

Successful execution of post-hydro, pre-commissioning treatment project for critical gas pipeline

The 60+ day project was completed with 24 hour on-site service and zero incidents



SITUATION

A large diameter, 300-mile natural gas, interstate pipeline system was planned to support incremental gas transmission throughput to keep up with market production demands and provide enhanced access to end consumers in the Eastern portion of the United States. To meet these demands, the asset was designed with 42-inch pipe across segments with varying lengths and wall thicknesses. In addition to the pipeline's size, the pipeline layout and associated location, terrain, and elevation profile posed challenges for this critical infrastructure's construction and pre-commissioning activities. Of notable concern was the corrosion and microbial risk and disposal of the fresh water sources identified for hydrostatic pressure testing of five pipeline segments.

INSIGHT

Given these challenges and the criticality of this asset to the market, the operator and pipeline construction company sought

300 miles

OF 42-INCH GAS PIPELINE TREATED POST-HYDROTESTING; PRE-COMMISSIONING

turnkey support to effectively and procedurally clean the pipeline post-hydrotesting, ensuring future internal corrosion risks stemming from these activities were minimized. Furthermore, they needed these services to be efficiently and safely managed.

The operator chose ChampionX for the end-to-end project management and execution, given ChampionX's midstream subject matter expertise and portfolio of engineered pipeline chemicals in combination with Baleen Process Solutions (BPS) team's agility and equipment solutions.

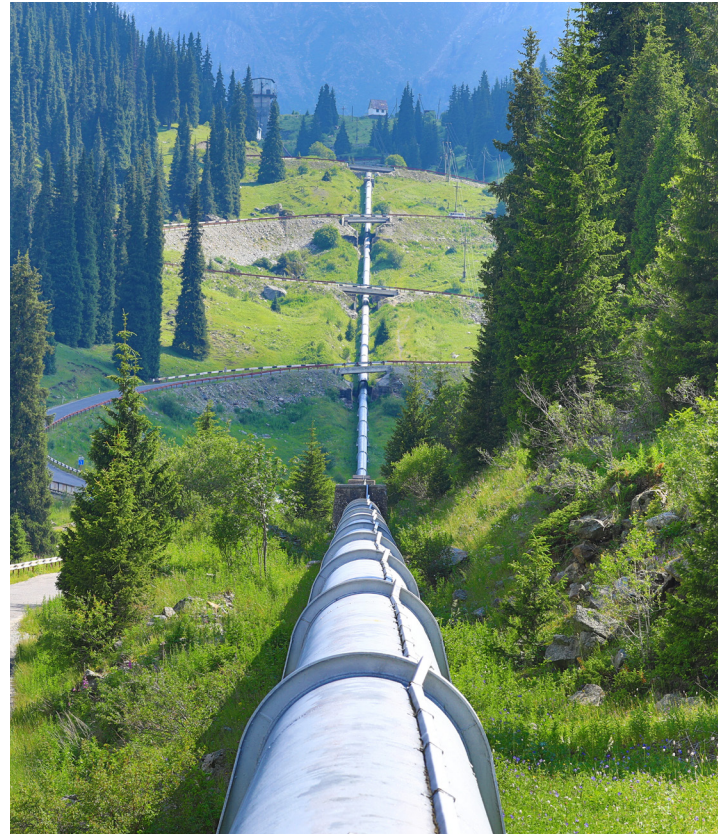
ChampionX provided the engineering and chemical program design, pigging procedures, pig tracking, and safety standards to clean, dry, and chemically treat all five-line segments. As the asset was in construction, robust engineering design was required to appropriately size external compression that would be required to propel the treatment pig trains. BPS completed the project execution and environmental services.

Chemical treatment post-hydro is critical to mitigate corrosion risks introduced to the new pipe from fresh water sources used in this testing. BIOC10031W is a broad spectrum, glutaraldehyde bactericide with use throughout the oil and gas industry. Its formulation is inherently biodegradable and winterized down to -40°F. CORR12525B is an oil-soluble, water-dispersible corrosion inhibitor formulated to leave a persistent inhibitor film.

SOLUTION

For this project, first a biocide treatment using BIOC10031W was recommended to prevent microbially induced corrosion (MIC) given its ability to control aerobic and anaerobic bacteria, including sulfate reducers, in a winterized package that was suitable for the pipeline's location and environment and the project's timeline which spanned the winter season. The biodegradable nature of this product would also allow for cost-effective disposal of spent chemical. ChampionX then recommended utilizing CORR12525B to lay down an inhibitor film persistent and long lasting to retard corrosion attack until the line was placed into service.

In addition to the chemical recommendation itself, ChampionX assessed the pipeline layout, route, and elevation profile pipeline dimensions to appropriately design the chemical application program and plan project logistics for each segment. BPS provided the on-ground support for field work, ensuring each pigging location received the necessary labor, chemical, temporary piping, and pigging equipment for execution. Furthermore, BPS provided safety oversight to ensure all personnel were properly trained and outfitted with the requisite personal protection equipment, and safety data sheets for all chemistries utilized were always available onsite. BPS also established safety exclusion zones for non-essential people determined using the EPA's ALOHA software.



Turnkey solution recommendation

- **Compression design** to propel the treatment train with a maintained flow velocity between 2- to 4-mph across all elevation profiles, the largest and most challenging of which was a 3,000 foot upward elevation shift.
- **Volume recommendations of BIOC10031W, CORR12525B, and methanol diluent** to ensure the pipe wall had appropriate contact time to support an effective microbial kill and inhibitor film.
- **Pumping equipment** sized to handle the large biocide and corrosion inhibitor volumes at each of the launcher locations.
- **Tap locations** on existing piping downstream of the mainline valve at the launcher locations for chemical introduction.
- **A three-pig treatment train design** to ensure debris was effectively removed prior to chemical contact and treatment of the internal pipe wall.

- **Temporary piping** to the existing drain on permanent and temporary pigging assemblies designed as receivers and to the existing closure on pigging assemblies designed as launchers.
- **Transmitters and receivers** for pig tracking of both the lead and trailing pigs at all the mainline valve sites and immediately upstream of the receipt locations. CDI's GlobalTrack live tracking system was used to track the treatment pigs where the system kept all parties involved of the treatment pigs location through texts and emails.
- **Dryers** sized to meet the required operator dew point spec of -40F.
- **Auxiliary fuel tanks** to supply the requisite fuel consumption compression.
- **Established footprint** for and procured secondary containment containing all temporary equipment.
- **Decontamination** of pigs and temporary equipment and capture and disposal of residual chemistries at receiver sites.
- **Loading equipment** rated to handle the loading and unloading of treatment pigs.
- **Management and coordination** of transportation and staging of all associated equipment and chemicals mentioned.

CONCLUSION

ChampionX and Baleen Process Services provided around the clock project management and support over a period of six months to ensure this large capital project was a success. When operational pressures required the pipeline to be commissioned prior to the final segment's treatment, the ChampionX and BPS team nimbly redesigned their approach to treat online using pipeline gas; this required additional equipment such as filters, and separators to be procured and temporarily installed on sight to enable this final treatment. The post-hydro pipeline services across all line segments were completed to the operators drying and treatment specifications without any safety incidents.

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