

JUBCOR

2024

CONFERENCE & EXHIBITION

INNOVATIVE SOLUTIONS FOR CORROSION CHALLENGES

Maximizing Cost Efficiency with Cutting-Edge Cryogel® Z

Unparalleled Online Insulation for
Unprecedented Project Flexibility

Presented By:
Altaf Rahman

Doing it differently



Insanity: doing the same thing over and over again and expecting different results.

~ Albert Einstein ~



Agenda

- Technology Overview
- Cryogel® Z delivering exceptional value by :
 - Optimizing your Turnarounds
 - Executing Projects with No or Minimum downtime.
 - Reducing the risk of “Loss in Containment ” and a safety incident.
 - Increase the uptime of your plant and increased profits.
- What is the evidence ? How do I know its going to work ?
 - We will demonstrate a proven process that shows how Cryogel® Z can be installed Online.
 - We will show Case studies around the world by major operators that have successfully used the proven technology.
- Questions
 - Ask questions.
 - Visit our booth and we'll give you a detailed overview.

Technology Overview

Aspen Aerogels Protecting Energy Assets Worldwide

22

Years of continuous R&D

400

Million sqft of installed base

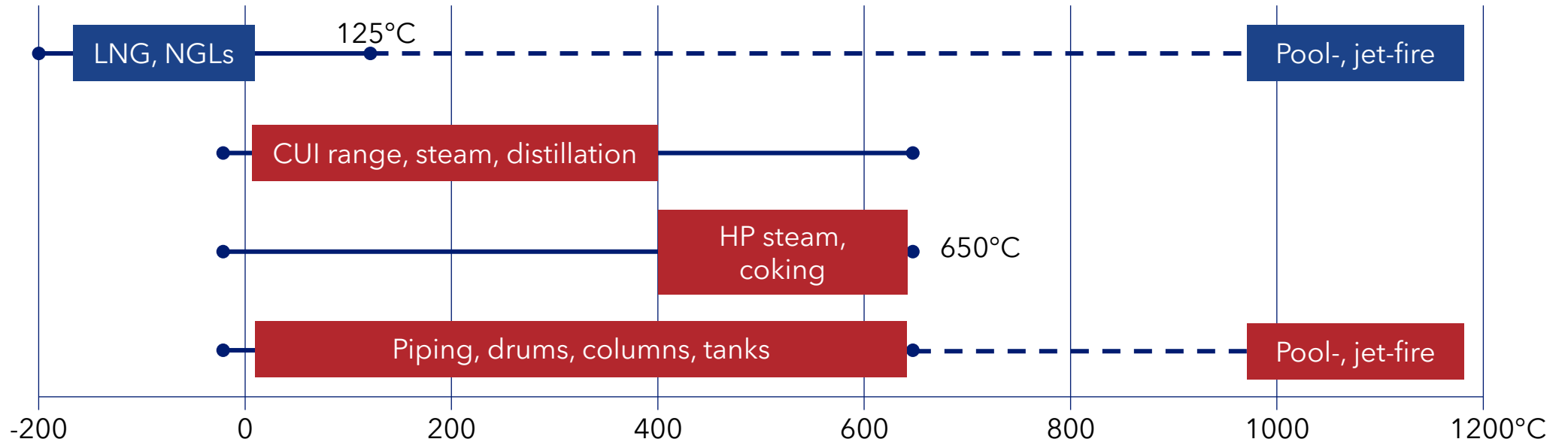
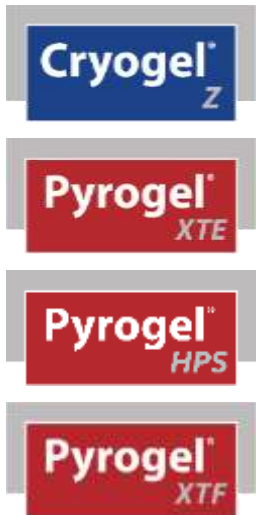
24

Out of 25 largest refineries

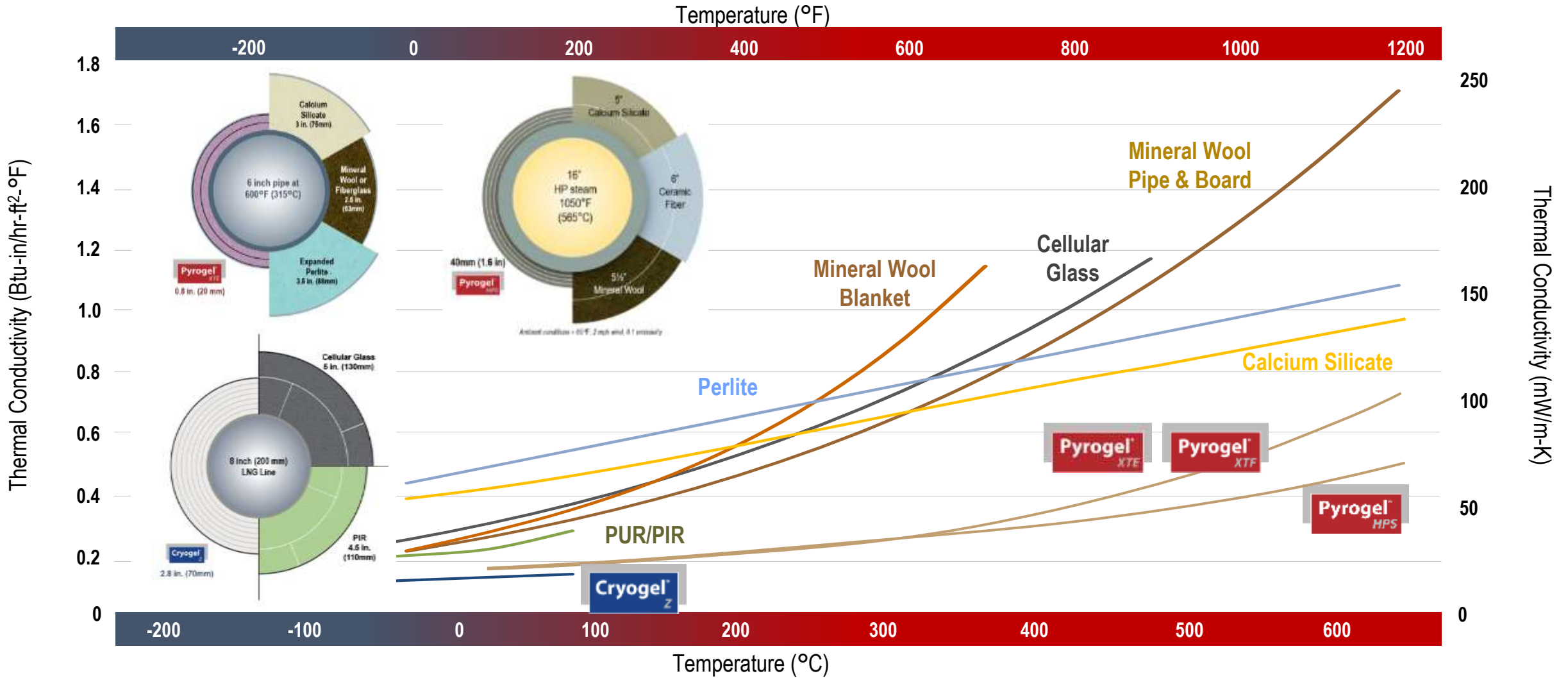


Cryogel® & Pyrogel®:

- Thinnest insulation
- Tough, flexible format
- Helps prevent CUI
- Faster to install
- Jet and pool-fire protection



The Thinnest Insulation Delivering The Lowest Thermal Conductivity



Opportunities To Value Engineer On Capital Projects



Arthur D. Little

Arthur D. Little has been at the forefront of innovation since 1886. We are an acknowledged thought leader in linking strategy, innovation and transformation in technology-intensive and converging industries. We navigate our clients through changing business ecosystems to uncover new growth opportunities. We enable our clients to build innovation capabilities and transform their organization.

Our consultants have strong practical industry experience combined with excellent knowledge of key trends and dynamics. Arthur D. Little is present in the most important business centers around the world. We are proud to serve most of the Fortune 1000 companies, in addition to other leading firms and public sector organizations.

For further information, please visit www.adlittle.com

Copyright © Arthur D. Little 2015. All rights reserved.

www.adl.com/ValueEng

Arthur D Little

Viewpoint

Value engineering of capital projects

Is your business optimizing value over the entire asset lifecycle, from the start?

Value engineering typically delivers at least 10% in lifetime cost savings, without compromising the quality of outputs or asset functionality

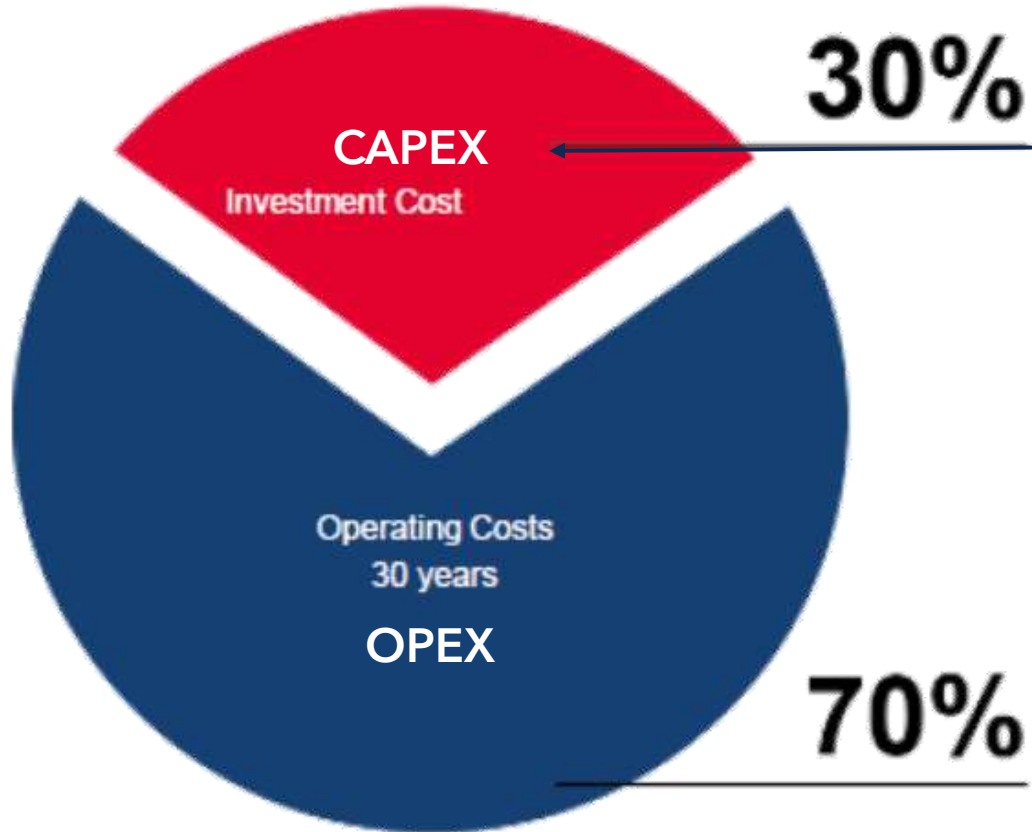
Value engineering can address this gap and provide a clear answer on how to optimize capital projects. Value

Cost saving efforts are typically focused on capital costs, whereas operations and maintenance costs can often be the bigger cost factors over the lifetime of an asset, and can even account for 60-70% of the total lifetime costs savings realized.

Most importantly, companies often lack the capabilities and knowledge required to optimize their investments.

Lifetime Cost Of Ownership

Majority of Cost is to Maintain Asset Integrity and Reliability



30% of the lifetime costs are invested at the CAPEX investment stage.

70% of the lifetime costs are invested in the Operational investment stages.

Benefits Culminate By Reducing Risk In Capital Projects

CAPEX (30%)

OPEX (70%)



Design

- Reduced Footprint
- Pipe Racking Density
- Steel Cost Reduction
- Hot, Cold & PFP solutions

Construction

- De-risk insulation phase
 - Faster Installation
 - Pre-Insulate Offsite
 - Reduced site Labor
 - Weather Insensitive
- Simplified Logistics

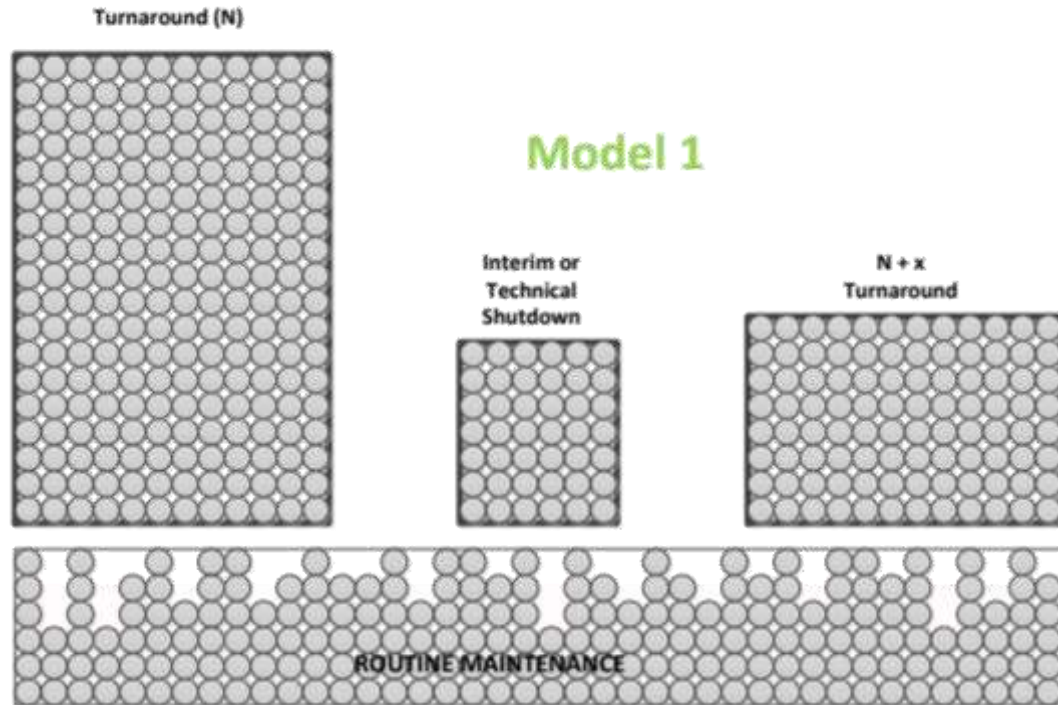
Operation

- Minimized Energy Costs
- Operation Insensitive to weather for sustained process conditions
- Superior Protection against CUI & CUF

Maintenance & TARs

- Reduced unit interventions
- Reduced TAR costs
- One time purchase
- Remove & Reuse
- Faster Installations for earlier return to service

Traditional Ways of Scheduling Turnaround Work



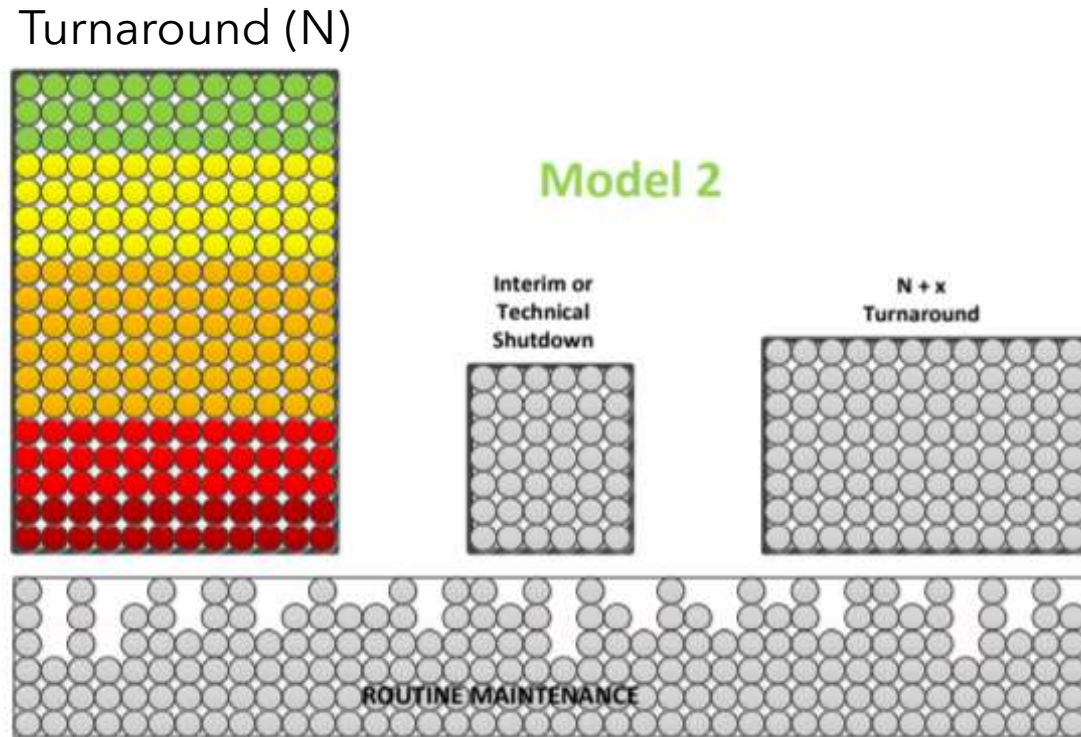
* Diagram reference www.kbc.com white paper

Everything is crammed into the TA regardless of importance.

High Cost

Erratic

Optimizing Your Turnaround Work

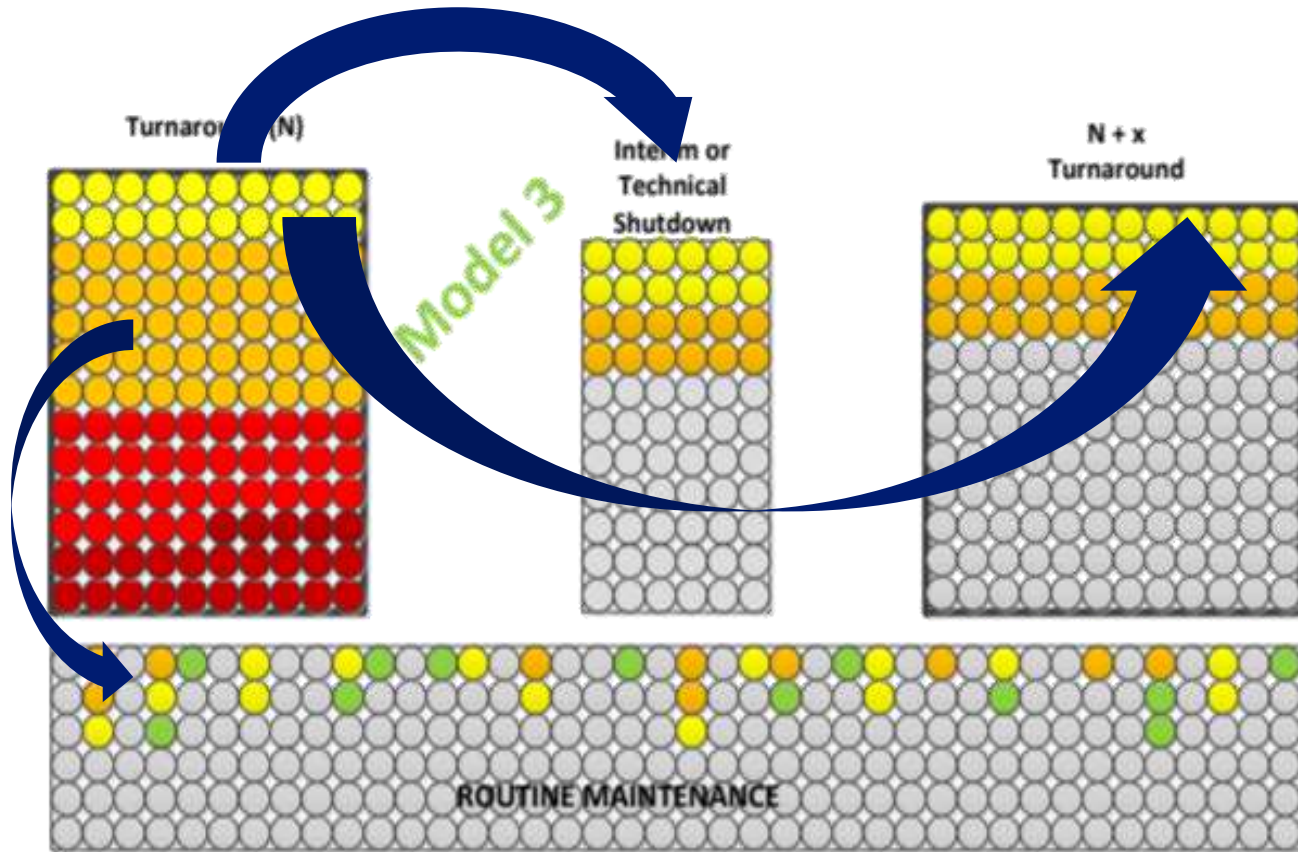


* Diagram reference www.kbcac.com white paper

Optimization by prioritizing work during TA.

None of the work shifted to Interim or technical shutdown.

Fully Optimized Turnaround Strategy Model



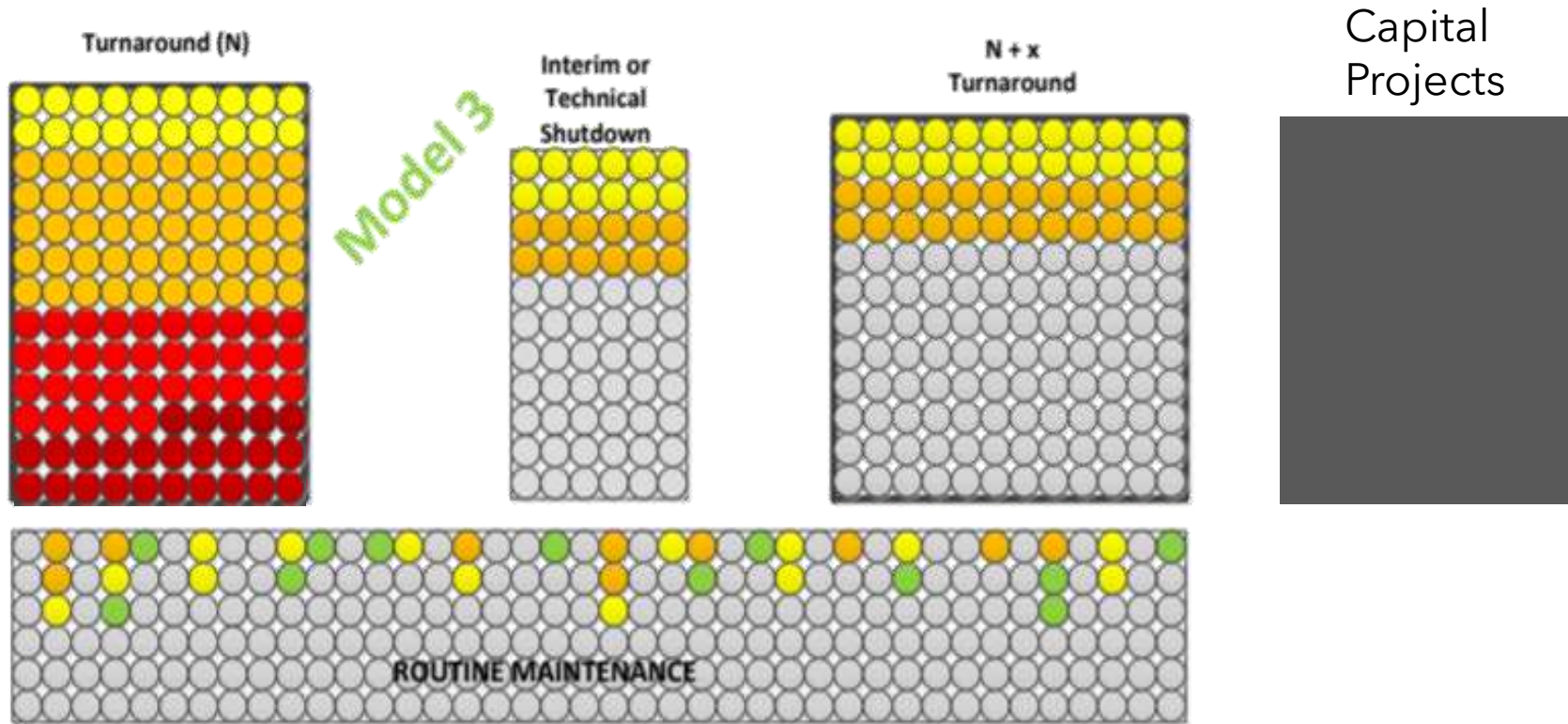
Optimizing by prioritizing work during TA.

Some of the work shifted to Interim or technical shutdown

Prioritize and move work into future turnarounds.

* Diagram reference www.kbcats.com white paper

Cryogel[®] Z Creates Space In Your Turnaround Schedule



* Diagram reference www.kbcatt.com white paper

Take cold work outside the shutdown.

Do the work at a time that fits you.

Cryogel[®] Z moves the work scope on your critical path into capital projects.

Saving costs, improving safety, and increasing profits by reducing downtime.

Online Installation Key Steps

Removal of
Incumbent
Insulation Material



Online Installation Key Steps

Removal of
Incumbent
Insulation Material

Pipe Surface Treatment -
Ice and Condensation
Removal

Stripping off the
incumbent insulation
material, 5-meter at
one time.



Online Installation Key Steps

Removal of Incumbent Insulation Material

Stripping off the incumbent insulation material, 5-meter at one time.

Pipe Surface Treatment - Ice and Condensation Removal

Installation to be done in dry conditions, i.e., not raining; slightly humidity is acceptable.

Removal of the adhered ice & insulation with a non-ferrous/ sparking tools, i.e., rubber hammer, wooden mallets, & plastic scrapper.

Method of de-icing varies upon site situation.

Construction of vapor stop at the interface between the incumbent insulation and Cryogel® Z



Online Installation Key Steps

Removal of Incumbent Insulation Material

Stripping off the incumbent insulation material, 5-meter at one time.

Pipe Surface Treatment - Ice and Condensation Removal

Installation to be done in dry conditions, i.e., not raining; slightly humidity is acceptable.

Removal of the adhered ice & insulation with a non-ferrous/ sparking tools, i.e., rubber hammer, wooden mallets, & plastic scrapper.

Method of de-icing varies upon site situation.

Construction of vapor stop at the interface between the incumbent insulation and Cryogel® Z

RHS will have the permanent vapor stop construction to avoid water ingress from the incumbent material to the brand new Cryogel® Z.

LHS will have the temporary vapor stop construction that will be removed later for subsequence Cryogel® Z installation in the next 5m segment.

Install the Cryogel® Z layers, secondary/ primary vapor barrier & jacketing



Online Installation Key Steps



Online Insulation Success Stories

Refinery in Norway



Challenges:

- The propane system insulation was completely degraded, leading to increased boil-off gas (BOG).
- BOG means **additional compressor load**, leading to **higher energy consumption** and CO2 emissions.
- Gas demand and energy costs in Europe meant no viable shutdown window to carry out the remediation scope.

Solution:

- Cryogel® Z was installed online enabling continuous operation of the plant.
- Cryogel® Z helped reduce hotspots leading to process stability and increased energy efficiency.
- Cryogel® Z requires no gluing, therefore eliminating drying and curing time.

RLPG Tanks, UK



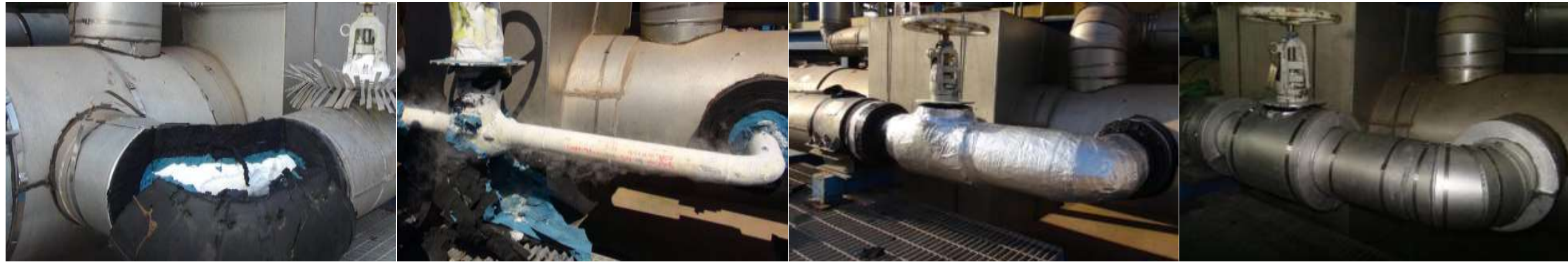
Challenges:

- RLPG tanks in service for 40 years.
- **Excessive corrosion** as well as increased weight overt the tanks lifetime which potentially affects the export facilities.
- Degradation of the underlying insulation affecting service continuity.
- Not able to inspect leading to uncertainty.

Solution:

- System remained online during Cryogel® Z online insulation; no impact on both oil production from the North Sea and export of gas.
- Cryogel® Z provided additional Passive Fire Protection (PFP).
- The upgrade to Cryogel® Z allows for easy and repeated inspections and enhanced reliability of the tanks.

LNG Receiving Terminal, China



Challenges:

- LNG terminal in service for 3 years with **systemic failures of foam insulation**.
- Infrequent shutdowns means **critical downtime** for LNG facility.
- Replacing back with foam insulation requires shutdown for installation work and longer downtime (for drying of sealant).

Solution:

- Cryogel® Z was installed live, enabling on-line strip-and-replace (except for traditional vapor stop).
- Super quick installation combined with redundant vapor barriers minimize vapor ingress/icing during live installation.
- Cryogel® Z is insensitive to freeze-thaw mechanics, or surface moisture / frost.

Petrochemical Plant, Saudi Arabia



U10 Cold Insulation List Survey											
U10 Category	Area	PID	Insulation	Process No.	Temp	Service	PSD	Facility	ES&H	U10/PSD	Remarks
1	W1	100-01	PSD-01-01	100	10	0	0	100	100	100	100
2	W2	100-02	PSD-02-01	200	15	0	0	100	100	100	100
3	W3	100-03	PSD-03-01	300	20	0	0	100	100	100	100
4	W4	100-04	PSD-04-01	400	25	0	0	100	100	100	100
5	W5	100-05	PSD-05-01	500	30	0	0	100	100	100	100
6	W6	100-06	PSD-06-01	600	35	0	0	100	100	100	100
7	W7	100-07	PSD-07-01	700	40	0	0	100	100	100	100
8	W8	100-08	PSD-08-01	800	45	0	0	100	100	100	100
9	W9	100-09	PSD-09-01	900	50	0	0	100	100	100	100
10	W10	100-10	PSD-10-01	1000	55	0	0	100	100	100	100
11	W11	100-11	PSD-11-01	1100	60	0	0	100	100	100	100
12	W12	100-12	PSD-12-01	1200	65	0	0	100	100	100	100
13	W13	100-13	PSD-13-01	1300	70	0	0	100	100	100	100
14	W14	100-14	PSD-14-01	1400	75	0	0	100	100	100	100
15	W15	100-15	PSD-15-01	1500	80	0	0	100	100	100	100

Challenges:

- The incumbent PIR was severely deteriorated, high water content as well as **ice formation**.
- This caused **integrity issues** and **high CUI rates**.
- Shutdown was approaching and time schedule was critical.

Solution:

- Technical and workshop training was provided to the contractor and client.
- Cryogel® Z was installed prior to the Turnaround window thus providing more flexibility for other critical activities.

LNG Terminal, Southeast China



Challenges:

- The incumbent PIR was degraded and allowed **water ingress**.
- Corrosion rates exceptionally high due to **marine environment**.
- Unforeseen shutdowns.

Solution:

- Cryogel® Z was installed online enabling continuous operation for the plant.
- Extreme CUI mitigation measures compared to the incumbent PIR.

Cryogenic Live Installation References

Year	Project
2009	Egyptian LNG: VJ pipe repair
2010	Yemen LNG: Valves and flanges
2017	Queensland-Curtis LNG: Strainers
2017	LNG Terminal in China - Piping
2017	Wheatstone LNG: Valves and flanges
2018	Ichthys LNG: Valves and flanges
2018	Cove Point LNG: Strainers
2019	Petrochemical Plant in KSA - Cold Lines
2020	Egyptian Natural Gas - 8" Valves and Elbows
2022	Refinery in Norway - Propane System
2023	UK Major gas processing site Propane System

Not All Aerogels Are The Same.....

Avoid Falling For The Trap of
False Equivalence!!



Our Experience When Customers Compare Aerogel Insulation

Expect More

- ASTM C1728 sets a good basic expectation for aerogel blanket performance, but not all products that meet ASTM perform the same.
- Customers expect aerogel material to perform longer and better.
- Aspen Aerogels tests its products beyond basic expectations.

Stand The Test of Time

- The truest tests happen outside of the lab, in real-world applications on your facilities, and over a long period of time.
- Aspen Aerogels has customer assets that are protected for 22 years and counting.
- Cryogel[®] Z has a comprehensive and proven track record of online insulation successes.

Trust Your Peers

- IOCs and NOCs worldwide have performed their own independent tests and chosen to use Pyrogel[®] and Cryogel[®].
- Aspen Aerogels has the most convincing install-base for aerogel insulation, with real-world success stories across oil and gas segments. Just ask our customers.

22 years of proven high-performance insulation.
Protect your assets and accept nothing but the best.

Cryogel[®]
Z

Pyrogel[®]



Q&A

*Scan for feedback.
Ask us about your challenges.*





JUBCOR

2024

CONFERENCE & EXHIBITION

INNOVATIVE SOLUTIONS FOR CORROSION CHALLENGES

aspen|aerogels®

*Scan for feedback.
Ask us about your challenges.*

THANK YOU

Reach out.



phone



email

