

## **BLM Booster Compressor Milestones Updated January 9, 2020**

### **Prior to March 2018 shutdown**

Funding had been put in place under the CRLP agreement for compressor tie in work, which included modifications to piping, valves, and controls. The work was planned to coincide with the March shutdown, which was required due to CHEU critical safety device preventative maintenance that had already been pushed back. This work was completed as planned during the shutdown.

However, in February Air Products was on site preparing for the shutdown work and identified additional issues needing to be resolved before CRLP approval to tie into CHEU equipment. The major issues included:

- Isolation of a common drain connecting Class 1 Div 2 compressor building with unclassified utility building
- Engineering review of relay settings and electrical design due to lack of documentation from construction
- Develop startup procedures
- Develop and implement MI / PM program

BLM pursued adding this work to the shutdown scope under the agreement. However, since the CRLP agreement was to be closed out by end of March and there was a broad push to replace all agreements with contracts within the Department of Interior, funding was not allowed to be added to the agreement for this additional work. BLM started the contracting process at the end of February to bring a third-party contractor in to complete the additional work identified.

### **March 19-23, 2018**

CHEU Maintenance shutdown and CRLP tie-in modifications. Contract awarded March 19 to BLM contractor.

### **March 28, 2018**

BLM contractor on site to collect information for planning, scheduling, and procurement.

### **March 31, 2018**

The original CRLP CHEU Agreement put in place in 2003 ended on midnight March 31, 2018. A Federal Acquisitions Regulation (FAR) Based contract is now in place. All BLM procurement actions now follow standard FAR acquisition processes.

### **April 16-20, 2018**

Contractor returned to perform the work.

- Isolation of common drain, reroute air compressor drainage
- Heat tracing
- Relay test and inspection, electrical single line drawings

**May 3, 2018**

Discussion between BLM and CRLP that proposal and funding would be required to perform the ORI and commissioning/startup support.

**May 16, 2018**

ORI proposal provided by CRLP to BLM.

**May 28-31, 2018**

Contractor on site to perform:

- Pre-startup safety review (PSSR)
- Nitrogen system modifications
- Electrical Preventative Maintenance
- Control drawings
- Develop Mechanical Integrity scope

**June 5-7, 2018**

Operational Readiness Inspection (ORI) performed. Additional issues not previously identified:

- Gasket replacement
- Conduit seals not poured
- Additional grounding of equipment
- Signage/labeling/valve tagging
- P&ID redlining and flow check
- N2 tie-in and instrument air specifications

Work still outstanding / not satisfactory from before ORI:

- Startup/operating procedures
- MI/PM program (in progress, to be completed in 1-2 weeks)
- Engineering review of relay settings and electrical design (in progress, 1-2 weeks)
- Instrument function checks/validation (to be performed during startup)
- Heat tracing

**June 13, 2018**

ORI summary list received by BLM.

### **June 14-August 23, 2018**

BLM review of ORI punch list, and execution strategy developed to address all work necessary to support operational release/start-up. BLM development and review of contract scope, cost estimate, administrative documents and Request for Quotation (RFQ) document preparation.

### **August 24, 2018**

RFQ issued.

### **August 25-November 29, 2018**

FAR-based Contract actions on going

### **November 30, 2018**

Contract awarded. Period of performance 12/10/18 – 3/1/2019. Contractor mobilized 12/10/2018 to perform initial quantity take-offs for materials order in December, with delivery projected in January 2019 to support start of on-site work in early January 2019.

### **January 20, 2019**

Materials and Staging of Contractors to begin repairs to the Booster Compressor.

### **February 19, 2019**

Support Contract work is underway, and completion has been additionally delayed by discovery of latent defects that need to be corrected, and a differing site condition requiring contract modification to address. Differing site condition of pipe stress required updated scope to complete cutting and welding of joints to relieve stress and align pipe flanges for the central compressor. While completing this work, three cuts were made at existing welded pipeline joints, and the cross section showed cold lap in all three welds. As a result of discovery of this latent defect, BLM ordered x-rays on all welds for piping related to the Central Compressor. While there are still some x-rays that have not yet been completed, majority of results indicate a major quality concern that will require extensive repair/rework to meet safety/quality requirements. As a result, the startup schedule will be delayed and due to the location of some of the welds needing repairs, a plant outage to perform the repairs is required before startup. Schedule for the weld repair work is being developed and will impact the outage date, but the outage is tentatively planned for mid to late March 2019.

### **March 2019**

BLM Support and Weld contractors performs weld repairs and building modifications to support the Compressor Project. Barring any new issues, the BLM projects compressor start-up may be possible after the October plant turnaround.

### **April 2019**

BLM Develops ORI checklist for Startup Requirements. Submits to AP for Sign Off.

### **May 2019**

Ongoing contractor work. Work on ORI checklist for Booster Compressor start Up.

## **June 2019**

Ongoing contractor work. Work on ORI checklist for Booster Compressor start Up.

## **July 2019**

Ongoing contractor work. Work on ORI checklist for Booster Compressor start Up.

## **August 2019**

Ongoing contractor work. Work on ORI checklist for Booster Compressor start Up.

## **September 2019**

75% of ORI requirements completed. BLM sends notice to storage holders and refiners that we will hold the Plant Outage end of October.

## **October 2019**

BLM Booster welding project completed and signed off by CRLP. Most items on ORI list signed off for plant turnaround and CHEU Integration planning/contracting started. April's Submitted ORI lists are signed off for startup by AP. Additional non-startup ORI items will be completed after plant startup in November. Restricted allocations for Plant Startup in place to boost pipeline pressures.

## **November 2019**

Plant shut down and repaired K-100 oil leaks and other maintenance items. Plant Restarted with Booster compressor running.

**November 12-22:** Plant shut down in the evening. Booster not operating as second stage suction strainer was plugged. Delay while awaiting BLM PLC programming contractor to make operating system updates to the monitoring systems. Booster contract modifications completed.

## **December 2019**

**December 10-13:** Booster compressor integration (PLC programming) by BLM contractor completed. Field Pressures balanced out and well flow testing completed. Remote operations panel now operational and identical in the control room for operator use. Started ramping in production over the weekend.

**December 16-17:** Booster one-way check valves for reciprocal service, freezes up due to cold weather. Flow from the gas wells to the plant dropped suddenly at 11:30 PM on Monday 12/16/2019 related to a hard freeze and ice buildup where we did not expect it to occur. The blockage problem was determined to be ice buildup in the check valves between the K200 and the K100. Temperatures that night dropped to 18°F. Root cause can be mitigated by turning down process cooler fans and heat tape installation. Turned down fans and tested flow (no blockage). The Operator on duty was able to save the plant from tripping, but we had a rough night and lost cold box temps. Ceased Helium production into pipeline at 5:30 AM on Tuesday 12/17/2019 with outage lasting 19 hours. Operations started the plant back up without the Booster Compressor. Shut down Booster until heat tape could be added to check valves.

**December 20:** Booster Compressor Heat Tape installed on relief valves to prevent freeze ups. Compressor restarted and placed into service. Closing louvers, Blade pitch changed to winter position planned for next shut down.

**December 27:** Booster Compressor runs for a full week without issues. Production volume data suggests that the Booster has raised production of helium into the pipeline from 2.2 million cubic feet a day to 2.45 million cubic feet per day (averaging 200-250 Mcf per day additional production). BLM continues to optimize booster compressor production.

**December 30:** Updated Compressor Milestones text. Review in preparation for posting to website.

## **January 2020**

**January 9, 2020:** Posting update to website.