

Uphill Mining Backfill Challenges

When Gravity Is Not On Your Side

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Project Engineering III
Kensington Mine



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The scientific and technical information concerning our mineral projects in this presentation have been reviewed and approved by a "qualified person" under Item 1300 of SEC Regulation SK, namely our Senior Director, Technical Services, Christopher Pascoe. For a description of the key assumptions, parameters and methods used to estimate mineral reserves and mineral resources included in this presentation, as well as data verification procedures and a general discussion of the extent to which the estimates may be affected by any known environmental, permitting, legal, title, taxation, sociopolitical, marketing or other relevant factors, please review the Technical Report Summaries for each of the Company's material properties which are available at www.sec.gov. 2023 reserves and resources were determined in accordance with Item 1300 of SEC Regulation S-K. Reserves and resources for certain prior periods were determined in accordance with Canadian National Instrument 43-101. Both sets of reporting standards have similar goals in terms of conveying an appropriate level of confidence in the disclosures being reported, but the standards embody slightly different approaches and definitions. The ranges of potential tonnage and grade (or quality) of the exploration results described in this presentation are conceptual in nature. There has been insufficient exploration work to estimate a mineral resource. It is uncertain if further exploration will result in the estimation of a mineral resource. The exploration results described in this presentation therefore, do not represent, and should not be construed to be, an estimate of a mineral resources or mineral reserve.

Introduction

Emilien Charbonneau, Project Engineer III

Background

French Canadian engineer from Quebec. Graduated from Polytechnique Montreal. Moved to Alaska in February 2022. Loves Hockey, Hiking, and Fishing.

Mining Experience

AgnicoEagle – Meadowbank & Amaruq

- Mobile Maintenance Project Engineer
- Equipment Reliability
- Continuous Improvement

Coeur Alaska – Kensington Mine

- Tech Services Project Engineer
- Backfill Improvement
- New Paste Booster Project Manager
- Underground Project Engineer



Coeur Alaska, Inc. is a subsidiary of Coeur Mining, Inc.

- Coeur Mining is a U.S.-based, well-diversified, growing precious metals producer
 - Kensington gold mine (Alaska)
 - Wharf gold mine (South Dakota)
 - Rochester silver-gold mine (Nevada)
 - Palmarejo gold-silver complex (Mexico)
 - Silvertip polymetallic exploration project (BC)
- Approximately 2,100 employees throughout the organization⁽¹⁾
- Proudly and responsibly produces the precious metals necessary for modern life



- OPERATING MINE
- EXPLORATION PROJECT

> About Kensington

Underground gold operation located 45 miles north-northwest of Juneau, Alaska.

Part of the Historic Berners Bay Mining District, which has seen over 130 years of resource development.



Left photo: "Eureka" Lode in Kensington Mining Company Mine, 1909. Alaska State Archives, Collection, Winter 6 Pond Photo Collection, ASL_p87_0496



> About Kensington (cont.)



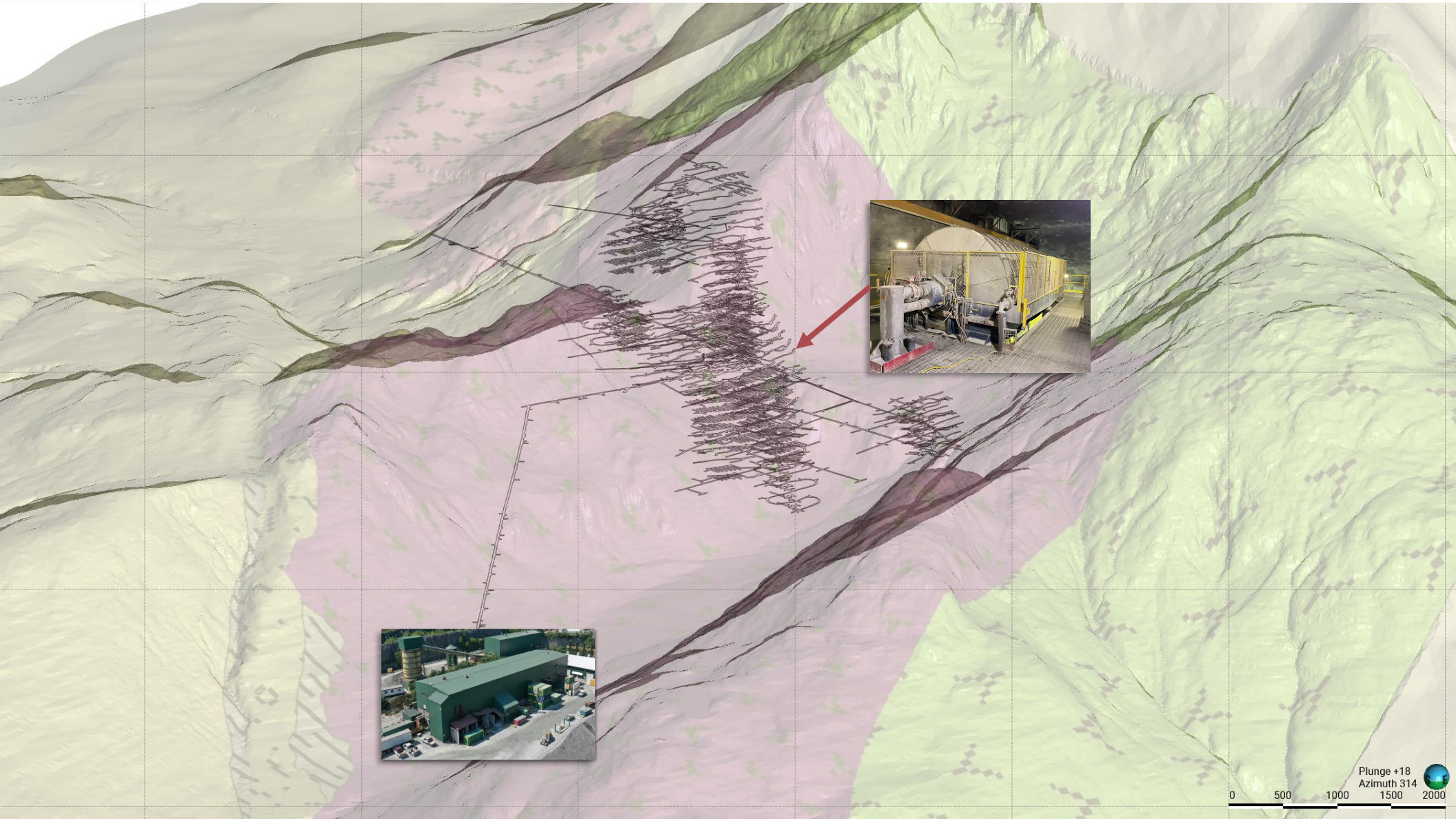
> About Kensington (cont.)



Backfill Overview

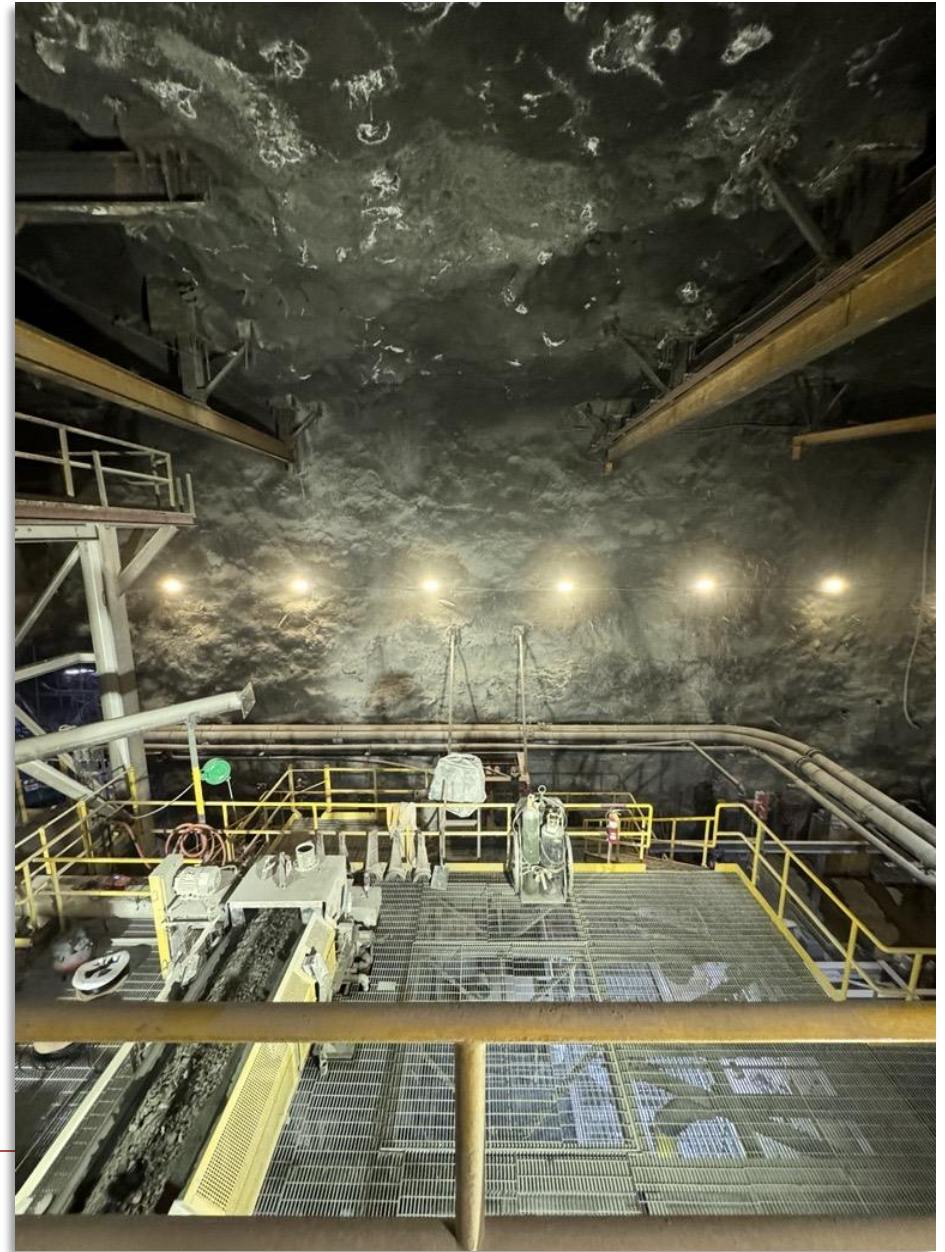
Emilien Charbonneau, Project Engineer III

> Ore-Body Location

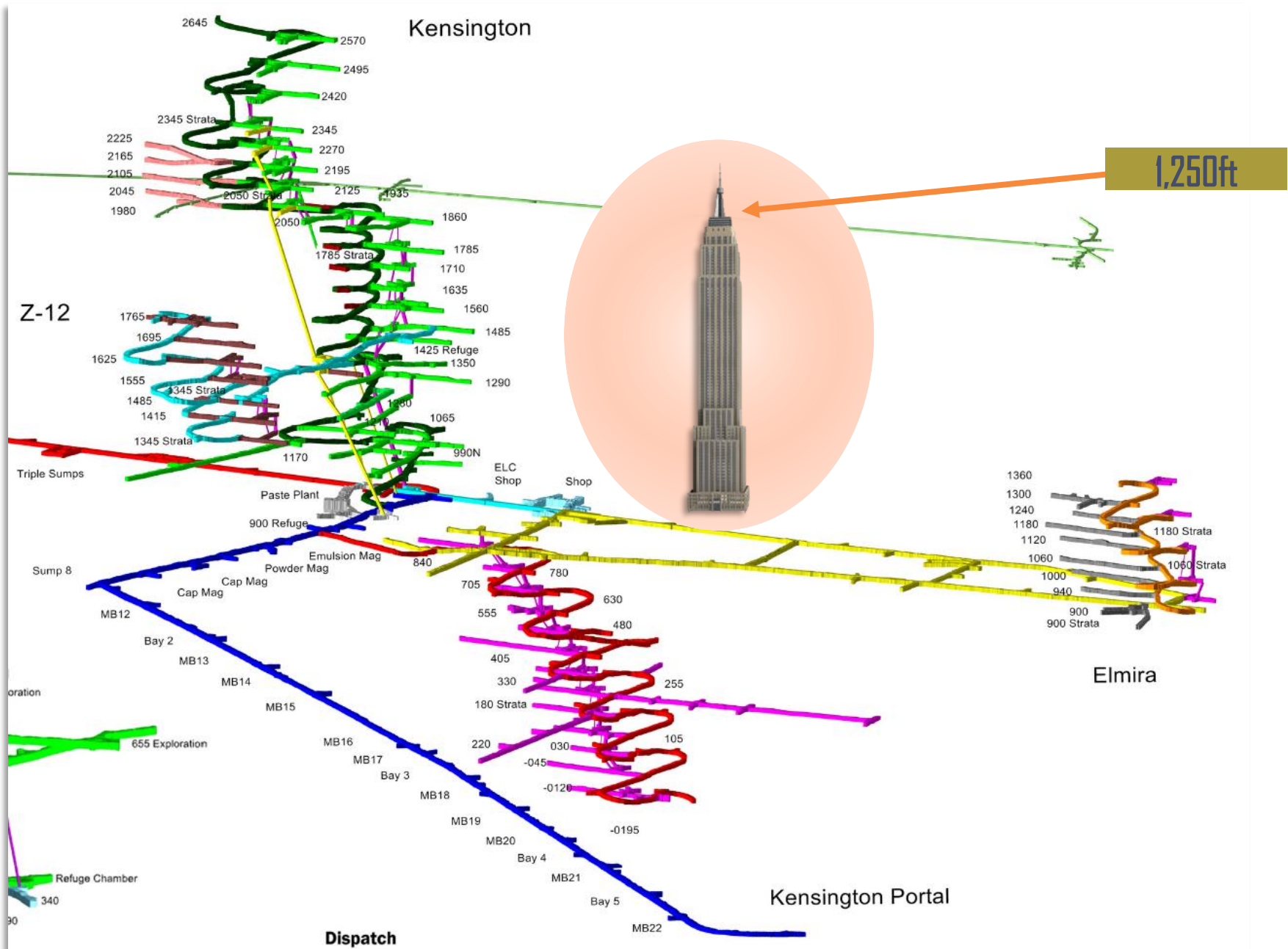


> Kensington's Backfill

- Paste Backfill (mine tailings, cement, water)
- 280,000 PasteTons/Year
- Underground Paste plant at 900 ft
- Booster pump station at 1415 ft
- Highest target at 2570 ft



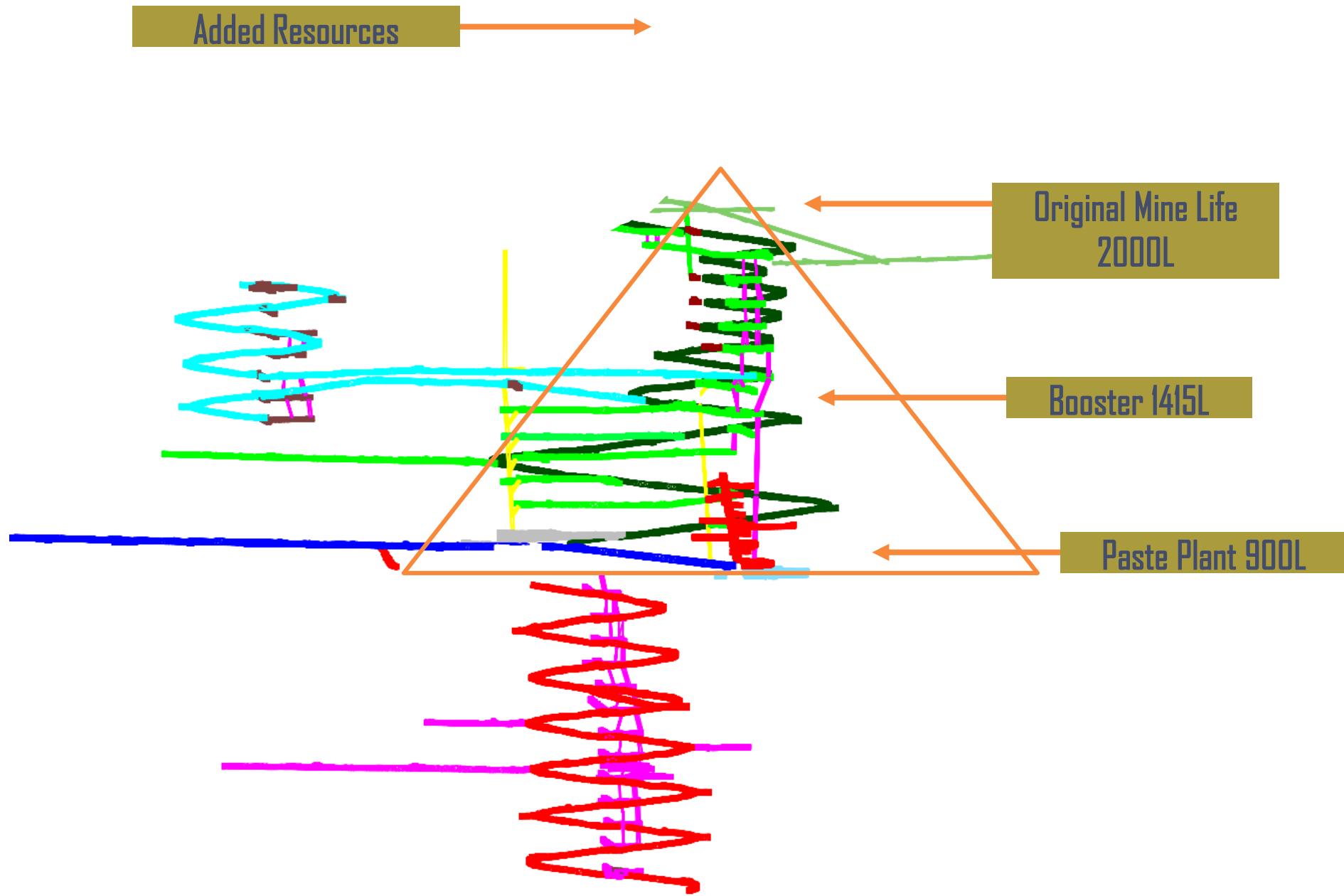
> Kensington's Backfill



Emerging Issues

Emilien Charbonneau, Project Engineer III

> Timeline and Expectations



> Emerging Issues

- Pipe geometry
- Flushing inefficiency
- Water Hammer (pipe failure, coupling failure)
- Moving target
- Back pressure
- Pump design



Improvements & Solutions

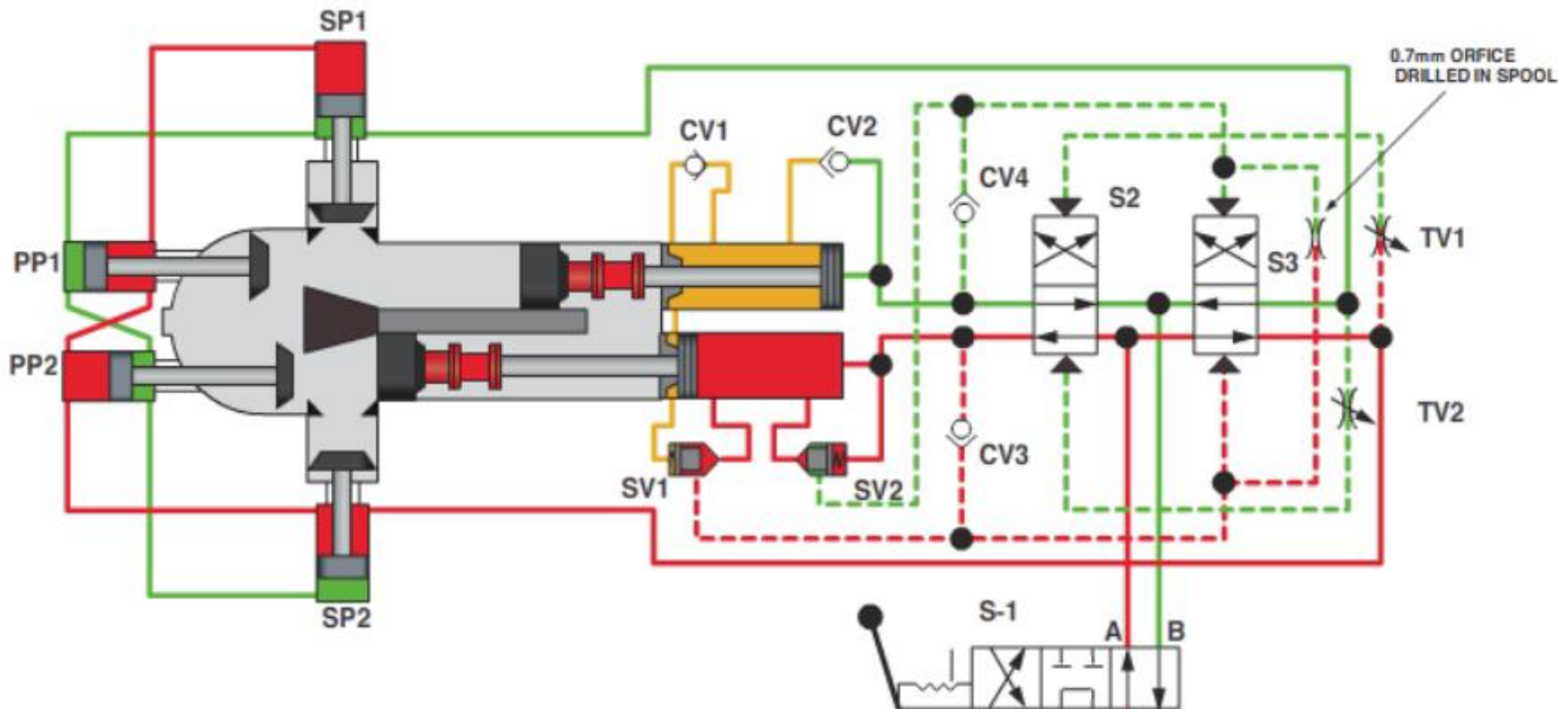
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> Water Hammer

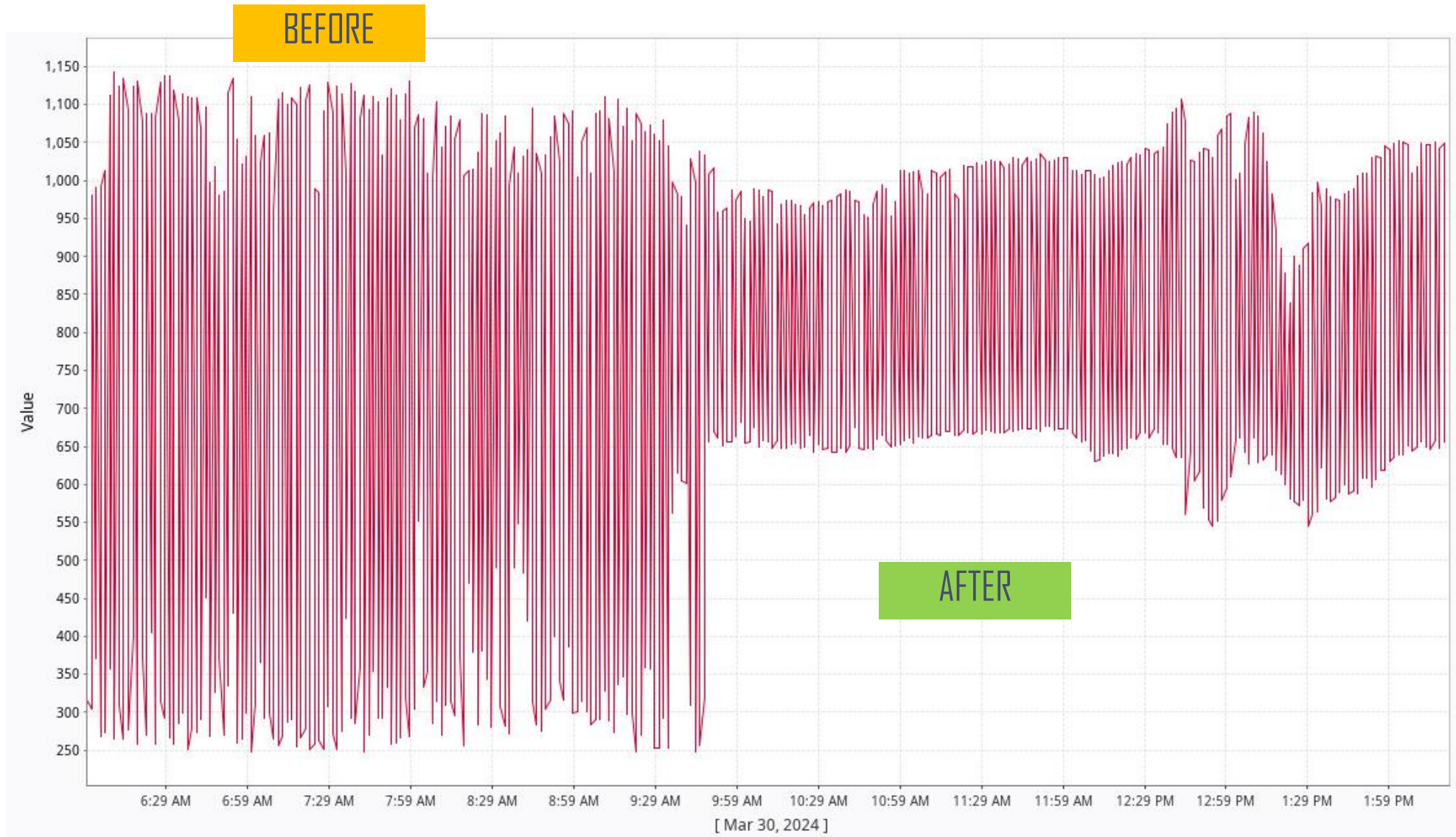


> Water Hammer (cont.)

- Pump reprogramming
 - Ideal Control Circuit (ICC)
 - Smoother transition
- Almost eliminated all piping issues



> Water Hammer (cont.)



> Washed Out Wear Parts



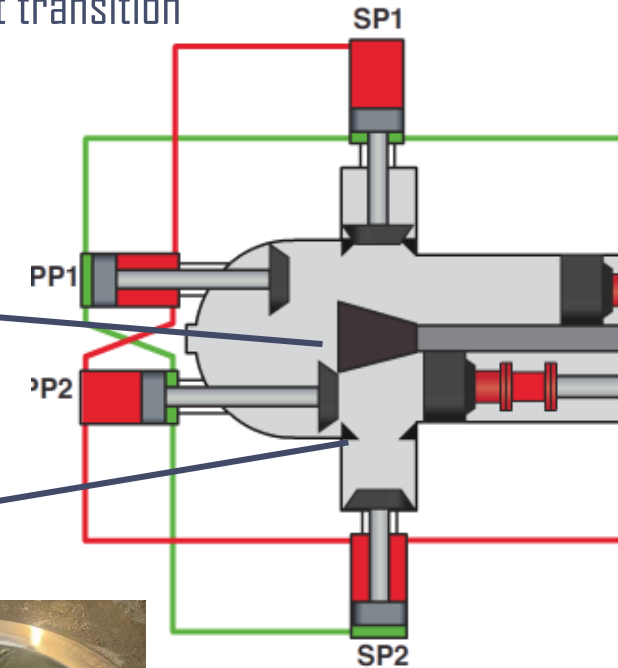
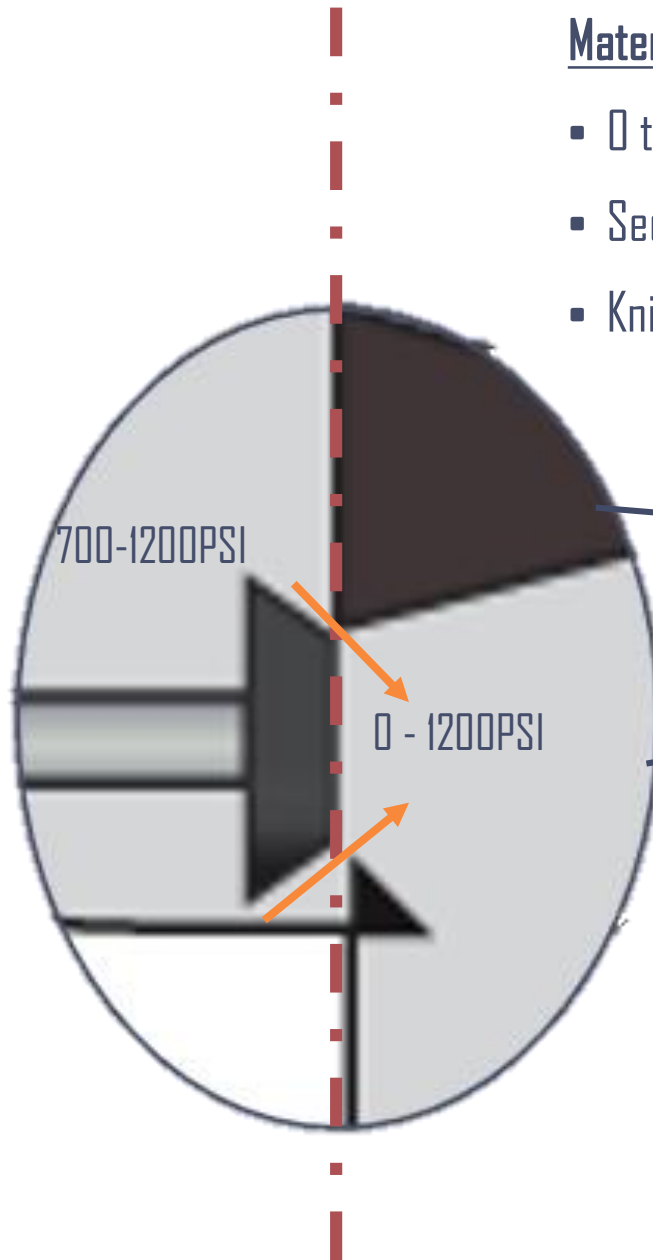
> Twin Circuit vs Single Circuit

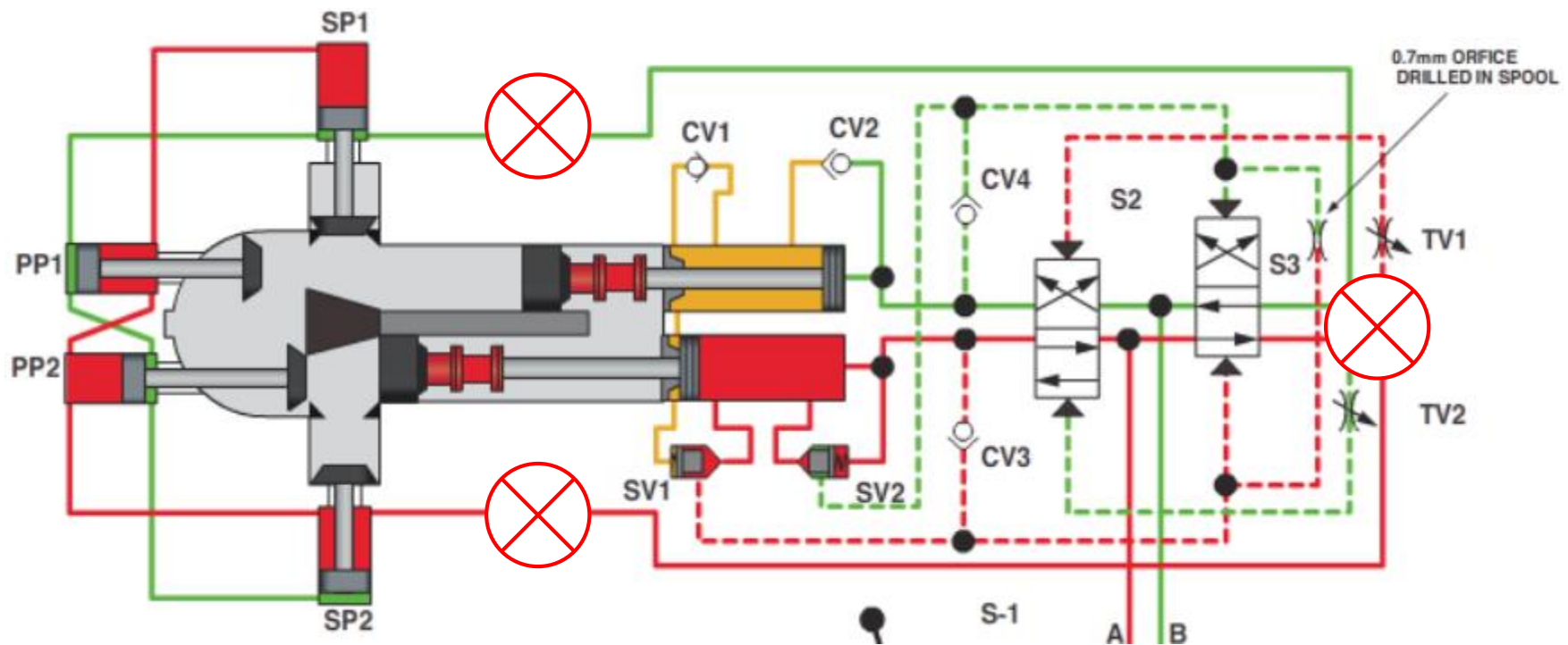
Discharge side

- 700 to 1,200psi
- Constant head pressure

Material side

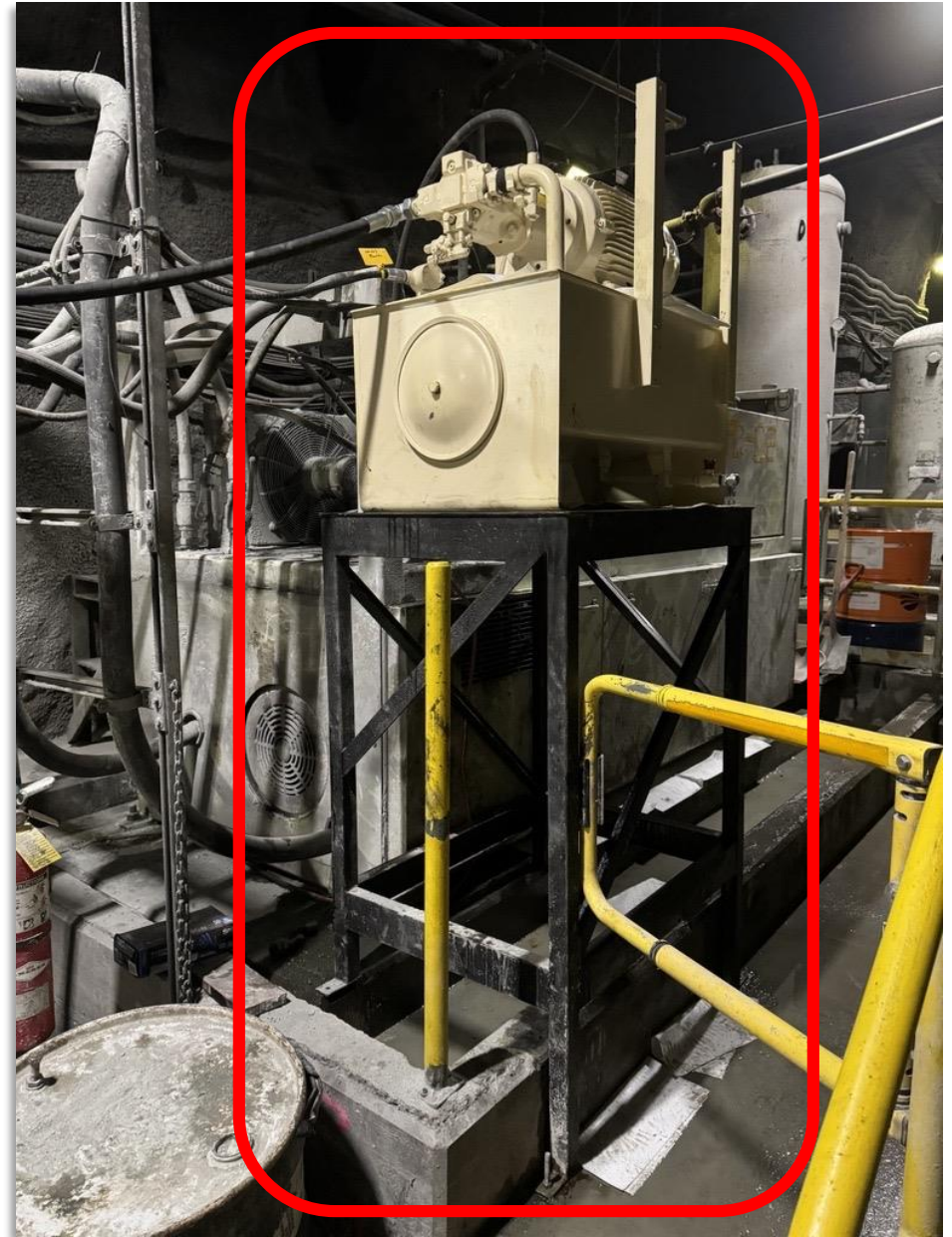
- 0 to 1,200psi
- See no pressure at transition
- Knife edge seal



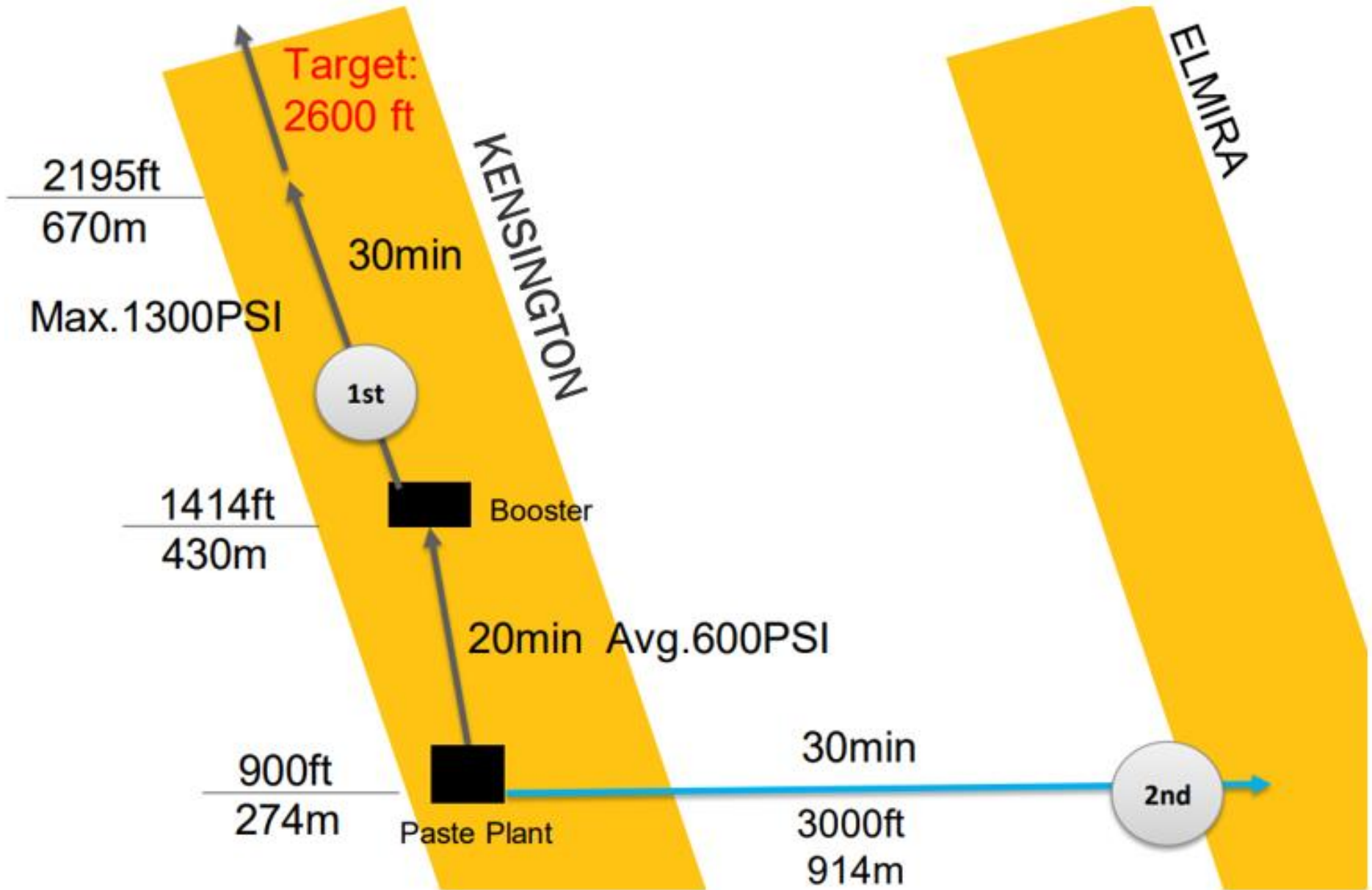


- Disconnect the S3 block and connect it to its own oil tank and motor
- Add accumulator to hold and control the hydraulic pressure
- Retrofit old technology to 2024 best practices

> Twin Circuit Conversion (cont.)



> Cement Admixture



> Cement Admixture (cont.)



Objective:

- Delay hydration of cement
- Reduce sedimentation
- Reduce water content
- Increase % solids
- Extend paste reach

> Cement Admixture (cont.)

0 min

REF



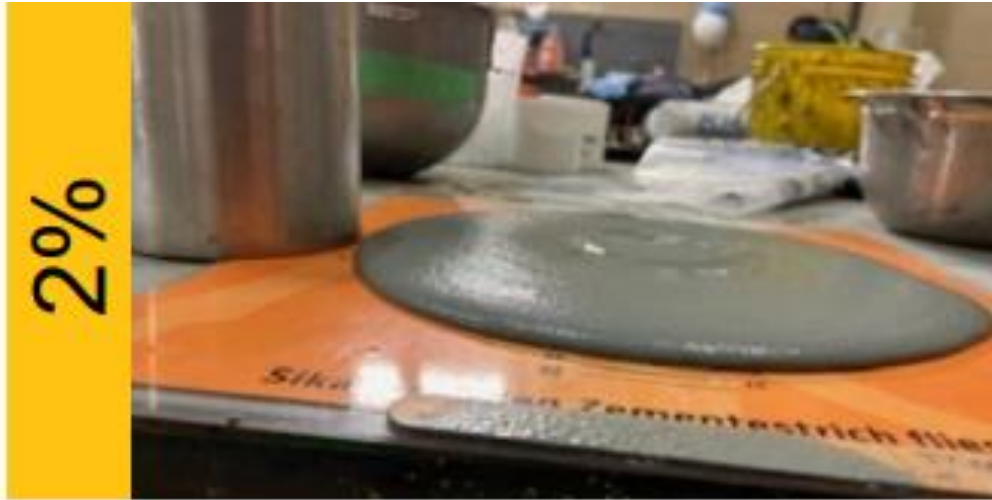
120 min



> Cement Admixture (cont.)

0 min

2%

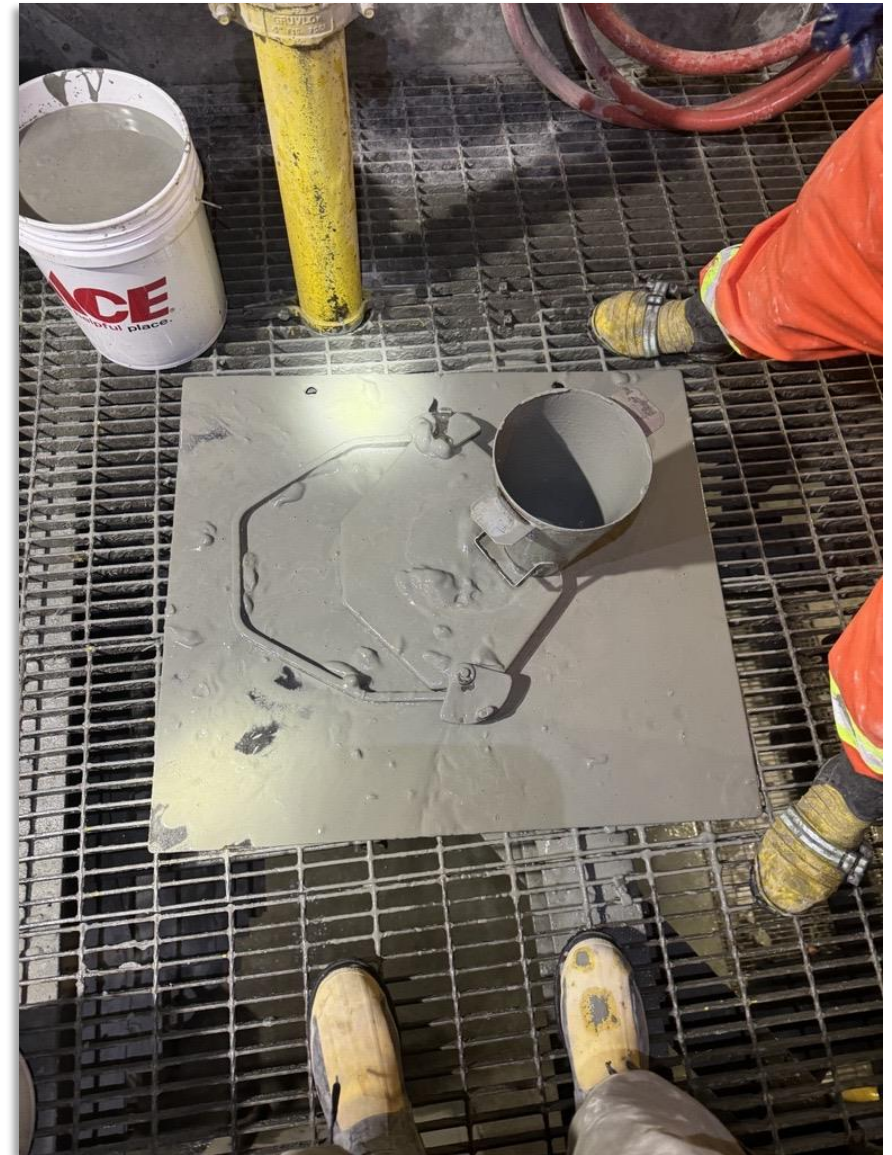


120 min



> Cement Admixture (cont.)

- Increased flowability of the paste
- Reduced buildup in pipe and hopper
- Reduced 100psi friction loss
- Increased solid content by 2%
- Needs more fine tuning

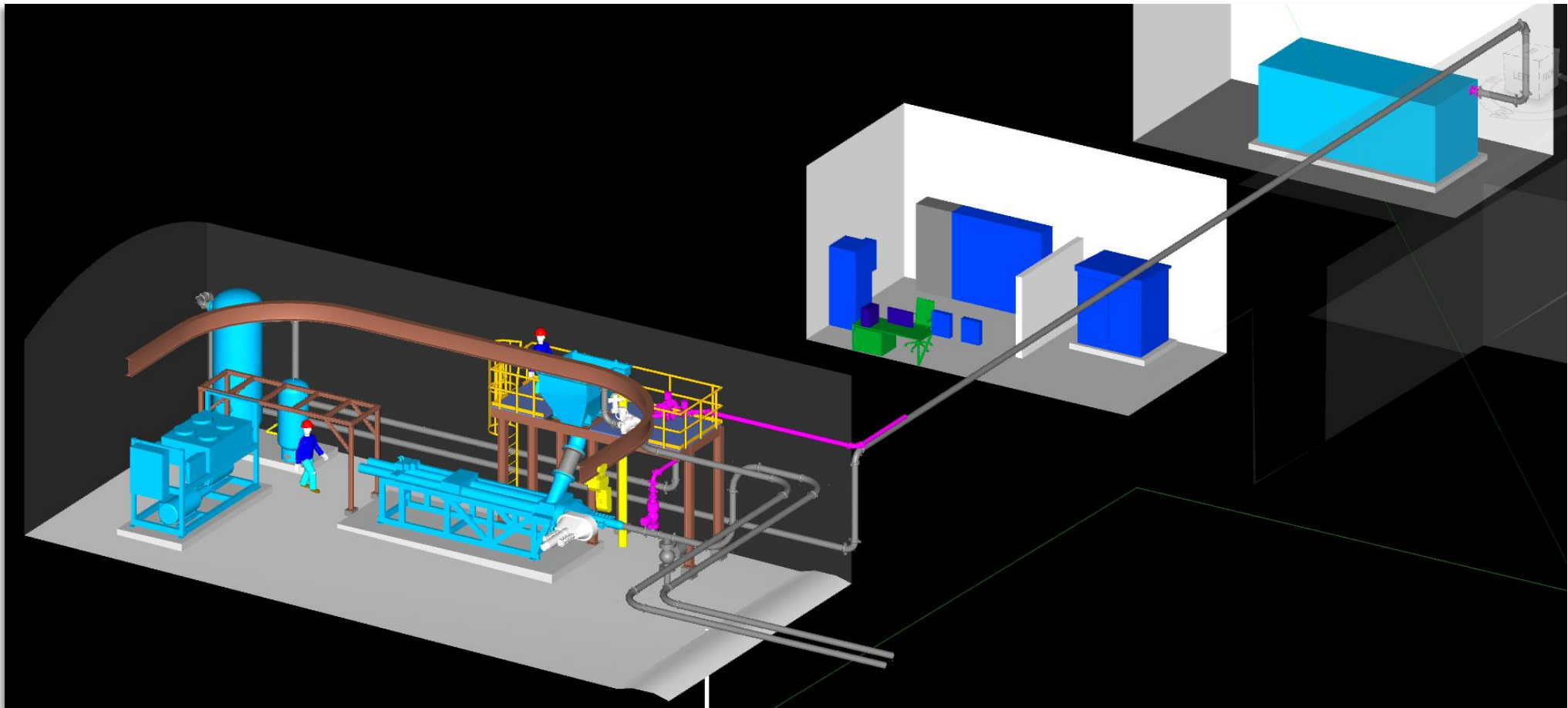


Conclusion

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> Conclusion

- Lessons learned with our current system will be taken into consideration for the new plant in the new Elmira ore body
- Operations and maintenance-friendly plant to set Kensington up for success



> Conclusion (cont.)

- Prevented a large capital expense of \$4M by eliminating the need for a second booster station
- Reduced pressure by 20%
- Increased paste placement by 30%
- Reduced risk of pipe bursts
- Increased team's overall knowledge
- Worked as a team to successfully fix paste issues for our unique situation
- On track to have a well-designed Elmira Booster Station



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