Event 2.

⁹ On October 7, 2020, AGT requested PHMSA approve DNV as the independent party to supplement and facilitate the RCFA for Event 2. PHMSA approved AGT's request on October 9, 2020.

environment of FS-01, resulting in a leak during pressurization of the Weymouth Compressor Station.

- Event 2, which occurred on September 30, 2020, was caused by a temporary loss of 129VDC power to the Weymouth Compressor Station's ESD panel.

Appendix A (Preliminary Direct Causes) summarizes the details of the preliminary direct causes. In addition, the mitigative and preventive actions taken to address the causes are described in more detail below.

4.2. Construction and Commissioning Records [ACAO Paragraph 2(f)]

Through its review of the construction and commissioning records pertaining to the Isolated Segment, AGT did not identify any conditions similar on the Isolated Segment that will pose any integrity or safety risk to restarting the Weymouth Compressor Station. AGT reviewed construction and commissioning records, such as the hydrostatic and pneumatic test pressure calculations, hydrostatic and pneumatic test documentation packages, overpressure protection and capacity verification, setpoint calculations, and the commissioning manual. In addition, AGT verified O-rings and seals on all entry points of all vessels, verified ESD design and construction, and completed an ESD components review. Following the review, AGT undertook a conservative approach and identified additional mitigative and preventive remedial measures and improvements to be implemented in the Weymouth Compressor Station prior to restart to provide for an added level of assurance. Appendices B (Construction Records Review and Mitigative, Preventive and/or Remedial Actions) and C (Commissioning Records Review and Preventive, Mitigative and/or Remedial Actions) summarize the details of the records reviewed and preventive, mitigative and/or remedial actions performed by AGT.

4.3. Remedial Measures [ACAO Paragraph 2(f)]

As set forth above, pursuant to ACAO Paragraph 2(f), AGT has conducted a review of the records of the Isolated Segment to assess for conditions¹⁰ similar to those surrounding Events 1 and 2. Based on that review, below is a summary of mitigative and preventive remedial actions that AGT has implemented prior to restarting the Isolated Segment, many of which were undertaken through an abundance of caution even though there were no identified deficiencies. The details of these remedial measures are provided in Appendices B and C.

4.3.1 Event 1: O-ring Gasket Replacements

The preliminary direct cause of Event 1 was an improper O-ring that was installed on the sump closure door of a horizontal filter separator (FS-01), as further described in Appendix A. To fully address that issue, AGT inspected all horizontal filter separator closures (FS-01 and FS-02) in the Isolated Segment and identified three (3) closures on FS-01 and FS-02 that

¹⁰ The preliminary direct cause of Event 1 appears to be an improper O-ring that was installed on the closure of a sump closure door of a horizontal filter separator (FS-01). The preliminary direct cause of Event 2 was determined to be temporary loss of 129VDC power to the ESD panel.

required new O-ring gaskets. All O-rings on FS-01 and FS-02 were replaced with the proper O-rings for the design conditions.

4.3.2 Event 2: ESD Panel Replacements

The preliminary direct cause of Event 2 was determined to be a temporary loss of 129VDC power to the ESD panel, as further described in Appendix A. AGT and DNV determined that there are only three (3) elements in the ESD panel power system that could cause a temporary loss of the 129VDC power to the ESD panel: (1) a 20 amp breaker in the 129VDC distribution panel, (2) approximately 50' of 12-gauge wire, and (3) a 20 amp breaker in the ESD panel itself.

To resolve any potential concern with these elements going forward, the 20 amp breaker in the 129VDC distribution panel was replaced with an in-kind new breaker. In addition, the 50' of 12-gauge power feed wire was replaced with a larger 10-gauge power feed to the ESD panel. The decision to upgrade to a 10-gauge power feed wire was made to ensure a better connection with the breakers. Finally, the 20 amp breaker in the ESD panel was replaced with a terminal block. The 20 amp breaker in the ESD panel was simply a redundant component and provided no additional protection since there is another 20 amp breaker at the distribution panel. AGT is working with a third party to test the condition and functionality of the breakers that have been removed and will provide follow-up documentation upon request.

4.3.3 Event 2: Other Remedial Actions

Given that the preliminary direct cause of Event 2 was determined to be a temporary loss of 129VDC power to the ESD panel, as further described in Appendix A, AGT evaluated the entirety of the ESD system design and components as a precaution to verify the system components, design and functionality. While the system components, design and functionality were confirmed to be within applicable specifications, AGT elected to implement multiple mitigative and preventive improvements for an added level of assurance, as follows:

- All ESD components were confirmed to be rated for direct current (DC) design. Through this evaluation process, the following seven (7) items were implemented and/or put in line as improvements to the system: tightened two (2) loose pushbutton knobs; replaced three (3) standard contact ESD buttons with three (3) sealed contact buttons; implemented preventive measures to avoid potential for moisture in the ESD low pressure trip switch (as part of the winterization project¹¹); and installed additional relays to the pushbutton wiring loops to improve the voltage drop across the system.
- All five hundred and forty-five (545) tubing fitting connections at the Weymouth Compressor Station were inspected. The vast majority (five hundred and twenty (520)) were technically sound. AGT tightened appropriate portions of twenty-five (25) tubing fitting connections.

¹¹ Winterization design and maintenance requirements were updated by AGT in 2019, and the winterization equipment at the Weymouth Compressor Station will be addressed to align with these requirements as a conservative measure, with a target completion date of 11/30/20. The winterization project has no bearing or impact on startup.

- AGT also evaluated all electrical/control connections within the ESD system and corrected identified deficiencies. A check of the input/output (I/O) wiring terminations resulted in seven (7) improvements: removal of the ferrules at I/O to improve connections; replacement of push-in comb jumpers with screw-in comb jumpers; and correction of five (5) loose or frayed wire connections.
- Moreover, AGT reviewed all bolt torquing at the Weymouth Compressor Station. The review identified twenty-five (25) flange sets that were appropriate for field verification to confirm documentation of torqued flanges. Inspection results showed that of the twenty-five (25) flange sets, sixteen (16) (all on the domestic gas skid) were correctly torqued, and documentation for those flange sets is being updated to reflect the correct torque values. The remaining nine (9) flange sets were inspected further, and were confirmed to be properly installed and torqued.

4.3.4 Assurance Activities Prior to Restart

In addition to the mitigative and preventive remedial actions and ESD system improvements discussed above, AGT already undertook in an abundance of caution additional engineering assurance activities prior to restart of the Weymouth Compressor Station for an added level of safety. These mitigative and preventive engineering assurance activities are summarized below:

- AGT inspected all closure seals at the Weymouth Compressor Station for proper O-rings and seals and replaced as necessary.
- AGT completed an initial risk assessment of the ESD system, following which the Company undertook a variety of the mitigative and preventive remedial actions identified in this Restart Plan.
- AGT evaluated all electrical/control connections in the Compressor Station Control Panel and the Unit Control Panel.
- AGT replaced all breakers in the 129VDC distribution panel.
- AGT validated the construction and commissioning processes and documentation and corrected any deficiencies, as described by the assurance activities set forth in Appendices B and C (ESD electrical, tubing, breaker replacement in the 129VDC panel, Compressor Station Control Panel electrical/control wiring, Unit Control Panel electrical/control wiring, Motor Control Center wire tightening, bolt torque, vessel closure inspections and winterization) to address potential construction or commissioning concerns.
- AGT evaluated and confirmed that all test pressure calculations for the entire facility are accurate and complete.
- As noted above, AGT evaluated all electrical/control connections within the ESD system, corrected electrical deficiencies, and implemented seven (7) improvements.

- AGT tightened all electrical connections on the load side of the Motor Control Center and corrected any deficiencies.

The details of these mitigative and preventive assurance activities are provided in Appendices A (Table 1), B and C.

4.3.5 Management of Change [ACAO Paragraph 2(g)]

Once the Restart Plan has been approved by PHMSA and prior to restart, AGT will implement its management of change (MOC) process to further analyze the proposed restart of the Isolated Segment and ensure that any necessary procedural modifications are incorporated into AGT’s O&M manual. Under the existing AGT US MOC Procedure, AGT documents the relevant changes, evaluates the implications of the change, and develops an action and implementation plan as warranted, including required management approvals and pre-change actions. AGT’s MOC process involves eight (8) primary steps which are summarized in Table 1.

Table 1 – AGT MOC Documentation Analysis and Approval Steps

| MOC Step | Summary |
|-----------------|---|
| Steps 1-2 | Document the change, including a description of the change, reason for the change, communication of the change, time limitations and status |
| Step 3 | Evaluate Implications of the Change and Develop Action Plan |
| Step 4 | Management Approvals of Implementation Plan |
| Step 5 | Completion of Pre-Change Actions |
| Step 6 | Implement Change |
| Step 7 | Completion of Post-Change Actions |
| Step 8 | Closure of MOC, Documentation in MOC Register, and Lessons Learned |

Before implementing the pressurization plan outlined in Section 5 below, AGT will verify that, prior to restart of the Isolated Segment, all required MOC actions have been completed. To date, AGT has not identified any changes to its SOPs that are needed due to the restart process. If any SOP changes are needed, however, they will be implemented in accordance with AGT’s normal SOP change process. Once completed, the MOC can be made available to PHMSA upon request.

5. Weymouth Compressor Station Restart Plan [ACAO Paragraphs 2(c)-(f), 3, 5]

5.1. Preliminary Work

AGT has prepared a plan to pressurize the Isolated Segment of Weymouth Compressor Station utilizing pre-determined increases in pressure and defined hold times, as set forth in Section 5.2 below. Sufficient patrolling and surveillance will be implemented to monitor pressure and confirm there are no leaks occurring during repressurization. In advance of pressurization, AGT will notify the PHMSA Eastern Region along with relevant local emergency responders as summarized in Table 2 below. AGT will document that all notifications have been made seventy-two (72) hours prior to implementation of the pressurization plan.

Table 2 – Advance Notification to Local Emergency Responders

| Norfolk County | Plymouth County |
|-----------------------------|---------------------------|
| Massachusetts DEP | Town of Hingham |
| Town of Weymouth | Hingham Fire Department |
| Weymouth Fire Department | Hingham Police Department |
| Weymouth Police Department | |
| City of Quincy | |
| Quincy Fire Department | |
| Quincy Police Department | |
| Town of Braintree | |
| Braintree Fire Department | |
| Braintree Police Department | |

5.2. Pressurization Execution Plan

AGT personnel will be on site throughout the Weymouth Compressor Station for pressurization of the Isolated Segment from the inlet Valve TV-1 to the outlet Valve TV-2. Communications between personnel will be established in advance of pressurization and shall be maintained by phone or radio. All activities of this pressurization will be performed during daylight hours over a four (4) day period.

At the Weymouth Compressor Station, AGT will assign (1) individuals to manipulate the blow off Valves BD-6, BD-7, BD-5, and implement purging activity at ESD-3 and ESD-4; (2) an

individual to manipulate the throttle Valve EQ-2; and (3) other technicians to monitor pressure both in the SCADA system and physically on pressure gauge transmitters PIT-301-1 and PIT-311-1, suction and discharge respectively. AGT will also assign personnel to simultaneously monitor throughout the entirety of the restart process both (1) the station pressure in the SCADA system, and (2) physically monitor the pressure gauge transmitters PIT-301-1 and PIT-311-1, suction and discharge respectively. If the pressure drops more than 10 psig during a hold period, personnel will be dispatched to investigate the cause of the pressure drop and conduct leak surveys of the Weymouth Compressor Station to sweep for leaks.

AGT will conduct instrumented leakage surveys of the Isolated Segment during the restart process and each pressurization phase in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station, utilizing gas detection equipment* and documented on Form 7T-65: *Report of Pipeline Patrol and Leak Survey*. The pressurization process will be stopped at any indication of leaks with elevated readings. AGT shall investigate all detected leak indications. Confirmation of any leaks with elevated gas readings or any operational issues that indicate a potential leak from the Isolated Segment will cause the suspension of the restart plan and implement the applicable SOPs to de-pressurize the effected components of the Compressor Station safely and investigate the leak. AGT must notify the PHMSA Eastern Region Director of any indications of elevated readings or operational issues and will make all appropriate repairs with approval from PHMSA.

The Weymouth Compressor Station was operating at 683 psig at the time of Event 2. The leakage surveys of the Isolated Segment of Weymouth Compressor Station will be performed during the two (2) hour hold periods in each phase, as follows:

- Phase 1 at 25% of 80% operating pressure 683 psig at the time of Event 2 ($0.80 \times 683 \text{ psig} = 546 \text{ psig}$ and $0.25 \times 546 \text{ psig} =$ approximately 136 psig);
- Phase 2 at 50% of 80% operating pressure 683 psig at the time of Event 2 ($0.50 \times 546 \text{ psig} =$ approximately 273 psig);
- Phase 3 at 75% of 80% operating pressure 683 psig at the time of Event 2 ($0.75 \times 546 \text{ psig} =$ approximately 409 psig); and
- Phase 4 at 80% of the operating pressure 683 psig at the time of Event 2 ($0.80 \times 683 \text{ psig} =$ approximately 546 psig).

Once 80% of the maximum pressure at the time of Event 2 has been reached, pressure held for a minimum of two (2) hours, and AGT has verified no leaks are present on the Isolated Segment, AGT personnel will stand down until AGT has submitted a written request to, and receives approval from, the PHMSA Eastern Region Director to proceed to Phase 5 pursuant to ACAO Paragraph 5, Temporary Removal of Pressure Restriction.

- Phase 5 will be to resume operations from the restricted pressure of 80% of 683 psig (i.e., 546 psig), to subsequently resume operations not to exceed MAOP (958 psig on the suction side of Weymouth Compressor Station and 1440 psig on the discharge side of the Compressor Station).

5.2.1 Pressurization Phase 1

AGT personnel will initially purge the Isolated Segment up to 50 psig, in accordance with SOP 5-3010: *Purging*. Upon completion and validation of 100% gas, the Manager of Technical Operations (or his delegate) shall give approval to proceed with Phase 1 after receiving approval from PHMSA.

Once the Manager of Technical Operations grants permission to continue pressurizing the Isolated Segment, AGT personnel at the Weymouth Compressor Station will confirm that all preparatory work has been completed. Valve EQ-2 will be opened slowly and the pressure in the Isolated Segment will be increased to approximately 136 psig (25% of 80% operating pressure 683 psig at the time of Event 2). Pressure will be under constant monitoring and documented via the Weymouth Compressor Station programmable logic controller (PLC). Once the pressure of the Isolated Segment is within 15 psig of target pressure of 136 psig, Valve EQ-2 will be closed, and a ten (10) minute settlement period will begin. After the settling period, the 2-hour holding period will begin and the time will be documented.

During the two (2) hour holding period, the pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. A leakage survey in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station* shall be performed on the Isolated Segment during the two (2) hour hold period as outlined in Section 5.2.

After two (2) hours of hold time has elapsed, the leakage survey is successfully completed, and AGT has verified that no leaks are present on the Isolated Segment, the AGT Manager of Technical Operations (or his delegate) will be notified and shall give approval to proceed to Phase 2 after receiving approval from PHMSA.

5.2.2 Pressurization Phase 2

During Phase 2, Valve EQ-2 will be opened slowly and the pressure in the Isolated Segment will be increased to approximately 273 psig (50% of 80% operating pressure 683 psig at the time of Event 2). Pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. Once the pressure of the Isolated Segment is within 15 psig of target pressure of 273 psig, Valve EQ-2 will be closed, and a ten (10) minute settlement period will begin. After the settling period, the two (2) hour holding period will begin and the time will be documented on the Return to Service Procedure.

During the two (2) hour holding period, the pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. A leakage survey in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station* shall be performed on the Isolated Segment during the two (2) hour hold period as outlined in Section 5.2.

After two (2) hours of hold time has elapsed, the leakage survey is successfully completed, and AGT has verified that no leaks are present on the Isolated Segment, the AGT Manager of Technical Operations (or his delegate) will be notified and shall give approval to proceed to Phase 3 after receiving approval from PHMSA.

5.2.3 Pressurization Phase 3

During Phase 3, Valve EQ-2 will be opened slowly and the pressure in the Isolated Segment will be increased to approximately 409 psig (75% of 80% operating pressure 683 psig at the time of Event 2). Pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. Once the pressure of the Isolated Segment is within 15 psig of target pressure of 409 psig, Valve EQ-2 will be closed, and a 10-minute settlement period will begin. After the settling period, the two (2) hour holding period will begin and the time will be documented on the Return to Service Procedure.

During the two (2) hour holding period, the pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. A leakage survey in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station* shall be performed on the Isolated Segment during the 2-hour hold period as outlined in Section 5.2.

After two (2) hours of hold time has elapsed, the leakage survey is successfully completed, and AGT has verified that no leaks are present on the Isolated Segment, the AGT Manager of Technical Operations (or his delegate) will be notified and shall give approval to proceed to Phase 4 after receiving approval from PHMSA.

5.2.4 Pressurization Phase 4

During Phase 4, Valve EQ-2 will be opened slowly and the pressure in the Isolated Segment will be increased not to exceed 546 psig (80% of operating pressure 683 psig at the time of Event 2). Pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. Once the pressure of the Isolated Segment is within 15 psig of target pressure of 546 psig, Valve EQ-2 will be closed, and a ten (10) minute settlement period will begin. After the settling period, the two (2) hour holding period will begin and the time will be documented on the Return to Service Procedure.

During the two (2) hour holding period, the pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. A leakage survey in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station* shall be performed on the Isolated Segment during the two (2) hour hold period as outlined in Section 5.2.

After two (2) hours of hold time has elapsed, the leakage survey is successfully completed, and AGT has verified that no leaks are present on the Isolated Segment, AGT personnel will stand down until the AGT Manager of Technical Operations (or his delegate) grants permission to proceed to Phase 5 after receiving approval from PHMSA as outlined below.

5.2.5 Pressurization Phase 5

Pursuant to ACAO Paragraph 5, AGT will submit a written request for temporary removal of the pressure restriction to the PHMSA Eastern Region Director demonstrating the temporary mitigative and preventive measures detailed herein and those which will continue during the temporary removal phase, and until such time that removal is approved by PHMSA per ACAO Paragraph 4 based on a reliable engineering analysis or the ACAO is closed.

Once the temporary removal of the pressure restriction pursuant to ACAO Paragraph 5 is approved by PHMSA, Pressurization Phase 5 will begin. AGT will slowly open Valve EQ-2 and the pressure in the Isolated Segment will be increased not to exceed MAOP (as high as 958 psig on suction side). In addition, Valve EQ-6 will be opened slowly and used to increase the pressure on the discharge side of the Weymouth Compressor Station. This could be as high as MAOP (1440 psig on the discharge side of the station). Pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. Once the pressure of the Isolated Segment is equalized with the adjacent pipelines on the suction and discharge side of Weymouth Compressor Station Valves EQ-2 and EQ-6 will be closed and a ten (10) minute settlement period will begin. After the settling period, the 2-hour holding period will begin and the time will be documented on the Return to Service Procedure.

During the two (2) hour holding period, the pressure will be under constant monitoring and documented via the Weymouth Compressor Station PLC. A leakage survey in accordance with SOP 4-2160: *Gas Leakage Survey – Compressor Station* shall be performed on the Isolated Segment during the two (2) hour hold period as outlined in Section 5.2.

After two (2) hours of hold time has elapsed, the leakage survey is successfully completed, and AGT has verified that no leaks are present on the Isolated Segment, the AGT personnel will stand down until the AGT Manager of Technical Operations (or his delegate) grants permission to place the Isolated Segment back into service after receiving approval from PHMSA.

The leakage surveys will continue on a weekly basis until such time that AGT provides PHMSA with a reliable engineering analysis in support of a request for removal of the pressure restriction pursuant to ACAO Paragraph 4 and which is approved by PHMSA.

6. Documentation

The actions that AGT has completed or will complete for purposes of restarting the Isolated Segment are documented in this Restart Plan and appendices and/or have already been provided to PHMSA. Documentation in support of these activities is maintained by AGT in accordance with its SOPs and additional documentation can be made available to PHMSA upon request.

7. Conclusion

AGT is committed to operating a safe pipeline system. AGT believes this Restart Plan addresses all applicable requirements of the ACAO and includes the actions, assessments and investigations necessary to validate the integrity of the Isolated Segment for operation up to the restricted pressure of 546 psig (80 percent of the actual operating pressure in effect immediately prior to Event 2) through Phases 1-4. AGT respectfully requests PHMSA's approval of this Restart Plan to resume operations of the Isolated Segment at an operating pressure up to 546 psig pursuant to PHMSA ACAO Paragraphs 2 and 3.

Through a final Phase 5 and based on a written request that is approved by PHMSA for temporary removal of the pressure restriction under ACAO Paragraph 5, AGT plans to operate

up to MAOP (958 psig on the suction side of the Weymouth Compressor Station and 1440 psig on the discharge side of the Compressor Station).

8. Restart Plan Mapping to ACAO Requirements

The following table contains the relevant ACAO requirements for the Restart Plan with reference to the specific section of the Weymouth Restart Plan where each requirement is addressed as applicable.

Table 3 – ACAO Requirements Mapping to Restart Plan

| PHMSA ACAO Reference | ACAO Requirement | Mapping ACAO and Restart Plan |
|--|--|-------------------------------|
| Restart Plan Phases 1-4 (up to 546 psig) | | |
| ¶¶ 2 (a), 3 | <p>The Director may approve the Restart Plan incrementally without approving the entire plan but the Isolated Segment cannot resume operation until the Restart Plan is approved in its entirety.</p> <p>After the Director the Restart Plan, AGT may return the Isolated Segment to service but the operating pressure must not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to Event 2, in accordance with Item 2 above.</p> | N/A |
| ¶ 2 (b) | Once approved by the Director, the Restart Plan will be incorporated by reference into this Order. | N/A |
| ¶ 2 (c) | The Restart Plan must provide for adequate patrolling of the Isolated Segment during the restart process and must include incremental pressure increases during start-up, with each increment to be held for at least two hours. | Restart Plan, Section 5.0. |
| ¶ 2 (d) | The Restart Plan must include sufficient surveillance of the Isolated Segment during each pressure increment to ensure that no leaks are present when operation of the line resumes. | Restart Plan, Section 5.0. |
| ¶ 2 (e) | The Restart Plan must specify a daylight restart and include advance communications with local emergency response officials. | Restart Plan, Section 5.0. |

| PHMSA ACAO Reference | ACAO Requirement | Mapping ACAO and Restart Plan |
|---|--|---|
| ¶ 2 (f) | The Restart Plan must provide for a review of the Isolated Segment for conditions similar to those that caused the Incidents, including a review of construction and commissioning records. AGT must address any findings that require remedial measures to be implemented prior to restart. | Restart Plan, Section 4.0 and Appendix A-C. |
| ¶ 2 (g) | The Restart Plan must also include documentation of the completion of all mandated actions, and a management of change plan to ensure that all procedural modifications are incorporated into AGT's operations and maintenance procedures manual. | Restart Plan, Section 4.0. |
| Restart Plan Phase 5 (not exceed to MAOP) | | |
| ¶ 5 | The Director may allow the temporary removal or modification of the pressure restrictions upon a written request from AGT demonstrating that temporary mitigative and preventive measures are being implemented prior to and during the temporary removal or modification of the pressure restriction. The Director's determination will be based on the known or suspected cause of Event 2 and the provision of evidence that preventive and mitigative actions taken by the operator provide for the safe operation of the Isolated Segment during the temporary removal or modification of the pressure restriction. | Restart Plan, Section 5.0 |

Weymouth Compressor Station Restart Plan Appendices A-C

PHMSA Amended Corrective Action Order

CPF No. 1-2020-014-CAO



5400 Westheimer Court
Houston, TX 77056

November 9, 2020

Appendix A. Preliminary Direct Causes

Appendix B. Construction Records Review and Mitigative, Preventive and/or Remedial Actions

Appendix C. Commissioning Records Review and Mitigative, Preventive and/or Remedial Actions

Appendix A. Preliminary Direct Causes

Event 1

On September 11, 2020, at approximately 8:45 am Eastern Daylight Time (EDT) (local time), AGT was performing commissioning activities at the Weymouth Compressor Station, when the pressure in the Compressor Station reached 579 psig and a horizontal filter separator (FS-01) experienced a loss of primary containment. AGT personnel immediately responded and closed the inlet and outlet valves (FSI-1 and FSO-1 respectively). Upon closing these valves, AGT personnel were unable to safely verify that the inlet and outlet valves were completely closed due to the location of the leak. As a result, at approximately 8:50 am EDT, the decision was made to open the four (4) manual blowdown valves to the source control silencer as part of the emergency shutdown (ESD) system.

The event resulted in a total of 169 mscf of gas being released (156 mscf from the source control silencer and 13 mscf from the filter separator itself) (Event 1). There were no injuries to personnel on the site and due to the small size of the release and lack of property damage, Event 1 did not constitute a reportable "incident" under PHMSA regulations, given the small volume of gas released and the lack of injuries, fatalities, or property damage. After the site was secured, Operations personnel began to investigate the cause of the loss of containment and determined the cause was a failed O-Ring Seal on the sump closure door of FS-01. AGT personnel contacted the manufacturer and ordered a complete set of replacement O-rings (three per filter separator) for FS-01 as well as replacement O-rings for horizontal filter separator FS-02 (the same make and model as FS-01). Upon receiving the replacement O-rings, it was observed that they were different than the O-rings that had been removed.

While not required by the ACAO for Event 1, DNV GL (DNV) was retained by AGT, with approval from PHMSA, to perform a Root Cause Failure Analysis (RCFA) of Event 1. DNV arrived on site on October 13, 2020, and began reviewing documentation, drawings (P&ID's, One-line diagrams), and phone logs. DNV also interviewed personnel that were present at the time of Event 1. DNV created an initial timeline of events and worked to identify a direct cause. DNV concluded through onsite observations, interviews, and the data reviewed that the preliminary direct cause of the loss of containment was an improper O-ring that was installed on the sump closure of FS-01. The originally installed O-ring was not designed for the operating environment of the vessel.

All components involved in the direct cause have since been replaced with the correct vendor supplied parts for both FS-01 and FS-02. Table 1 provides the details of these mitigative and preventive remedial actions.

Event 2

On September 30, 2020, at approximately 10:20 AM EDT, the Weymouth Compressor Station ESD system was initiated, resulting in a release of approximately 195 mscf of natural gas through the Compressor Station source control silencer (Event 2). Event 2 was not a reportable "incident" under PHMSA regulations, given the small volume of gas released and the lack of injuries,

fatalities, or property damage. Further, the ESD system operated as intended and consistent with PHMSA regulations.

While not a reportable "incident" under PHMSA regulations, the event was reported to Massachusetts Department of Environmental Protection and local officials. AGT initiated troubleshooting activities throughout the day and evening. While no deficiencies were noted, through the initial troubleshooting efforts, AGT elected to undertake the following precautionary mitigative and preventive activities: (1) the 129 Volt, Direct Current (VDC) 20 amp breaker to the ESD panel was replaced with a like kind spare breaker, (2) the 50' of 12-gauge wire between the 129V distribution panel and the ESD panel was replaced with 10-gauge wire to ensure better connections with the breakers, and (3) the 20 amp breaker in the ESD panel was replaced with a terminal block. Replacing the 20 amp breaker in the ESD panel does not present a safety issue; there is one breaker at the 129VDC distribution panel and the one in the ESD panel was a redundant component for ease of working on the system. All the parts that were replaced have been retained for further testing.

On October 1, 2020, PHMSA issued a Corrective Action Order (CAO) for Events 1 and 2, CPF No. 1-2020-014-CAO.¹² At that time, AGT discontinued its in-house investigation and initiated a third-party investigation per the terms of the ACAO. Specifically, DNV¹³ was retained by AGT, with approval from PHMSA, to perform a RCFA of Event 1 and 2. DNV arrived on site on October 13 and began review of the documentation, drawings (P&ID's, One-line diagrams), and data/SCADA logs. DNV also interviewed personnel that were present at the time of Event 2. AGT personnel interviewed included the Area Supervisor, Electrical/Instrument Tech Specialist, Electrical/Instrument Technician, Area Safety Lead, Site Safety Inspector, and the Electrical Inspector. DNV also interviewed contractors, including the EN Engineering Project Engineer, and JL Allen's two (2) Electrical Superintendents, and two (3) Electricians.

From the drawings, the data/SCADA logs, interviews and observations of those present, and the troubleshooting already completed, DNV created an initial timeline of events and developed an observation log to help identify the direct cause. After conducting the site inspection, review of drawings, and conducting interviews, DNV determined that the only scenario which can recreate and cause Event 2 is a loss of 129VDC power to the ESD panel. Figure 1 provides the details of DNV's preliminary process of elimination analysis.

¹² The CAO was updated and superseded by an Amended CAO (ACAO) that PHMSA issued on October 30, 2020.

¹³ On October 7, 2020, AGT requested PHMSA approve DNV GL as the independent party to supplement and facilitate the RCFA for Event 2. PHMSA approved AGT's request on October 9, 2020.

Figure 1 – Event 2, DNV Process of Elimination Analysis

| Observations and logs | Potential Direct Cause | | | | | | | | | | | |
|--|------------------------|----|----|----|----|----|----|----|----|----|----|----|
| | D1 | D2 | D3 | D4 | F1 | F2 | F3 | F4 | F5 | F6 | U1 | U2 |
| Station PLC operational | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Station HMI (IOU) was frozen | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Unit 1 strobe lights ON | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ESD HMI rebooting | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ESD PLC reporting fault | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ESD Pilot and Power Gas integrity verified | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ESD fault alarms during event | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Valve activations reported | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| MCC Unmanned | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ESD Panel closed | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

■ The cause CAN produce the observation or log entry
 ■ The cause CANNOT produce the observation or log entry

• *Designed operation* - Initiate ESD with designed mechanism
 – D1 Pushbutton activation (electrical)
 – D2 Manual open pilot gas blowdown valve (manual ESD)
 – D3 Operating the Flexflow pressure switch
 – D4 PLC initiated ESD from Fire and Gas detection logic

• *Faults* - Initiate ESD with due to technical faults
 – F1 Loss of containment of pilot gas lines
 – F2 Open circuit in the pushbutton daisy chain
 – F3 Complete loss of 129VDC (Battery and Charger)
 – F4 Loss of 129VDC power to ESD Panel
 – F5 ESD PLC spurious operation
 – F6 Loss of 24VDC in ESD Panel

• *Unplanned operation* - Initiate ESD by human
 – U1 ESD Panel Circuit breaker activation
 – U2 ESD PLC Circuit fuse disconnect

Through this data gathering and analysis, DNV concluded that the preliminary direct cause of the ESD event on September 30, 2020 was the temporary loss of 129VDC power to the ESD panel. AGT and DNV determined that there are only three (3) elements in the ESD panel power system that could have caused a temporary loss of the 129VDC power to the ESD panel: (1) a 20 amp breaker in the 129VDC distribution panel, (2) approximately 50' of 12-gauge wire, and (3) a 20 amp breaker in the ESD panel itself. In an abundance of caution, all components of this power system have since been replaced or removed or otherwise addressed, as part of the Company's implementation of mitigative and preventive measures, and are being sent to a company specializing in inspecting this type of equipment. Table 1 provides the details of the remedial actions.

In addition, AGT is performing several other precautionary assurance activities as further mitigative and preventive measures to ensure the Weymouth Compressor Station will start-up in a safe and reliable manner, as set forth in Section 4.3 of the Restart Plan and Appendices B and C.

**Table 1 – Events 1 and 2:
Summary of Mitigative and Preventive Remedial Actions**

| Event No. | Group Performing Evaluation | Assurance Activity (Mitigation) | Date of Evaluation | Mitigative, Preventive and/or Remedial actions | Responsible Group | Date Completed |
|-----------|-----------------------------|----------------------------------|--------------------|--|------------------------------|----------------|
| Event 1 | Operations Team | Replace all O-Rings on FS-01 | 9/11/2020 | Replace all O-Rings on FS-01 | Operations Team | 9/17/2020 |
| | | Replace all O-Rings on FS-02 | 9/11/2020 | Replace all O-Rings on FS-02 | | 9/19/2020 |
| | | Inspect all vessel closure seals | 9/16/2020 | Suction Pig Barrel | | 7/2/2020 |
| | | | | Discharge Pig Barrel | | 9/16/2020 |
| | | | | Fuel Gas Separator V-3-1 | | 9/21/2020 |
| | | | | Fuel Filter Sock Element | | 9/22/2020 |
| | | | | Fuel Gas Last Chance Filter | | Solar records |
| | | | | Domestic Gas Separator D-4-1 | | 9/23/2020 |
| | | | | V8 Source Control Tank | | 9/18/2020 |
| | | | | V9 Source Control Separator | | 9/16/2020 |
| | | | | V-10 Case Vent Separator | | NA |
| | | | | V-11 Station Blow Down Separator | | NA |
| Event 2 | RCFA Team and Operations | | 10/1/2020 | Replace 20 amp breaker in 129VDC Distribution Panel with RIK | Projects and Operations Team | 10/2/2020 |
| | | | 10/1/2020 | Replace 20 amp breaker in ESD panel with termination block | Projects and Operations Team | 10/2/2020 |
| | | | 10/1/2020 | Replace 12 Gauge power feed wire with 10 gauge | Projects and Operations Team | 10/2/2020 |

Appendix B. Construction Records Review and Additional Mitigative, Preventive and/or Remedial Actions

| Group Performing Evaluation | Assurance Activity (Mitigation) | Date of Evaluation | Mitigative, Preventive, and/or Remedial Actions | Responsible Group | Date Completed |
|-----------------------------|--|--------------------|---|-------------------|----------------|
| Engineering | Quality assurance conducted for hydrostatic / pneumatic pressure testing: 100% of test pressure calculations and 25% of test documentation packages. All were accurate and complete. No action required. | 10/17/2020 | NA | NA | 10/17/2020 |
| Engineering | Quality assurance conducted for overpressure protection: verified device list versus drawings, capacity verification, and set point calculations. All were accurate and complete. No action required. | 10/17/2020 | NA | NA | 10/17/2020 |
| Engineering | In similar vintage designs, a controls design oversight occurred where fuel gas vent valve actuation was not alarmed in the station control. Confirmed that the Weymouth fuel gas system does not have the same design and uses regulators with a redundant relief valve, so the issues does not exist at the Weymouth Compressor Station. | 10/16/2020 | NA | NA | 10/16/2020 |
| Engineering | In prior expansion projects, filter separators were designed for the peak day flow of the project but not for the maximum flow capability of the gas compressor. This has led to undersized filter separators at several locations. After evaluation, it was determined that the filter separator capacity at the Weymouth Compressor Station well exceeds the flow capability of the gas compressor and it meets the requirements of the filter separator design specification. | 10/16/2020 | NA | NA | 10/16/2020 |
| Engineering | Confirmed that the seal gas booster pumps at the Weymouth Compressor Station are electric, not | 10/16/2020 | NA | NA | 10/16/2020 |

| Group Performing Evaluation | Assurance Activity (Mitigation) | Date of Evaluation | Mitigative, Preventive, and/or Remedial Actions | Responsible Group | Date Completed |
|-----------------------------|--|--------------------|--|----------------------------|----------------|
| | pneumatic, and they meet the current design standard. | | | | |
| Engineering | The turbine fuel gas heater at the Weymouth Compressor Station requires re-design. Solar requires a minimum 130° F at the skid edge to prevent elemental sulfur deposition in the unit fuel valves. We are only achieving 105° F at the Weymouth Compressor Station. Major Projects Design has been engaged to re-design the turbine fuel gas system to achieve 130° F at the skid edge. | 10/16/2020 | Major Projects Design has been engaged to re-design the turbine fuel gas system to achieve 130° F at the skid edge; will not affect nor is critical issue for startup. | Projects | TBD* |
| Engineering | Compressor vent systems exceeding the maximum vent rate on Solar compressors can be an issue on similar vintage designs. Exceeding the vendor's maximum allowable vent rate leads to rapid decompression failures of the soft goods (O-rings and gaskets) in the compressor. Basic Systems (engineering contractor) reviewed the compressor vent design and determined that the maximum depressurization rate is 488 psig/min, whereas the maximum allowable depressurization rate for Solar compressors is 580 psig. Thus, no issue is presented. | 10/16/2020 | NA | NA | 10/16/2020 |
| Engineering | Review of the 2016 arc flash assessment indicated an undetermined incident energy level at the generator and that one of the two lighting distribution transformers (480VAC to 125VAC / 208VAC) was removed from the design, both of which require remediation and/or re-assessment pursuant to AGT's current arc flash standard. This can be handled administratively with approach boundaries until the reassessment is complete. | 10/16/2020 | Perform Arc Flash Assessment. Not critical for startup. | Engineering and Operations | 11/30/2020* |

| Group Performing Evaluation | Assurance Activity (Mitigation) | Date of Evaluation | Mitigative, Preventive, and/or Remedial Actions | Responsible Group | Date Completed |
|-----------------------------|---|--------------------|---|-------------------------|----------------|
| Engineering | Winterization design and maintenance requirements were updated in 2019, and AGT developed a plan to bring the Compressor Station up to current requirements as a conservative measure, with a target completion date of 11/30/20. These issues have no impact on startup. | 10/16/2020 | Update and install facility winterization plan. Not critical for startup. | Projects and Operations | 11/30/2020* |
| Engineering | The PLC Lab has evaluated the Weymouth Compressor Station Control Panel program and determined that a Compressor Station Control Panel outage will not cause an ESD. | 10/16/2020 | NA | NA | 10/16/2020 |
| Engineering | Unit fast stops can trigger a compressor case vent. Operations and Solar previously addressed the fast stop situations for the Weymouth Compressor Station and determined that the case vent scenarios have been minimized as much as possible. | 10/16/2020 | NA | NA | 10/16/2020 |
| Engineering | A third-party design firm with Safety Integrated Systems experience is being contracted to evaluate the ESD system design and provide recommendations to enhance the ESD system at the Weymouth Compressor Station and harden the current system against false ESD activations. | 10/13/2020 | Develop a Safety Integrated System Proposal | Engineering | TBD* |

(* Denotes an action not critical for startup)

Appendix C. Commissioning Records Review and Additional Mitigative, Preventive and/or Remedial Actions

| Group Performing Evaluation | Assurance Activity (Mitigation) | Date of Evaluation | Mitigative, Preventive, and/or Remedial Actions | Responsible Group | Date Completed |
|--------------------------------|--|--------------------|--|-------------------------|--------------------------|
| RCFA Team and Engineering Team | As additional precautions, and based on the review of the Commissioning Manual, employee interviews, and inspection findings, various assurance activities were initiated as mitigative, preventive and/or remedial actions. | 10/14/2020 | Verify Tubing connections throughout the facility | Projects and Operations | 10/16/2020 |
| | | 10/18/2020 | Replace all breakers in the 129VDC distribution panel | | 10/28/2020 |
| | | 10/19/2020 | Validate Station Control Panel terminations | | 10/23/2020 |
| | | 10/20/2020 | Validate Unit Control Panel terminations | | 10/27/2020 |
| | | 10/21/2020 | Validate electrical connections in the Motor Control Center on the line side | | 10/26/2020 |
| | | 10/16/2020 | Validate correct bolt torque | 10/23/2020 | Projects and Engineering |