2020 ECR Plan Status Update Report
Quarterly Report – Update #18
April 30, 2025

Executive Summary:

General

This report covers LG&E and KU's ("Companies") progress on the 2020 Environmental Cost Recovery ("ECR") Plan through the first quarter of 2025. The Companies filed applications requesting approval of their 2020 ECR Plan on March 31, 2020[1] and received approval on September 29, 2020.

Safety performance to date remains excellent with an Inception-to-Date OSHA Recordable Incident Rate of 0.23 compared to the industry average of 2.4. The Year-to-Date OSHA Recordable Incident Rate is 14.35, due to a single recordable incident occurring over a relatively small number of hours worked in early January.

Work to date continues to focus on construction and startup activities at two of the three stations: Ghent ("GH") and Mill Creek ("MC'). The Trimble County ("TC") Effluent Limitation Guidelines ("ELG") system and the GH Bottom Ash Transport Water system achieved Commercial Operations in the second quarter of 2024. Both GH and MC ELGs are both mechanically and electrically complete, and start-up activities continued. MC successfully passed performance testing but subsequently experienced transmembrane pressure trips requiring additional tuning throughout the first quarter of 2025. GH anticipates starting performance testing in April.

Compared to the total 2020 ECR Plan projected cost of $405.2 million (net)[2], as provided in Case Nos. 2020-00060 (KU) and 2020-00061 (LG&E), the projected spend, as of the first quarter of 2025 is $302.2 million (net)[2]. This projected spend represents a $103.0 million (net) reduction from the original filing. The total spend to date increased to $267.2 million (net)[2] through March 31, 2025.

Background

The Environmental Protection Agency's ("EPA") 2015 ELG Rule and amendments precipitated the need to construct ELG water treatment systems at TC, MC and GH, as well as a Bottom Ash Transport Water ("BATW") recirculation system at GH. The EPA's proposed amendments to the 2015 ELG Rule were finalized in the Fall of 2020. The current ELG Rule includes daily maximum and monthly average limits for the concentration of mercury, nitrates/nitrites, selenium and arsenic allowed in Flue-Gas Desulfurization ("FGD") wastewater effluent.

To meet the revised limits for these constituents, the Companies are required to install ELG water treatment systems to treat the effluent from the physical/chemical FGD process water treatment systems recently placed into service as described in the 2016 ECR Plan quarterly reports. Without the proposed 2020 ECR

[1] Case No. 2020-00060 and Case No. 2020-00061
[2] Co-Owners of the Trimble County plant: Illinois Municipal Electric Agency (IMEA) and Indiana Municipal Power Agency (IMPA) are responsible for 25%. IMEA owns 12.12% and IMPA owns 12.88%. Co-owner shares are not included in the costs provided in this report.

Plan projects at TC, MC, and GH stations, the Companies would not be able to continue steam generating operations at these generating stations and simultaneously comply with the ELG Rule, as enforced by Kentucky Pollutant Discharge Elimination System ("KPDES") permits at each generating station. This would significantly impair the Companies' ability to fulfill their mandate to provide adequate, efficient, and reasonable service to their ratepayers, as these generating stations are the three largest generating stations within the Companies' generating fleet. The ELG Rule requires compliance for the FGD wastewater as soon as possible on or after November 1, 2020, but no later than December 31, 2025.[3]

The final ELG Rule also includes up to 10 percent volumetric discharge limit (on a 30-day rolling average) for BATW, which also must be complied with "as soon as possible" but in no event later than December 31, 2025. This proposed discharge limit requires KU to construct a BATW recirculation system on the existing bottom ash transport system at GH (now in operation). The recirculation system collects the transport water previously discharged from the remote bottom ash dewatering facility and reroutes it through tanks and piping systems back to the four generating units for reuse. TC and MC do not require a BATW recirculation system due to their bottom ash transport systems being previously converted to a dry transport instead of a wet sluicing system like GH's.

On May 9, 2024, the EPA promulgated the final ELG Rule ("ELG") requiring membrane filtration followed by solidification or thermal evaporation for zero discharge of FGD Wastewater; zero discharge of Bottom Ash Transport Water; and zero discharge of combustion residual leachate waters and did not establish specific limitations for Legacy Waste Water as the permitting authority will be responsible to establish site-specific technology-based limits. The ELG stipulates compliance as soon as possible, but no later than December 31, 2029. The ELG also creates a 2034 Permanent Cessation of Coal Combustion ("PCCC") subcategory. To qualify for the 2034 PCCC, facilities must file a Notice of Planned Participation ("NOPP") by December 31, 2025 committing to retire all coal-fired units by December 31, 2034. The EPA has set interim limits based on the 2020 ELG, and all facilities must fully comply starting on their respective 2020 ELG applicability date, until their 2024 ELG applicability date, or their 2034 PCCC retirement date. The Companies are currently reviewing the final ELG rule and are formulating a compliance strategy.

Because of the uncertainties created by ELG, the Companies expect legal challenges to the ELG. Respective outcomes may influence future compliance direction.

[3] 84 Fed. Reg. 64664.

Schedules

FGD Process Water Treatment Facilities and Diffusers

Project	Project #	Awarded Contractor	Status[4]	Planned / Actual In-Service Date[5]
Trimble County Effluent Limitations Guidelines Water Treatment System[6]	KU Project 44 LG&E Project 32	OKEP	Awarded March 15, 2021	Placed in service May 2024
Mill Creek Effluent Limitations Guidelines Water Treatment System[6]	LG&E Project 31	OKEP	Awarded March 15, 2021	April 2025
Mill Creek Outfall 025 Diffuser	LG&E Project 31	Tetra Tech	Awarded May 12, 2021	Placed in service December 2021
Ghent Effluent Limitations Guidelines Water Treatment System[6]	KU Project 43	OKEP	Awarded March 15, 2021	June 2025
Ghent Bottom Ash Transport Water Recirculation System[7]	KU Project 43	OKEP	Awarded March 15, 2021	Placed in service May 2024
Ghent Outfall 001 Diffuser	KU Project 43	MAC Construction & Excavating	Awarded March 22, 2021	Placed in service December 2021

[4] Project Engineering Department or Engineering, Procurement, and Construction ("EPC") Contract work status.
[5] The Planned In-Service Dates are per the 2020 ECR Plan filing (Straight Testimony, page 4-5) or the current, active construction schedule. Actual in-service dates are signified with red font.
[6] ELG Equipment OEM: Frontier
[7] BATW Equipment OEM: United Conveyor Corporation

Quarterly Status Update:

General

The engineering, procurement, and construction ("EPC") contracts for TC, MC, and GH were awarded on March 15, 2021 to Old Kentucky Energy Partners ("OKEP"), which is a joint venture between Bowen Engineering (a local company) and United E&C. MC's ELG system completed performance testing and is working toward achieving Commercial Operations. GH's ELG system continued performance testing, during which the system experienced transmembrane pressure trips.

Burns & McDonnell ("B&McD") is the ELG Owner's Engineer and is assisting the Companies with reviewing engineering, design and construction support related to the few remaining submittals and the minimal remaining fieldwork by the EPC (OKEP) and ELG technology providers (Frontier – ELG) or United Conveyor Corporation (Ghent BATW).

KU Project 44 and LG&E Project 32 – Trimble County (TC) Station Effluent Limitations Guidelines (ELG) Water Treatment System

General

Project 44 (KU) and Project 32 (LG&E) are for construction of an ELG water treatment system at the TC generating station. The current forecasted capital costs to implement these facilities is $74.4 million (net)[8], allocated between KU and LG&E.

[8] KU's 48 percent ownership allocation equals $35.7 million (Project 44) and LG&E's 52 percent ownership allocation equals $38.7 million (Project 32) – both costs are net.

ELG

The ELG system was constructed in close proximity to the recently completed process water treatment system ("PWS"). All facilities were installed on land currently owned by KU and LG&E at the generating station. The system is designed to handle water flow capacity up to 750 gallons per minute. The EPC contractor remains focused on completion of as-built drawings.

Commercial Operation of the ELG system was achieved during the second quarter of 2024 and record drawing turnover packages are anticipated early in the second quarter of 2025.

B&McD has been contracted to engineer the required modifications to the TC1 oxidation air system previously noted. The new oxidation air blowers have been purchased and will be installed in the spring of 2026, which is a change from the prior scheduled fall of 2025 date due to generation business need. Until these modifications are fully developed and installed, the generating station will utilize the same chemicals which facilitated the successful Performance Test.

Reliable operations and maintenance of the new ELG facility requires on-site spare parts and materials. A new warehouse is necessary for this purpose and will be constructed adjacent to the ELG facility. This construction contract was awarded to East & Westbrook Construction, Inc ("E&W"). The warehouse is planned to be a 22,500 square foot pre-engineered metal building with internal shelves and racking. During this quarter, E&W placed concrete for the new loading dock area and access roads leading to the warehouse; completed installing primary and secondary steel for the loading dock canopy and fire protection riser builder; completed installing siding, insulation, and roof panels for the warehouse, loading dock canopy, and fire protection riser building; and performed miscellaneous civil/site grading activities. In the interior portion of the warehouse, E&W's subcontractors began installing overhead fire protection sprinkler piping, overhead roll up doors, and electrical conduit and receptacles.

Trimble County – ELG Water Treatment Location – No Changes

LG&E Project 31 – Mill Creek (MC) Station Effluent Limitations Guidelines (ELG) Water Treatment System and Diffuser

General

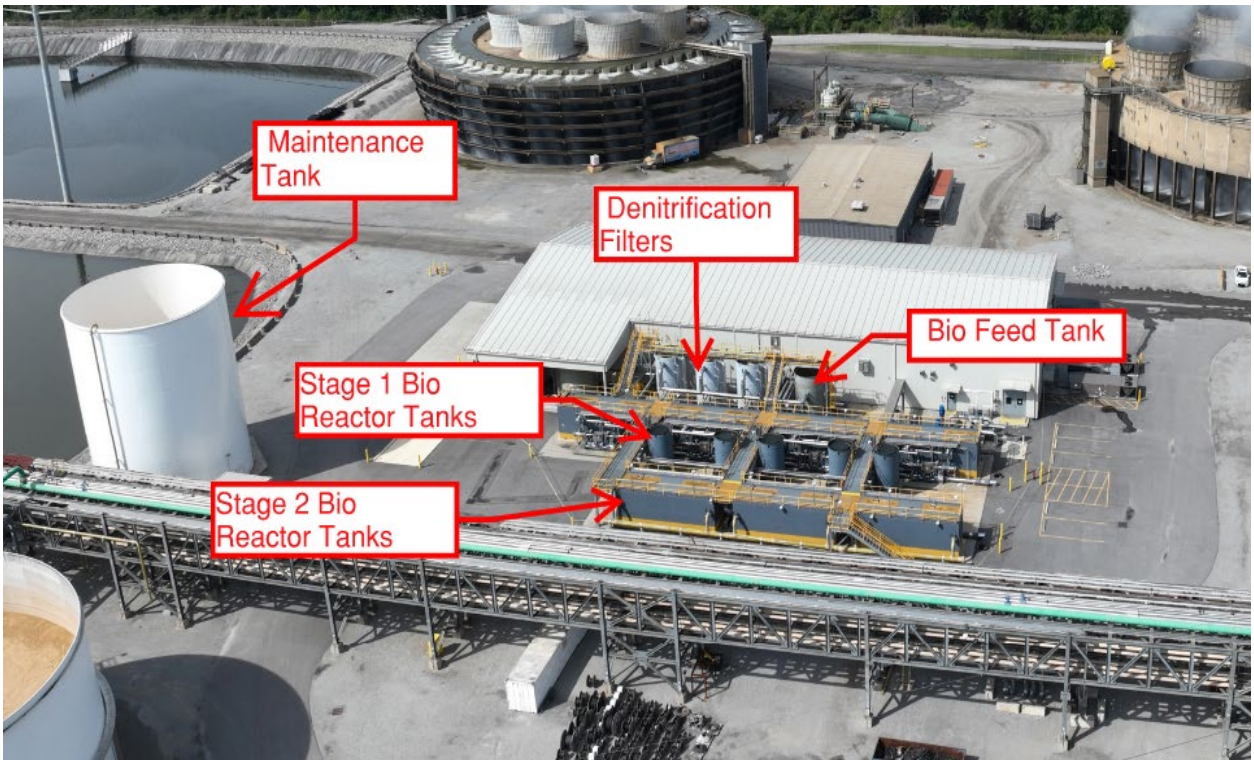
Project 31 is for construction of an ELG water treatment system and wastewater diffuser at the MC generating station. The current forecasted capital costs to implement this project is $69.6 million. The MC project team has engaged the TC and GH project teams during all major reviews to apply lessons learned from the other projects. This collaborative effort was implemented to ensure lessons learned are applied across all the projects to promote a common fleet approach to the ELG program.

ELG

In the fourth quarter of 2024, OKEP completed the performance testing of the system. OKEP is working towards providing all final documentation for the issuance of a Certificate of Commercial Operations. Subsequent to completion of the performance tests, the system experienced transmembrane pressure trips. OKEP responded with further system tuning to regain the contractual system performance throughout the first quarter, and no KPDES permit exceedance occurred. The system is now operating per design.

Diffuser

The diffuser was installed and placed into service in 2021.



Mill Creek – ELG Water Treatment – No Changes from December 2024

KU Project 43 – Ghent (GH) Station Effluent Limitations Guidelines (ELG) Water Treatment System, Bottom Ash Transport Water (BATW) Recirculation System, and Diffuser

General

Project 43 is for construction of an ELG water treatment system, a BATW recirculation system, and a wastewater outfall diffuser at the GH generating station. These facilities are designed to process and lawfully discharge wastewater from GH in accordance with the EPA's existing and proposed amendments to the ELG Rule and the existing Kentucky Pollutant Discharge Elimination System ("KPDES") Permit for GH. The current forecasted capital costs to implement these facilities is $158.2 million, with construction completed for the BATW recirculation system and anticipated in the second quarter 2025 for the ELG water treatment system.

The GH project team continues to engage the TC and MC project teams during all major reviews, to apply lessons learned from the other projects. This collaborative effort was implemented to ensure lessons learned are applied across all the projects to promote a common fleet approach to the ELG program.

ELG

Throughout the first quarter of 2025, start-up and commissioning of the ELG system continued. Initial performance testing of the system was cancelled due to process transmembrane pressure trips. Performance testing is now planned to resume in April 2025. The project team completed punch list item walkdowns, review of ELG turnover packages, observed the performance testing attempt, and reviewed the proposed performance testing recovery plan. Tank farm area heat trace, insulation and lagging work continued, as well as addressing mechanical and electrical punch list items. Maintenance tank installation is in progress. An area pavement installation scope was developed and will be bid in the second quarter of 2025.

Bottom Ash Transport Water ("BATW")

During the first quarter, the BATW project team worked further to address various documentation concerns which the contractor anticipates to resolve in the second quarter of 2025.

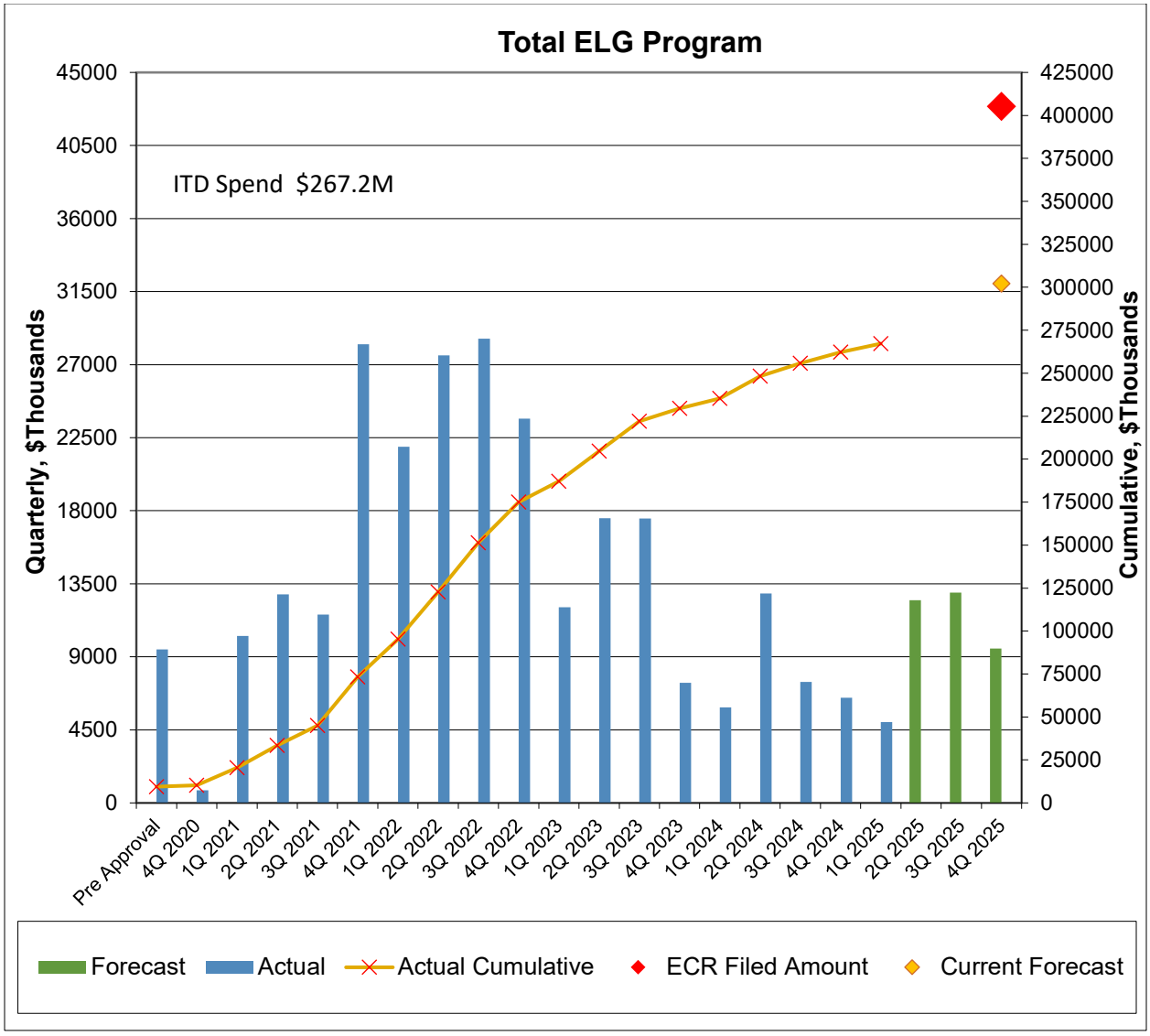
Diffuser

The diffuser was installed and placed into service in 2021.

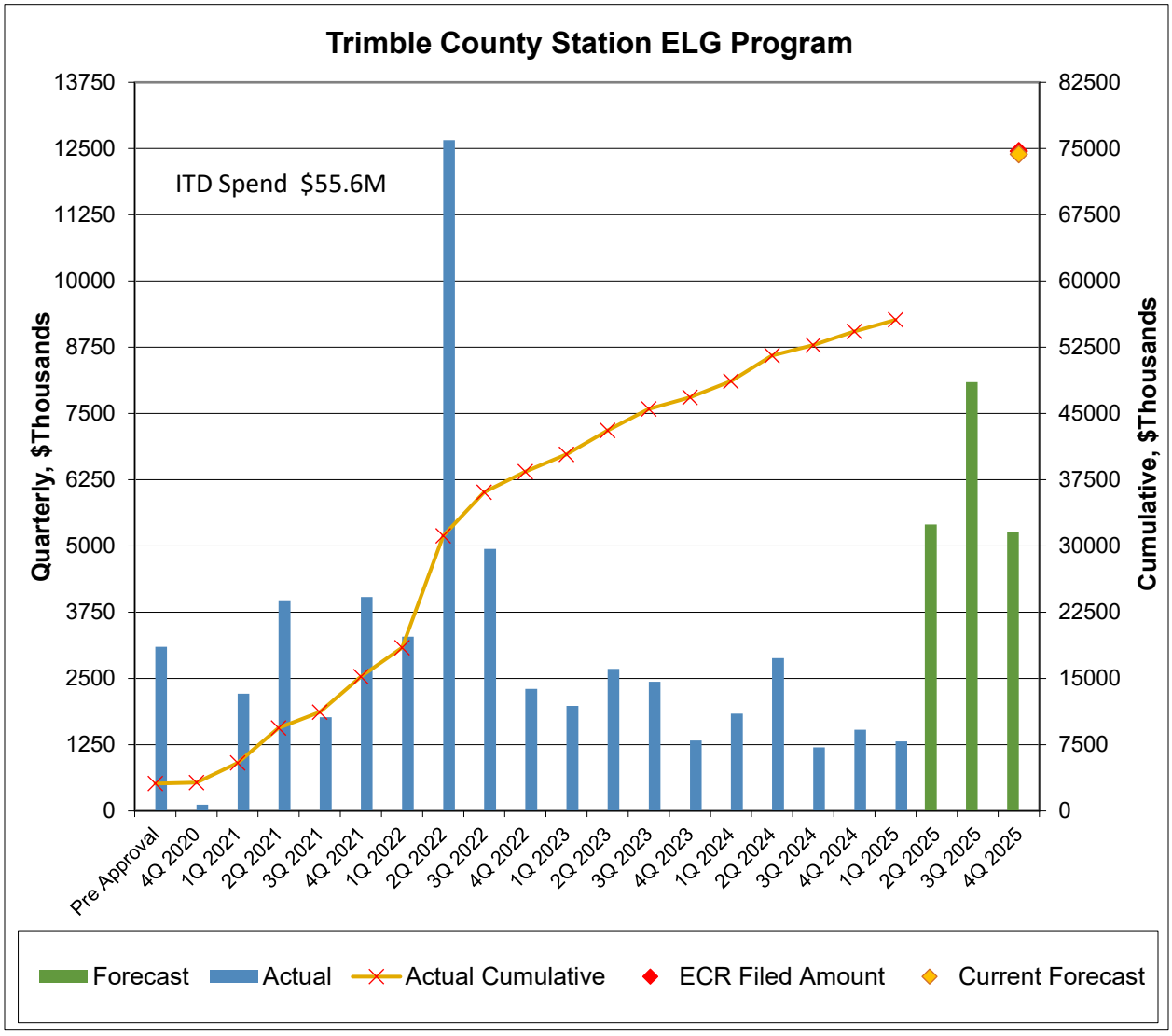
Ghent – ELG Water Treatment – No Changes from December 2024

Financials:

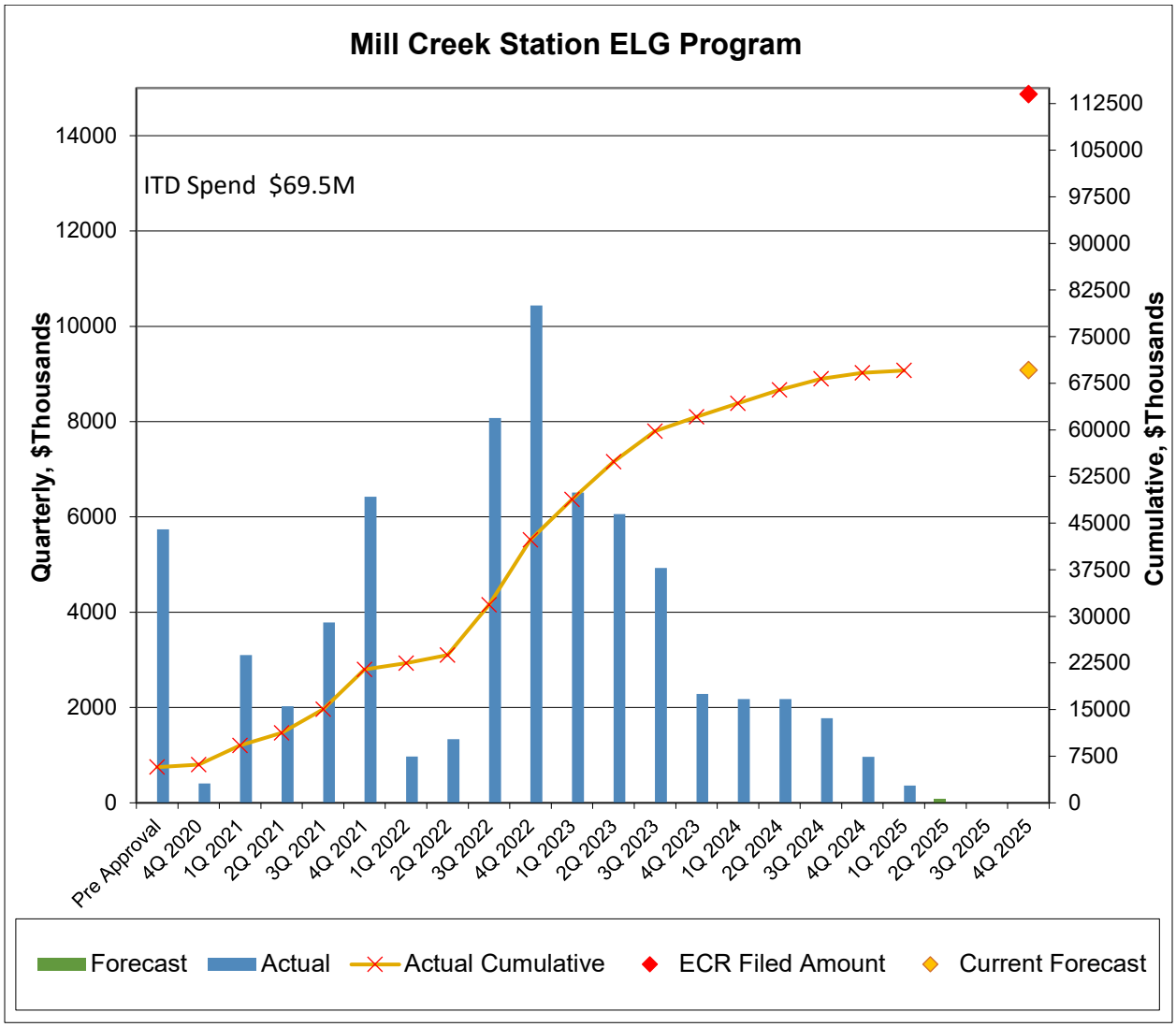
As previously reported, the total 2020 ELG Program approved forecasted cost was over $405 million (net). As noted in prior quarterly reports, this forecasted cost was reduced significantly. The currently projected spend of $302.2 million (net) remains well below the filed amount. Total spend increased to $267.2 million (net)[2] through March 31, 2025. The graph below includes: 1) a symbol (◆) to show the current forecast to completion and 2) inception-to-date ("ITD") Spend in the upper left of the chart.



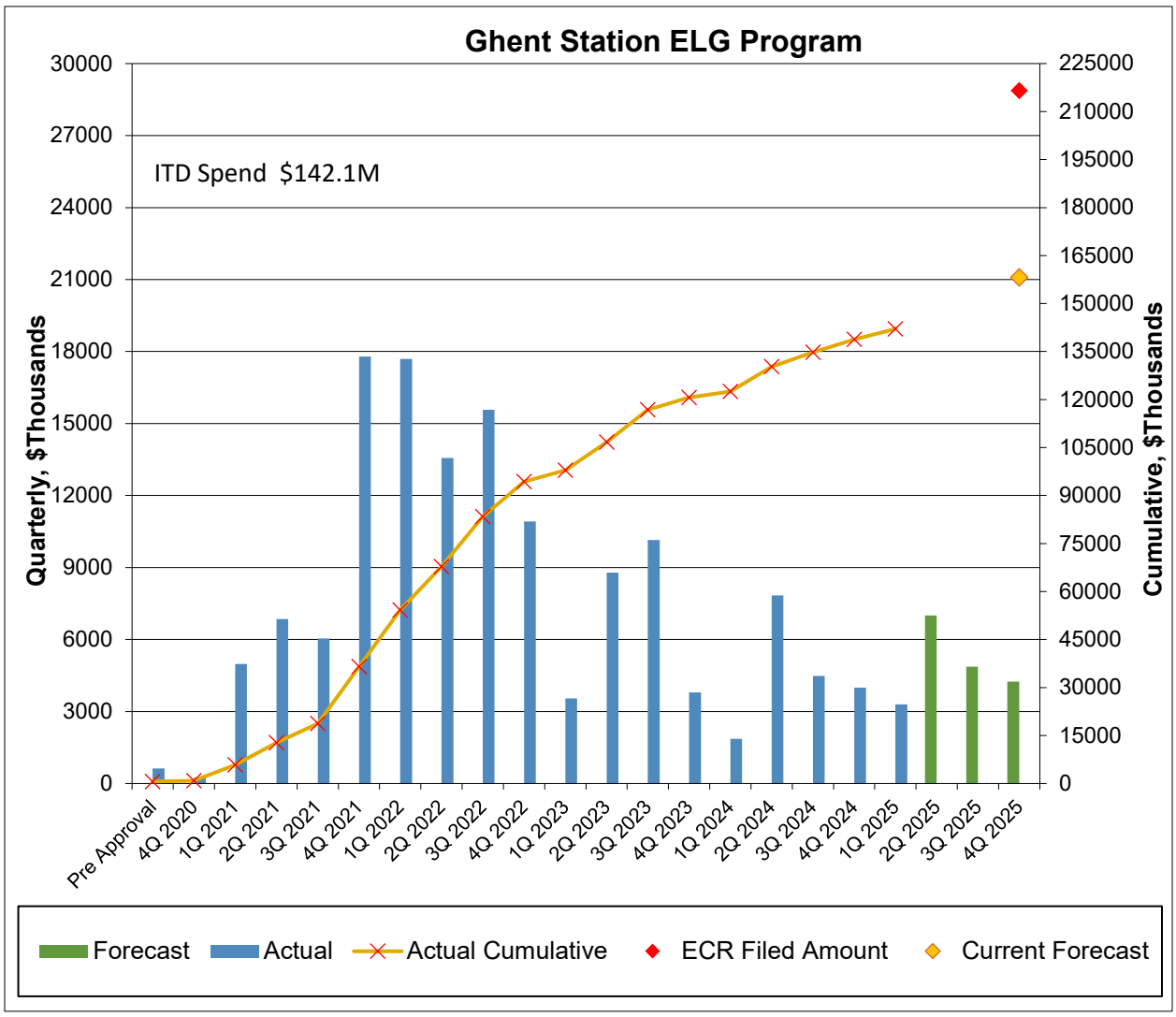
The total Trimble County Station ELG Program forecasted cost is $74.4 million (net)[2]. Total spend increased to $55.6 million (net)[2] through March 31, 2025. The graph below includes: 1) a symbol (◆) to show the current forecast to completion and 2) inception-to-date ("ITD") Spend in the upper left of the chart.



The total Mill Creek Station ELG Program and Diffuser forecasted cost is $69.6 million. Total spend is $69.5 million through March 31, 2025. The graph below includes: 1) a symbol ( ) to show the current forecast to completion and 2) inception-to-date ("ITD") Spend in the upper left of the chart.



The total Ghent Station ELG Program, BATW, and Diffuser forecasted is $158.2 million. Total spend increased to $142.1 million through March 31, 2025. The graph below includes: 1) a symbol (◆) to show the current forecast to completion and 2) inception-to-date ("ITD") Spend in the upper left of the chart.



Planned Activities for Next Quarter:

KU Project 44 and LG&E Project 32 – Trimble County (TC) Station Effluent Limitations Guidelines (ELG) Water Treatment System

ELG – OKEP plans to complete the update of remaining as-built drawings for record. B&McD will complete the engineering for the replacement of the existing Unit 1 oxidation air blowers and associated piping system. E&W will complete the installation and calibration of the loading dock equipment and the interior electrical and fire protection systems and receive and install the new racking and shelving systems in the warehouse. Achievement of Final Completion is expected during the second quarter of 2025.

LG&E Project 31 – Mill Creek (MC) Station Effluent Limitations Guidelines (ELG) Water Treatment System and Diffuser

ELG – OKEP has substantially completed redline updates to CTO Books and record drawings in order to achieve Commercial Operations in the second quarter of 2025. Work will continue to complete all punch list items. Achievement of Final Completion is expected during the second quarter of 2025.

Diffuser – No further work expected.

KU Project 43 – Ghent (GH) Station Effluent Limitations Guidelines (ELG) Water Treatment System, Bottom Ash Transport Water (BATW) Recirculation System, and Diffuser

ELG – OKEP expects to complete the four (4) week performance test. Completion of punch list items will continue along with completion of record drawings. Placing this system In-Service is targeted for the second quarter of 2025. OKEP will complete the maintenance tank erection. An area pavement scope will be released for bid.

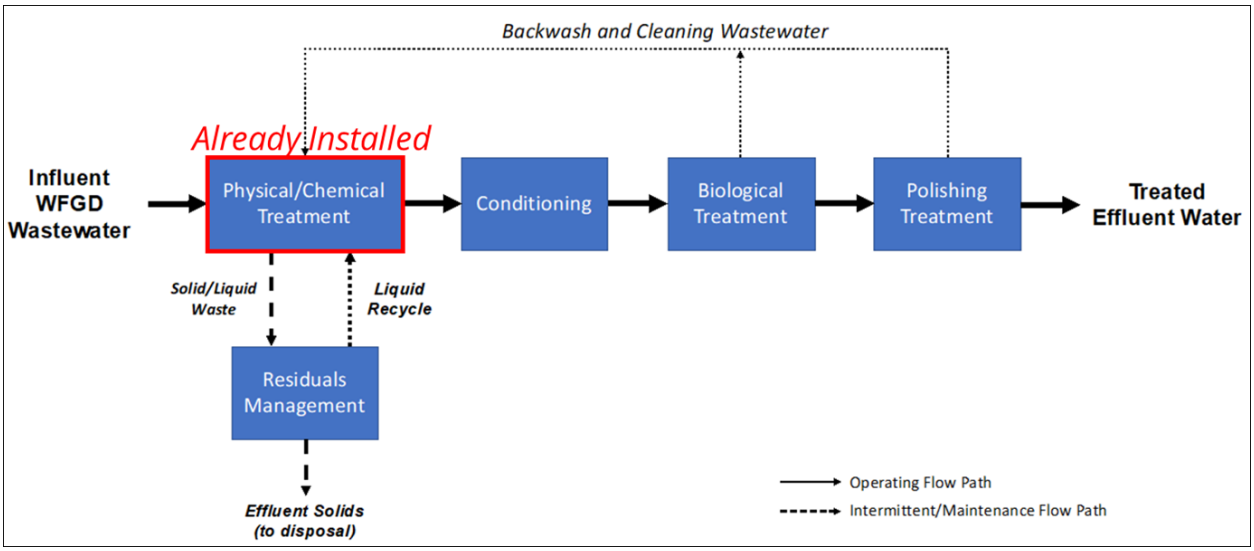
BATW – PE continues to work with OKEP to close punch list items.

APPENDIX

ELG Water Treatment System Description – TC, MC, and GH

The ELG Rule requires the Companies to use the Best Available Technology Economically Achievable ("BAT")[9] to control particulate, metals, arsenic, mercury, selenium, and nitrates/nitrites. Current BAT technology is physical/chemical treatment plus biological treatment. The process water systems are physical/chemical systems designed to capture particulate and most metals; however, they are not designed to capture nitrates/nitrites and selenium. The levels of nitrate/nitrite and selenium capture required by the ELG Rule requires biological treatment of the process water treatment system's effluent.

The first step in the biological treatment process is denitrification, which is the reduction in concentration of nitrates/nitrites through a biological process utilizing denitrification equipment. Effluent from the denitrification equipment is discharged to the first stage reactor, which is comprised of fiberglass vessels and internal reactor surfaces. The reactor contains living microorganisms, which are fed nutrients and convert the nitrates/nitrites and selenium molecules in an aerobic atmosphere, to an elemental form. Effluent from the first stage reactor flows into a second stage reactor, where additional biological processes reduce remaining selenium. The elemental form of selenium is transferred, via a backwash phase of the process, to the equalization tanks at the beginning of the process water treatment system for particulate removal. The second stage reactor feeds to an ultrafiltration ("UF") system where remaining particulate metals are filtered out. The UF tank is then discharged to a series of clean water tanks, which can be used to backwash the biological and UF systems or be discharged. A "typical" flow diagram is shown below.



The majority of the mechanical and electrical systems will be constructed in a building for weather protection, whereas most of the biological process tanks will be located outside. The building houses the denitrification equipment, UF systems, effluent tanks, various pumps and support subsystems. The system also requires cleaning and chemical feed equipment, pumps, piping, valves, and electrical equipment.

[9] 84 Fed. Reg. 64624.

Separate rooms must be constructed inside the treatment building to house battery systems and electrical equipment. A control room is also required, along with restrooms. The reactor area, including the vessels housing the microorganisms, will be constructed outside the building under a weather canopy. All of the tanks and reactors in the system must be large enough to handle the immense volume of water flowing through the effluent treatment process. In other words, the system must be sized commensurate with the process water treatment systems recently commissioned to enable treatment of the effluent of flow from the process water treatment systems.

Diffusers Description – GH and MC

The diffusers installed at GH and MC are large multi-port pipes that connect to the stations' wastewater outfall pipe and are placed into the bottom of the Ohio River with the discharge ports above the riverbed and facing downstream. The pictures shown below provide a general concept of the GH diffuser, similar to the MC diffuser. As this graphic representatively shows, the diffuser is a single large discharge pipe that is installed in the riverbed. The diffuser ports face downstream to disperse the water out of multiple discharge ports instead of a single, larger point of discharge.

Ghent Outfall 001 Diffuser Concept