AVEVA PI WORLD

Application of PI System in a rapid growth environment

Cheniere Energy

Presented by: Matthew Henderson, Gene Standley & Edward Rooker

Safe Harbor Statements

Forward-Looking Statements

This presentation contains certain statements that are, or may be deemed to be, "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements, other than statements of historical or present facts or conditions, included or incorporated by reference herein are "forward-looking statements." Included among "forward-looking statements" are, among other things:

- statements regarding the ability of Cheniere Energy Partners, L.P. to pay or increase distributions to its unitholders or Cheniere Energy, Inc. to pay or increase dividends to its shareholders or participate in share or unit buybacks;
- statements regarding Cheniere Energy, Inc.'s or Cheniere Energy Partners, L.P.'s expected receipt of cash distributions from their respective subsidiaries;
- statements that Cheniere Energy Partners, L.P. expects to commence or complete construction of its proposed liquefied natural gas ("LNG") terminals, liquefaction facilities, pipeline facilities or other projects, or any expansions or portions thereof, by certain dates or at all;
- statements that Cheniere Energy, Inc. expects to commence or complete construction of its proposed LNG terminals, liquefaction facilities, pipeline facilities or other projects, or any expansions or portions thereof, by certain dates or at all;
- statements regarding future levels of domestic and international natural gas production, supply or consumption or future levels of LNG imports into or exports from North America and other countries worldwide, or purchases of natural gas, regardless of the source of such information, or the transportation or other infrastructure, or demand for and prices related to natural gas, LNG or other hydrocarbon products;
- statements regarding any financing transactions or arrangements, or ability to enter into such transactions;
- statements relating to Cheniere's capital deployment, including intent, ability, extent, and timing of capital expenditures, debt repayment, dividends, and share repurchases;
- Statements regarding our future sources of liquidity and cash requirements;
- statements relating to the construction of our proposed liquefaction facilities and natural gas liquefaction trains ("Trains") and the construction of our pipelines, including statements concerning the engagement of any engineering, procurement and construction ("EPC") contractor or other contractor and the anticipated terms and provisions of any agreement with any EPC or other contractor, and anticipated costs related thereto;
- statements regarding any agreement to be entered into or performed substantially in the future, including any revenues anticipated to be received and the anticipated timing thereof, and statements regarding the amounts of total LNG regasification, natural gas, liquefaction or storage capacities that are, or may become, subject to contracts;
- statements regarding counterparties to our commercial contracts, construction contracts and other contracts;
- statements regarding our planned development and construction of additional Trains or pipelines, including the financing of such Trains or pipelines;
- statements that our Trains, when completed, will have certain characteristics, including amounts of liquefaction capacities;
- statements regarding our business strategy, our strengths, our business and operation plans or any other plans, forecasts, projections or objectives, including anticipated revenues, capital expenditures, maintenance and operating costs, free cash flow, run rate SG&A estimates, cash flows, EBITDA, Consolidated Adjusted EBITDA, distributable cash flow, distributable cash flow per share and unit, deconsolidated debt outstanding, and deconsolidated contracted EBITDA, any or all of which are subject to change;
- statements regarding projections of revenues, expenses, earnings or losses, working capital or other financial items;
- statements regarding legislative, governmental, regulatory, administrative or other public body actions, approvals, requirements, permits, applications, filings, investigations, proceedings or decisions;
- statements regarding our anticipated LNG and natural gas marketing activities;
- statements regarding the COVID-19 pandemic and its impact on our business and operating results, including any customers not taking delivery of LNG cargoes, the ongoing creditworthiness of our contractual counterparties, any disruptions in our operations or construction of our Trains and the health and safety of our employees, and on our customers, the global economy and the demand for LNG; and
- any other statements that relate to non-historical or future information.

These forward-looking statements are often identified by the use of terms and phrases such as "achieve," "anticipate," "believe," "contemplate," "continue," "could," "develop," "estimate," "example," "expect," "forecast," "goals," "guidance," "intend," "may," "opportunities," "plan," "potential," "predict," "project," "propose," "pursue," "should," "subject to," "strategy," "target," "will," and similar terms and phrases, or by use of future tense. Although we believe that the expectations reflected in these forward-looking statements are reasonable, they do involve assumptions, risks and uncertainties, and these expectations may prove to be incorrect. You should not place undue reliance on these forward-looking statements, which speak only as of the date of this presentation. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of a variety of factors, including those discussed in "Risk Factors" in the Cheniere Energy, Inc. and Cheniere Energy Partners, L.P. Annual Reports on Form 10-K filed with the SEC on February 24, 2022, which are incorporated by reference into this presentation. All forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by these "Risk Factors." These forward-looking statements are made as of the date of this presentation, and other than as required by law, we undertake no obligation to update or revise any forward-looking statement or provide reasons why actual results may differ, whether as a result of new information, future events or otherwise.

Agenda

About Cheniere Energy

Organizational Efficiency & Alignment

Analytics and Monitoring

Industrial Control System Monitoring

Cheniere: Market Leading LNG Platform with Global Scale

#2
SECOND LARGEST LIQUEFACTION PLATFORM GLOBALLY

$75B
ENTERPRISE VALUE

2,300+
CARGOES EXPORTED FROM CHENIERE PROJECTS

>$40B
INVESTMENT IN INFRASTRUCTURE(1)

11%+
OF GLOBAL LIQUEFACTION CAPACITY

37
COUNTRIES & REGIONS DELIVERED TO FROM CHENIERE

#1
LNG PROVIDER TO EUROPE 1H 2022

#233
2022 Fortune 500

Sabine Pass Liquefaction
~30 mtpa Total Production Capacity

Corpus Christi Liquefaction
~25+ mtpa Total Production Capacity(1)

>30 Creditworthy Counterparties Across the Globe

Leading EPC and Infrastructure Providers

(1) Includes 10+ mtpa under construction for CCL Stage 3.

Cheniere's Pathway with PI System

- PI AF Databases/Applications: 13
- Elements (Assets): ~6,000
- Analysis Templates: 2,800
  - Analyses: ~24,000 (9x)
- Notification Rule Templates: ~2,300
  - Notification Rules: ~15,000 (7x)
- Event Frames: ~25,000

PI AF

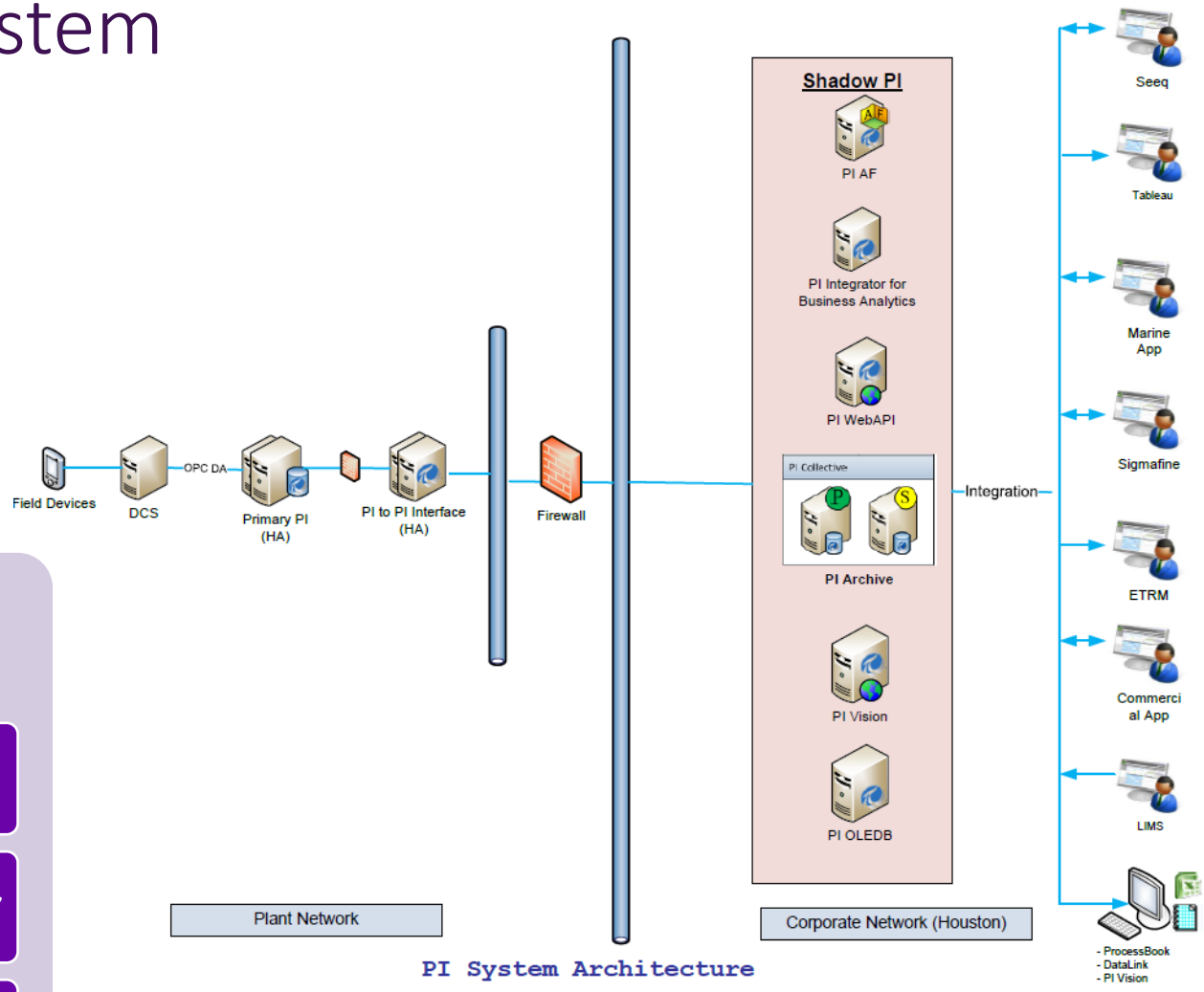
- Business System Communication
- Repeatable Calculations & Tools

PI Vision

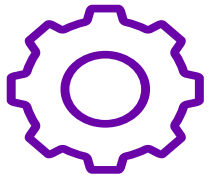
- Dashboards
- Analytics, Monitoring, Troubleshooting
- PI Event Frames

Seeq

- Reports
- Analytics, Monitoring, Troubleshooting
- System Health & Monitoring



Application of the AVEVA PI System in a rapid growth environment



Challenge

- From March 2016 to March 2022, Cheniere received 9 x 5mtpa LNG Trains and associated facilities, .
- Rapid growth in operations, maintenance, support & contractor teams.
- LNG was a new industry to the lower 48 states
- Manage early operational challenges while realizing upside production volumes.

Solution

- PI AF & PI Vision streaming calculations and events provide a foundation to easily replicate assets and tools.
- Proactive training and support to help build value adding tools.
- Emphasis on users developing and using templates to achieve organizational goals.
- PI Vision communicates real time operating status, providing a platform to drive understanding and alignment through all teams in the organization.

Benefits

- Consistent & transparent understanding of operations & challenges through the business.
- Efficient information transfer to business systems.
- Improved production & business outcomes.
- Achieved economies of scale quickly and efficiently.

CHENIERE

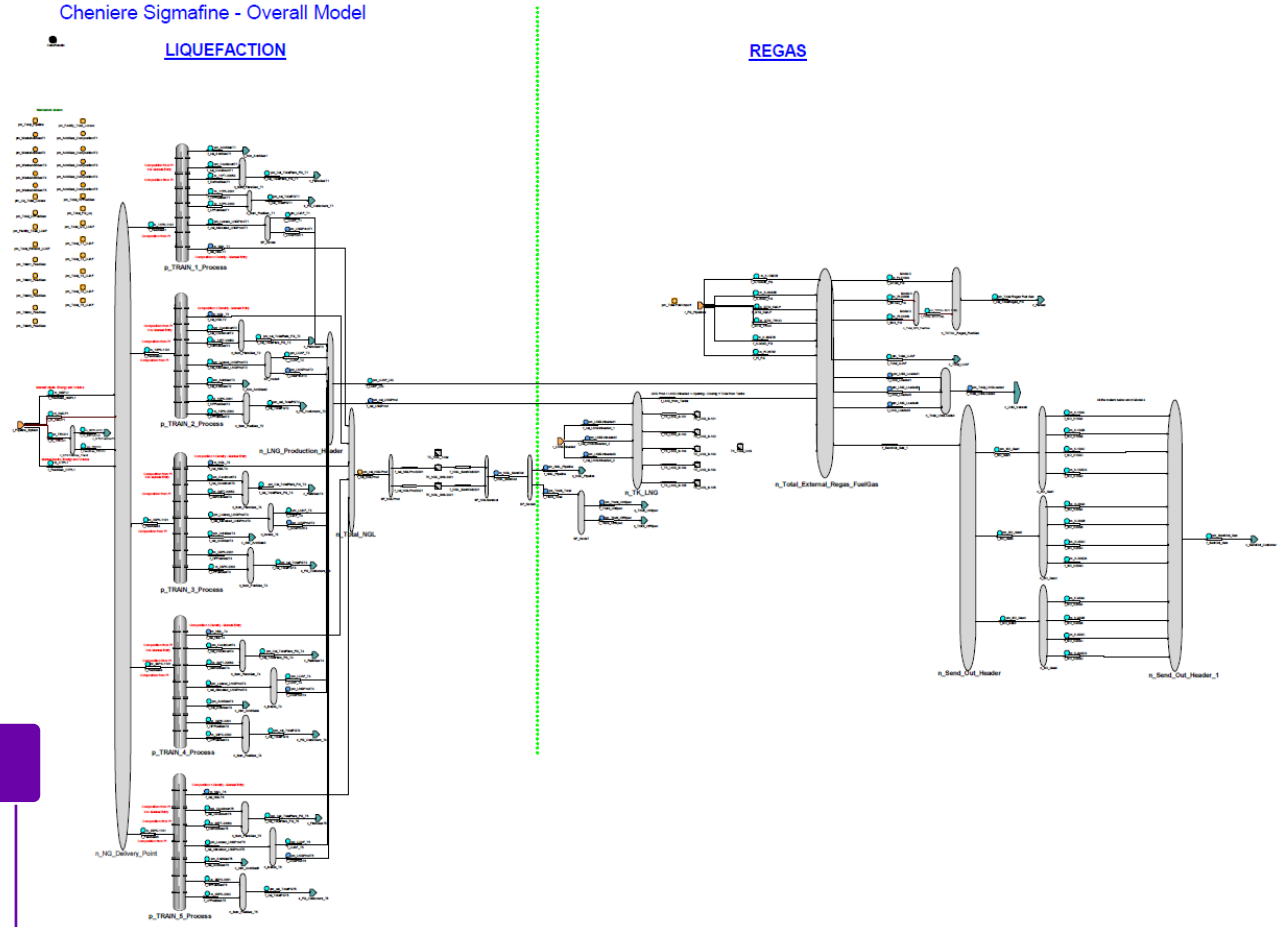
Organizational Efficiency & Alignment

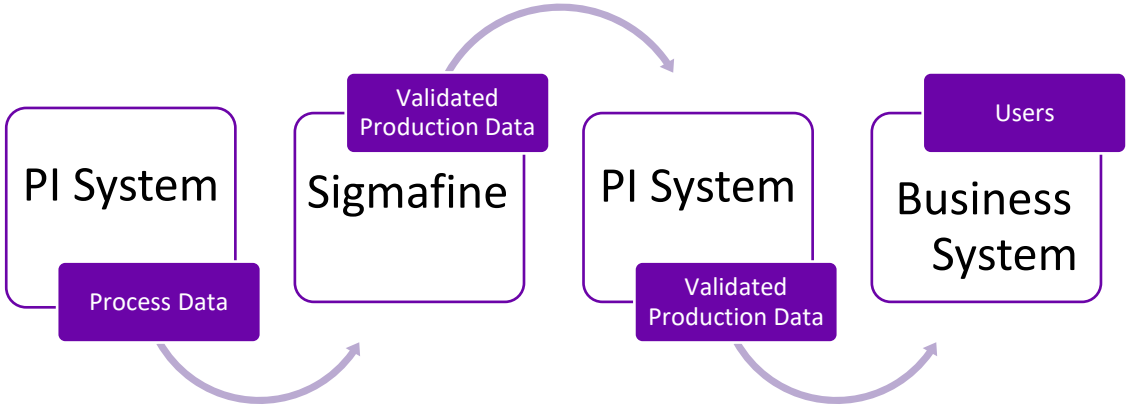
Matthew Henderson

AVEVA

Production Reporting using PI System & Sigmafine

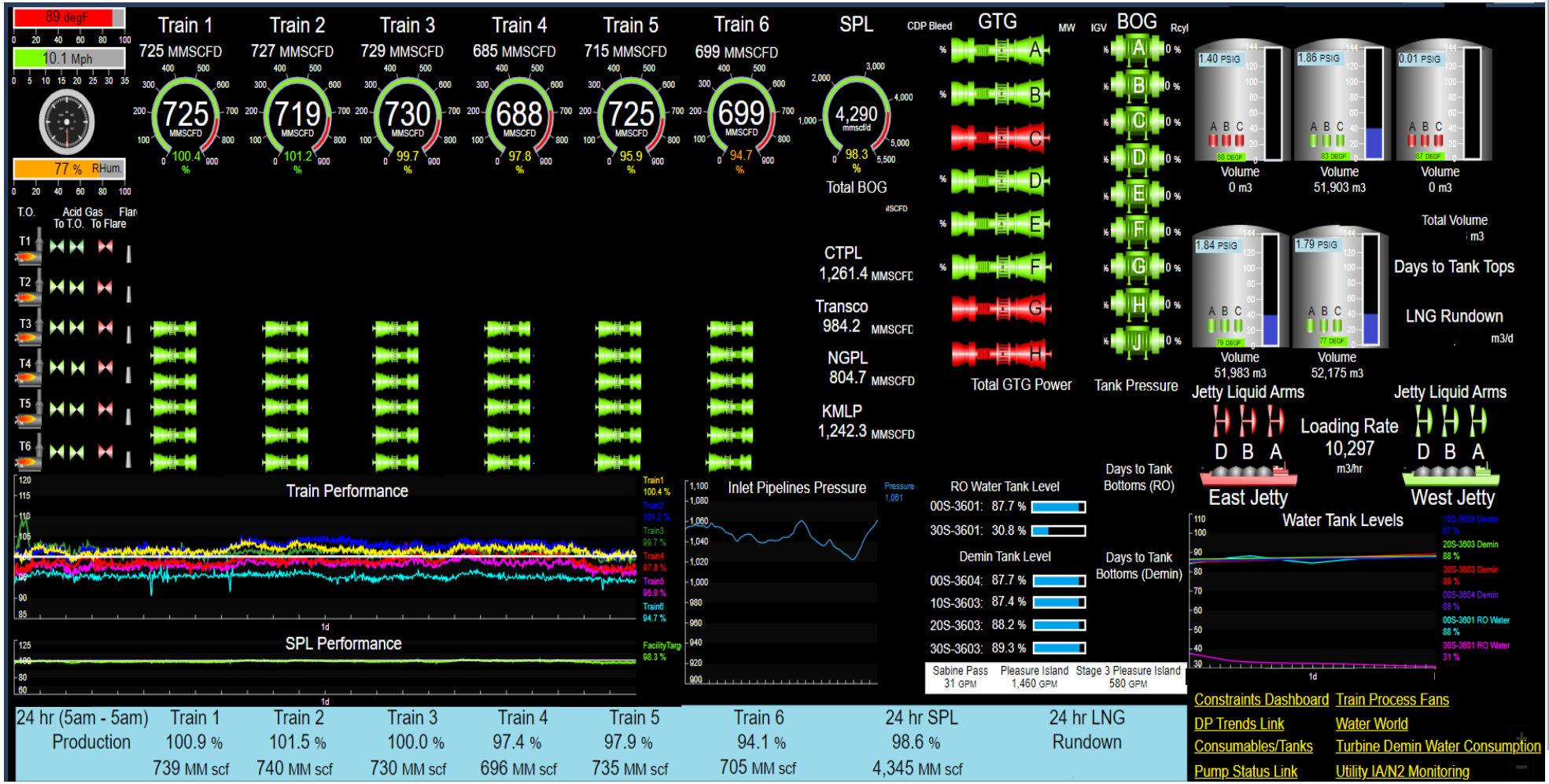
- Cheniere utilizes Sigmafine to perform energy balances and publishes validated production data to PI System which is extracted by other business systems.
- Single model encompasses entire facility.

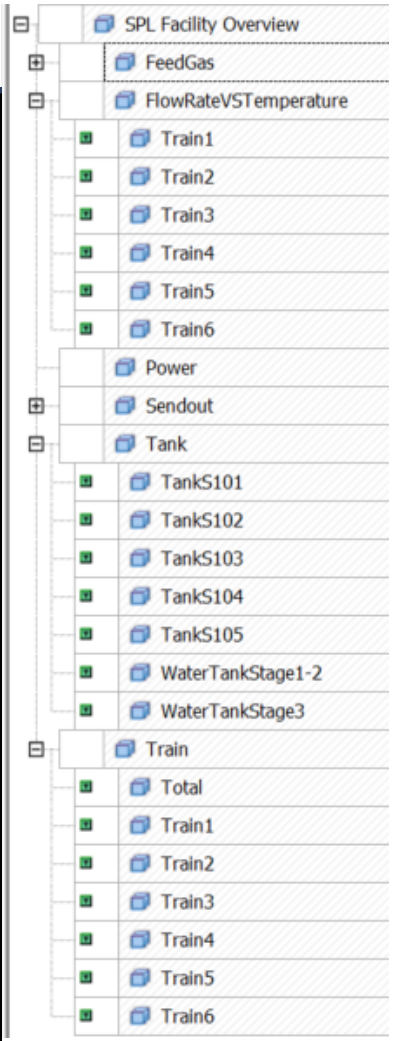




Dashboards

- High value PI Vision displays; Simple to expand new assets; Used by all areas of the business



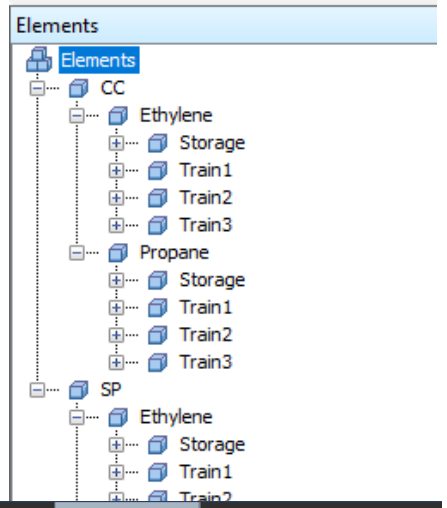


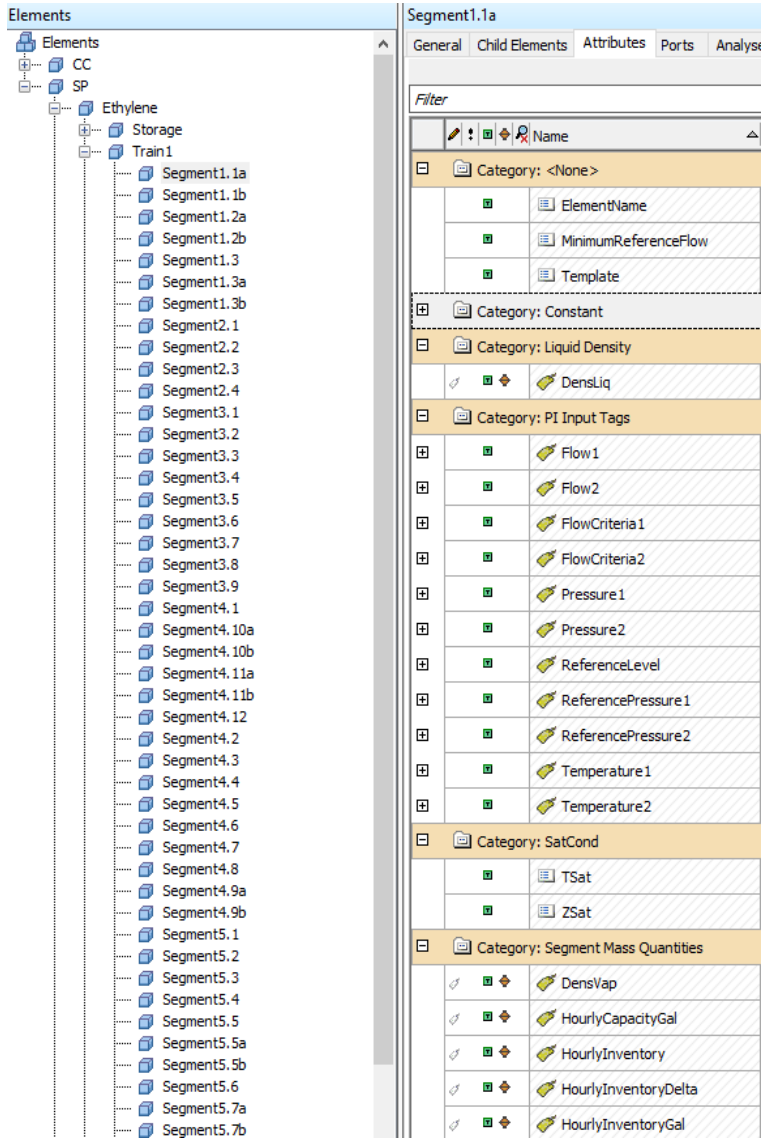
Production Optimization

- Alignment & communication of complex concepts across broad teams is critical.

Refrigerant Inventory Management

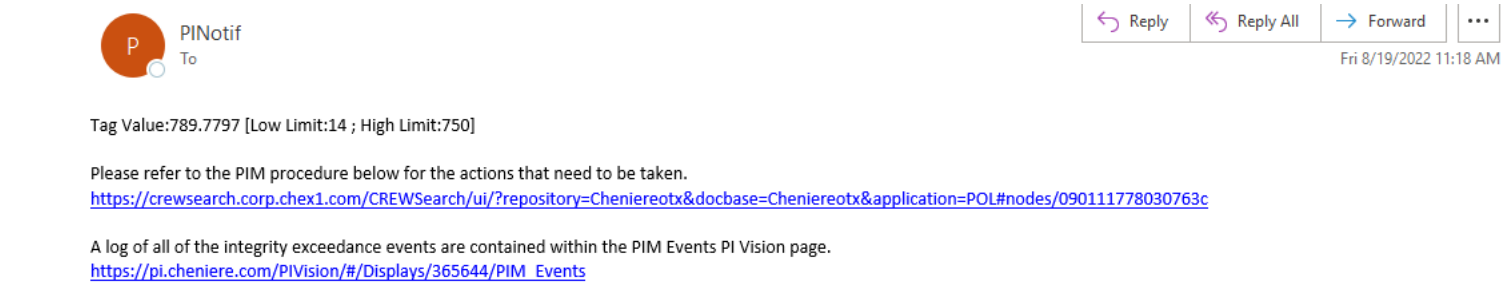
- ConocoPhillips Optimized Cascade Process features closed loop Propane and Ethylene Refrigerants that are typically sourced outside the facility.
- Critical to have enough to operate but enough space to de-inventory trains for maintenance events.
- Traditionally done within MS Excel spreadsheets
- PI AF & PI Vision offers significant benefits





Process Integrity Envelope Monitoring with PI Event Frames

- Additional layer above alarm and safety systems.
- PI Event Frames (Notifications) are easily adaptable and updatable
- Integrity Monitoring – initiates investigations into integrity envelope exceedances
    - Drives PSV testing or fit for service evaluations.
    - Re-rating equipment design conditions where appropriate.
    - Investigating special operations or gaps that allowed the excursion.
    - Utilizes PI Vision Dashboard to Acknowledge events and provide details on cause.



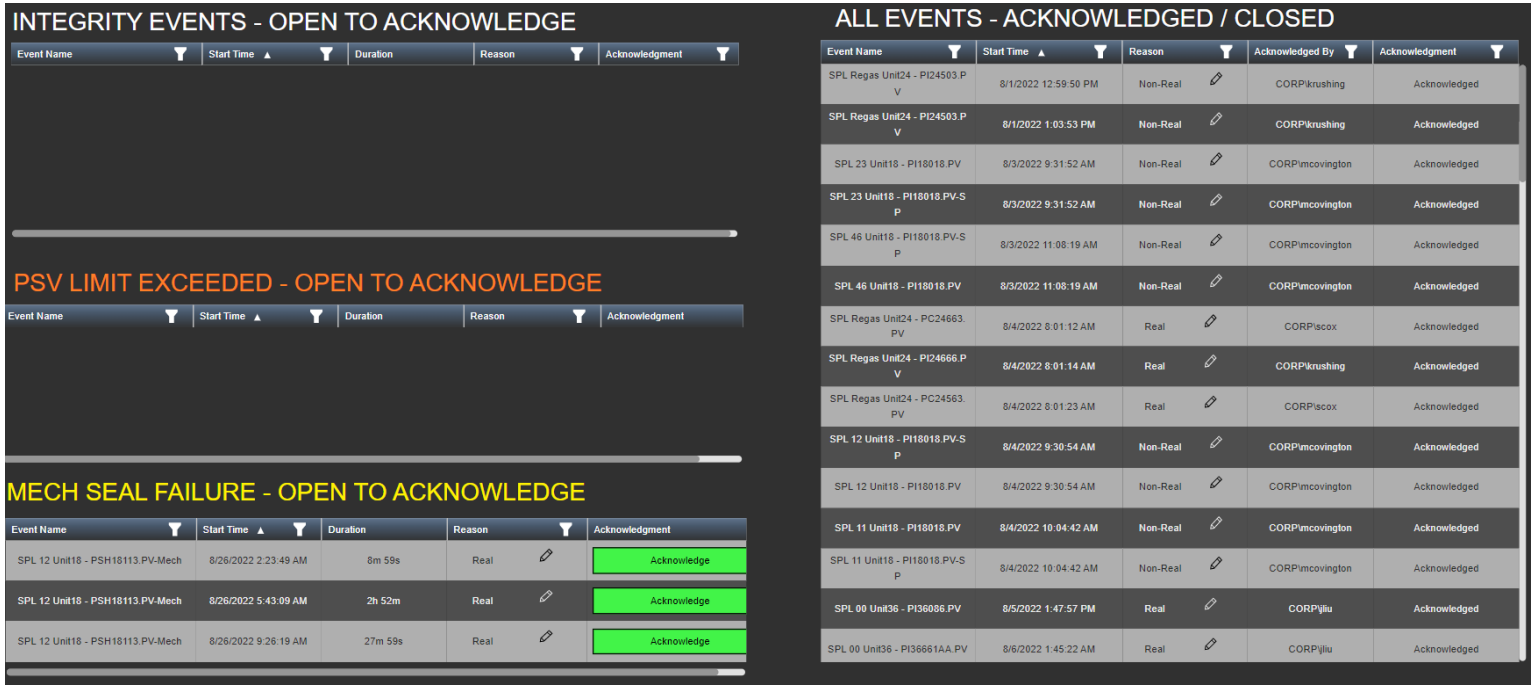
PINotif
To

Reply | Reply All | Forward | ...
Fri 8/19/2022 11:18 AM

Tag Value:789.7797 [Low Limit:14 ; High Limit:750]

Please refer to the PIM procedure below for the actions that need to be taken.
https://crewsearch.corp.chex1.com/CREWSearch/ui/?repository=Cheniereotx&docbase=Cheniereotx&application=POL#nodes/090111778030763c

A log of all of the integrity exceedance events are contained within the PIM Events PI Vision page.
https://pi.cheniere.com/PIVision/#/Displays/365644/PIM_Events



CHENIERE

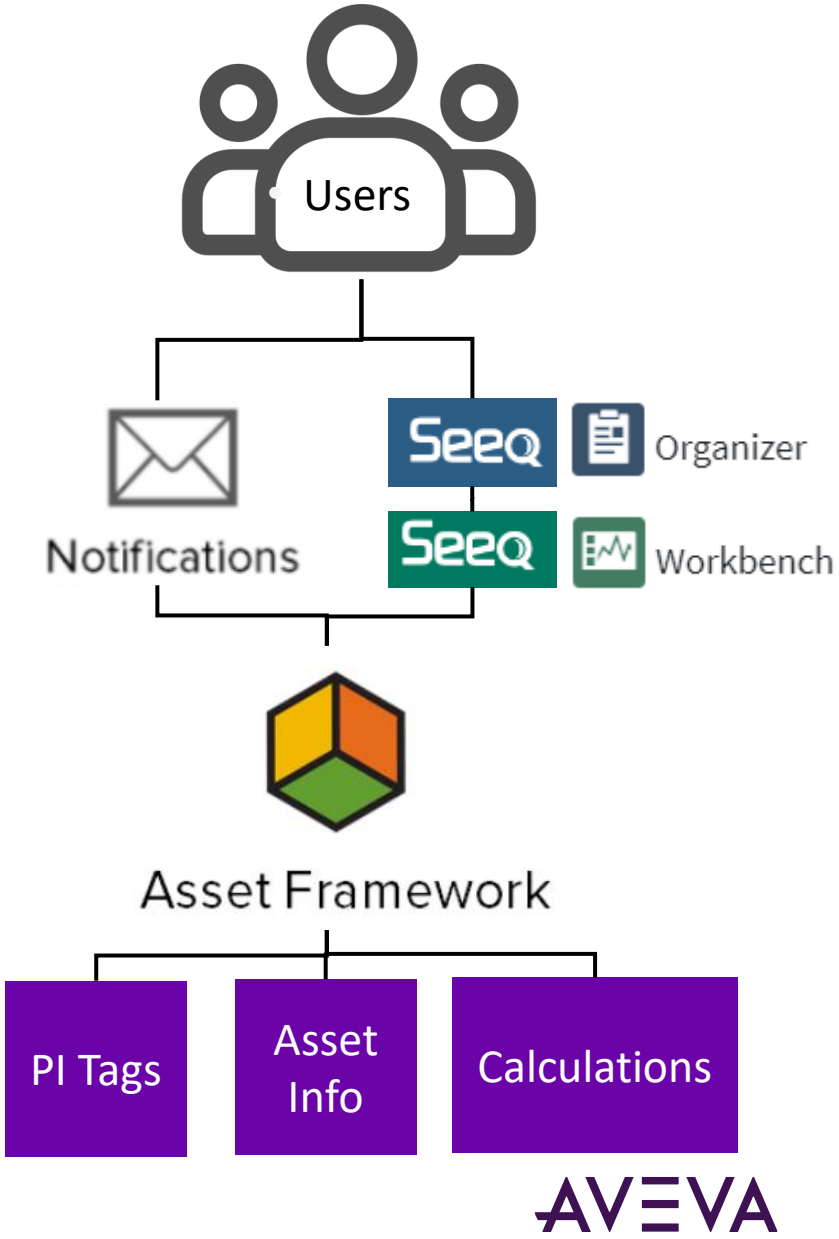
Analytics and Monitoring

Gene Standley

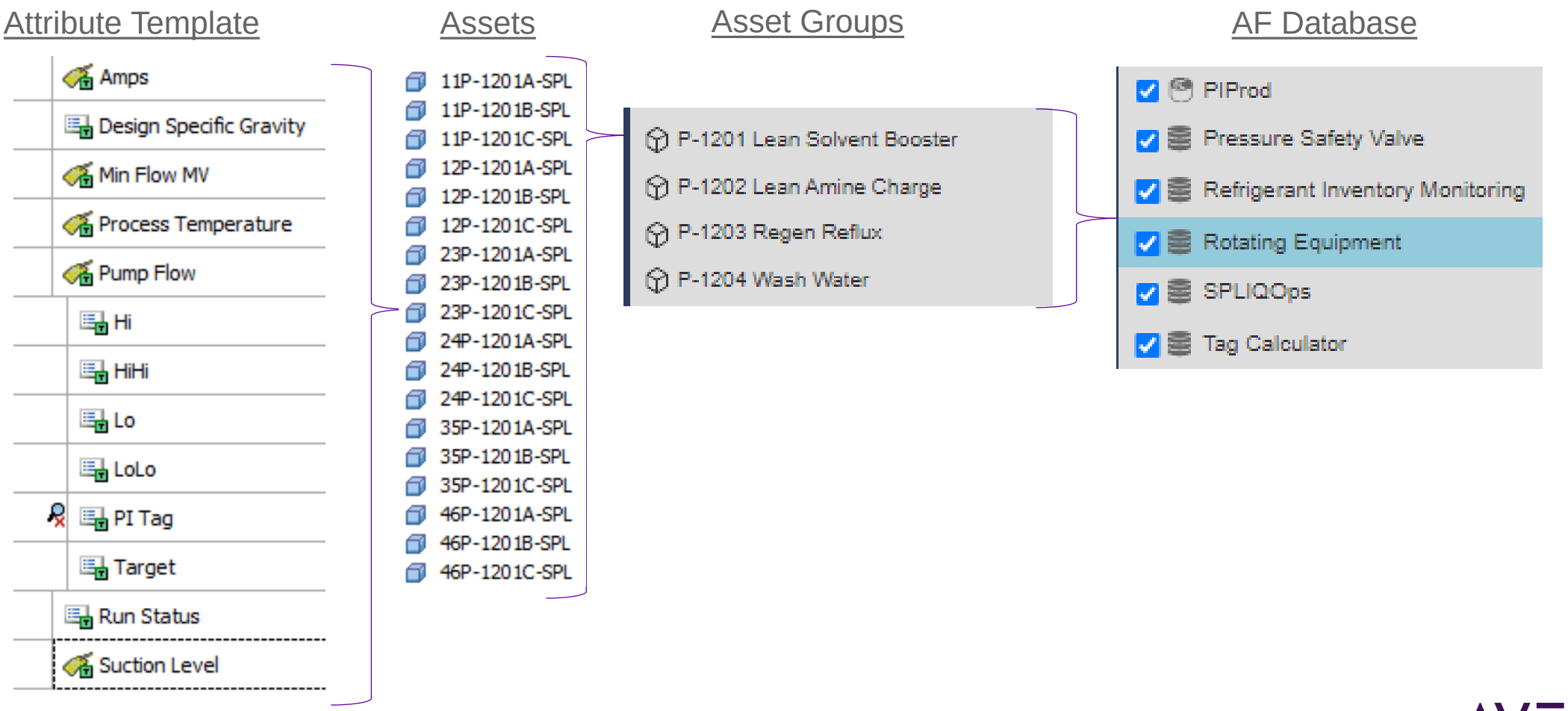
AVEVA

SPL Monitoring with PI AF and Seeq

- **Challenge**
  - Monitor thousands of assets through existing instrumentation. Find a way to make it practical and maintainable.
- **Solution**
  - Implemented PI Asset Framework database for Rotating Equipment Assets
    - Use templates to standardize monitoring across assets
    - Share calculations and improvements across many assets at once
    - Use attributes to provide ready access to signals and calculations
    - Setup PI notifications to advise on important events like mechanical alarms and trips
  - Setup Proactive Monitoring in Seeq
    - Seeq Workbench enables development of more advanced analysis and metrics
    - Seeq Organizer tropics allow trends, metrics, and other asset information to be view concurrently
- **Result**
  - A powerful and manageable solution for proactive asset monitoring



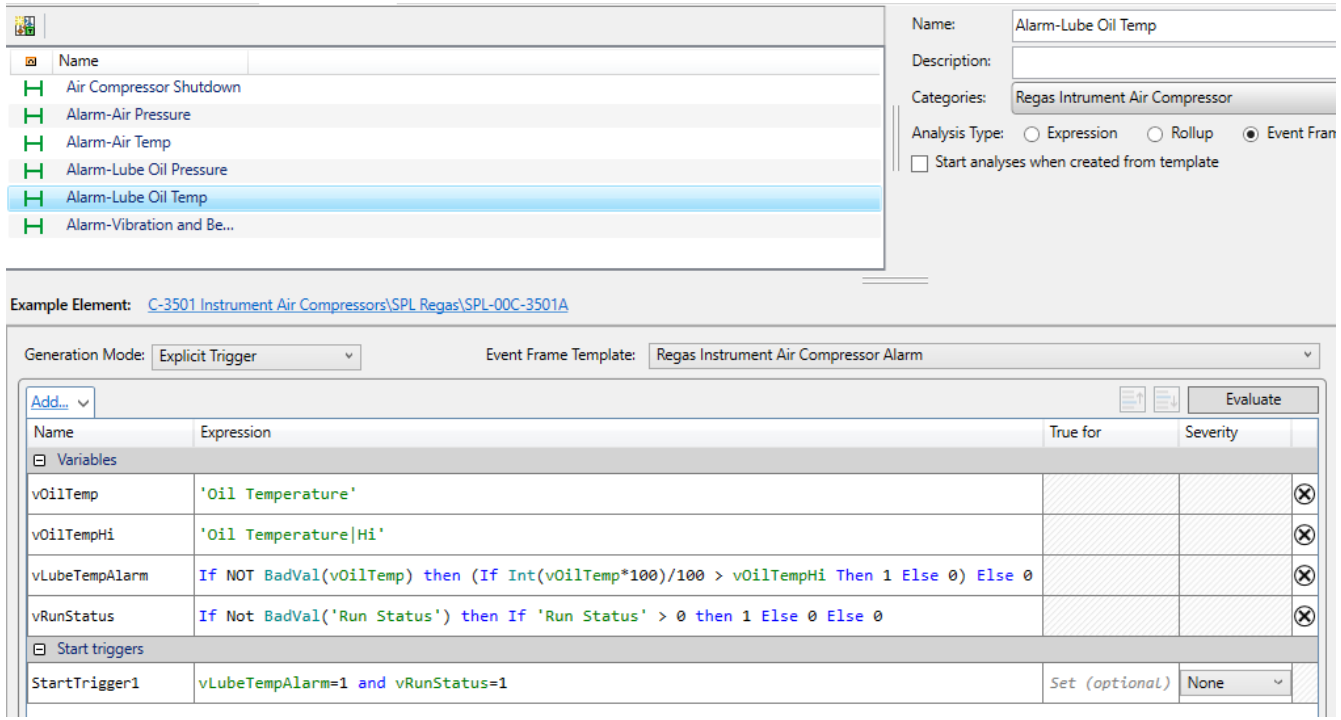
PI Asset Framework for Rotating Equipment



PI Notifications For Compressor Alarms

- Some compressors can run for years at a time before issues arise and others need regular attention
- PI Analysis Templates and PI Notification allow problems to be detected in both cases
- Cheniere uses PI notifications extensively to aid awareness and early troubleshooting

Instrument Air Compressor Analysis Templates



Alarm Email Notification

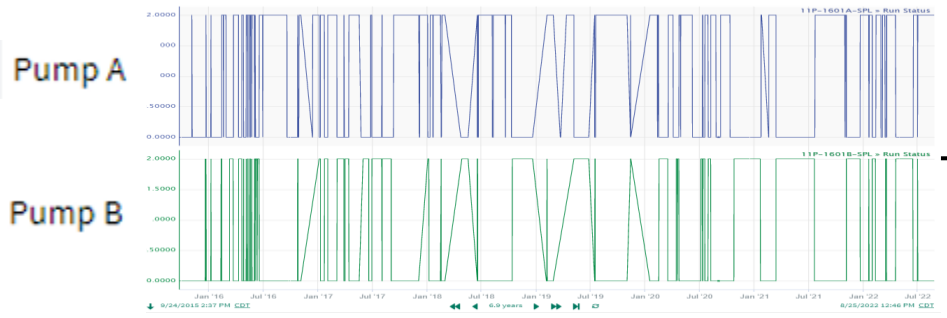
SPL-00C-3501A **Air Pressure Alarms**			
Tag Description	**Tag Number**	**Tag Value**	**Alarm Threshold**
Inlet Air Filter Differential Pressure	00PDI35100A.PV	0.00	
Intercooler Pressure	00PI35103A.PV	30.01	> 90
SPL-00C-3501A **Vibration and Bearing Temperatures**			
Tag Description	**Tag Number**	**Tag Value**	**Alarm Threshold**
Temperature Motor Drive End	00TI35144A.PV	200.70	> 200
Temperature Motor Non-Drive End	00TI35145A.PV	170.70	> 200
Vibration Gearbox A	00VI35142A.PV	41.00	> 80
Vibration Gearbox B	00VI35143A.PV	48.00	> 80
Vibration Motor Drive End A	00VI35130A.PV	38.99	> 80
Vibration Motor Drive End B	00VI35131A.PV	44.00	> 80
Vibration Motor Non-Drive End A	00VI35132A.PV	15.00	> 80
Vibration Motor Non-Drive End B	00VI35133A.PV	28.01	> 80
Vibration Stage 1 Drive End A	00VI35134A.PV	47.00	> 80
Vibration Stage 1 Drive End B	00VI35135A.PV	52.00	> 80
Vibration Stage 1 Non-Drive End A	00VI35136A.PV	0.00	> 80
Vibration Stage 1 Non-Drive End B	00VI35137A.PV	5.00	> 80
Vibration Stage 2 Drive End A	00VI35138A.PV	6.01	> 80
Vibration Stage 2 Drive End B	00VI35139A.PV	12.00	> 80
Vibration Stage 2 Non-Drive End A	00VI35140A.PV	55.00	> 80
Vibration Stage 2 Non-Drive End B	00VI35141A.PV	60.00	> 80

Seeq Metrics for Rotating Equipment

- Seeq Workbench allows engineers to readily build analysis and metrics
- Seeq Organizer Topic provides a platform for presenting and consuming data
- This is a powerful combination for proactive asset monitoring!

Basic Metrics from Run Status

Run Status: Digital On / Off



Seeq

Total Asset Run Hours

Asset	Run Hours
Pump A	35155 h
Pump B	26977 h

Total Asset Startups

Asset	Startup Count
Pump A	71
Pump B	63

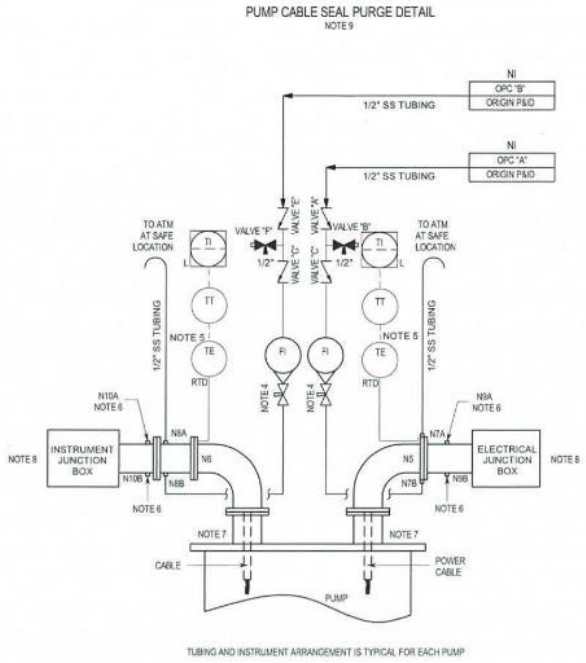
Monthly Runtime

	8/1/2021	9/1/2021	10/1/2021	11/1/2021	12/1/2021	1/1/2022	2/1/2022	3/1/2022
Pump A	100 %	100 %	95.481 %	9.6072 %	37.674 %	86.2 %	58.892 %	69.458 %
Pump B	0 %	0 %	0 %	87.465 %	62.244 %	8.2372 %	30.089 %	8.9259 %

PI Asset Framework & Seeq

Seeq Organizer Topics allow Cheniere a practical way to proactively monitor hundreds of assets.

- Dashboards can be automatically updated on a schedule to ensure ready availability.
- Metrics, Trends, Equipment Information, Pictures, and Notes can be viewed together in one space.
- Baseline items:
  - Metrics
    - Detect gaps in availability of spares
    - Integrity Limits Exceedances (Flow, Temperature, Pressure)
    - Mechanical Seal Alarms
  - Trends
    - Vibration and Bearing Temperatures Trends
    - Pump and Compressor Performance Trends
    - Compressor and critical asset instrumentation health



Electrical RTD Weekly Minimum Temperature

	2/10/2022	2/17/2022	2/24/2022	3/3/2022
S1A Min Temp	26.718 °F	34.105 °F	26.915 °F	40.439 °F
S1B Min Temp	25.727 °F	31.094 °F	24.196 °F	40.285 °F
S3A Min Temp	-46.25 °F	-24.14 °F	1.6461 °F	44.837 °F
S3B Min Temp	-11.20 °F	-16.28 °F	-137.9 °F	-48.67 °F

CHENIERE

Industrial Control System Monitoring

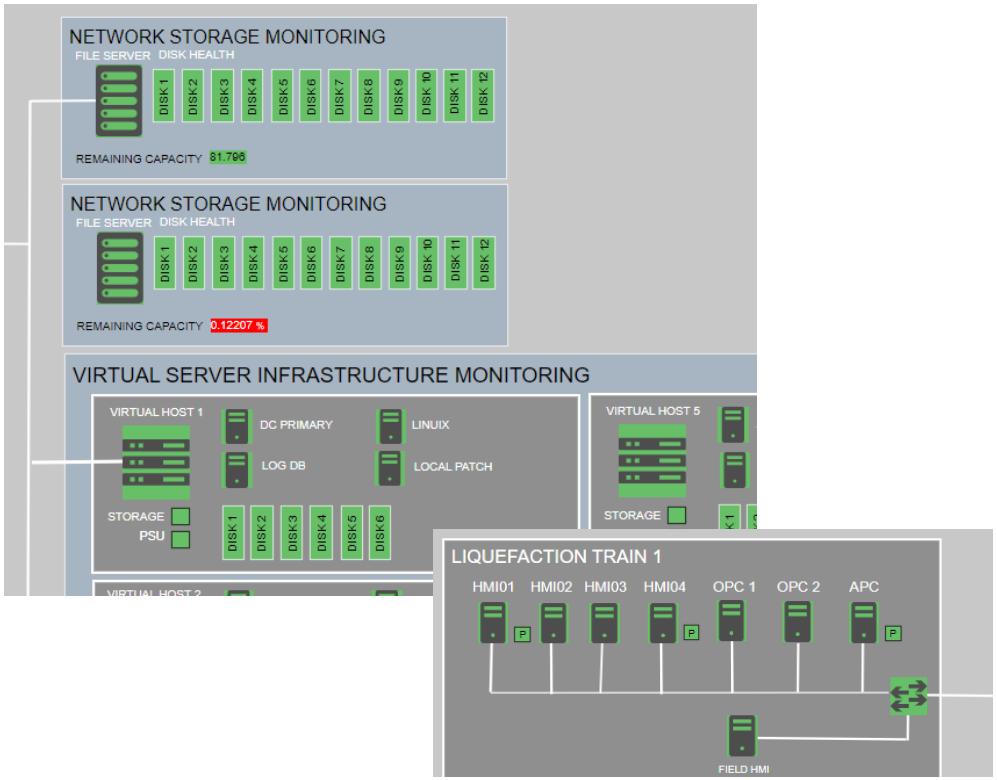
Edward Rooker

AVEVA

Industrial Control System Monitoring

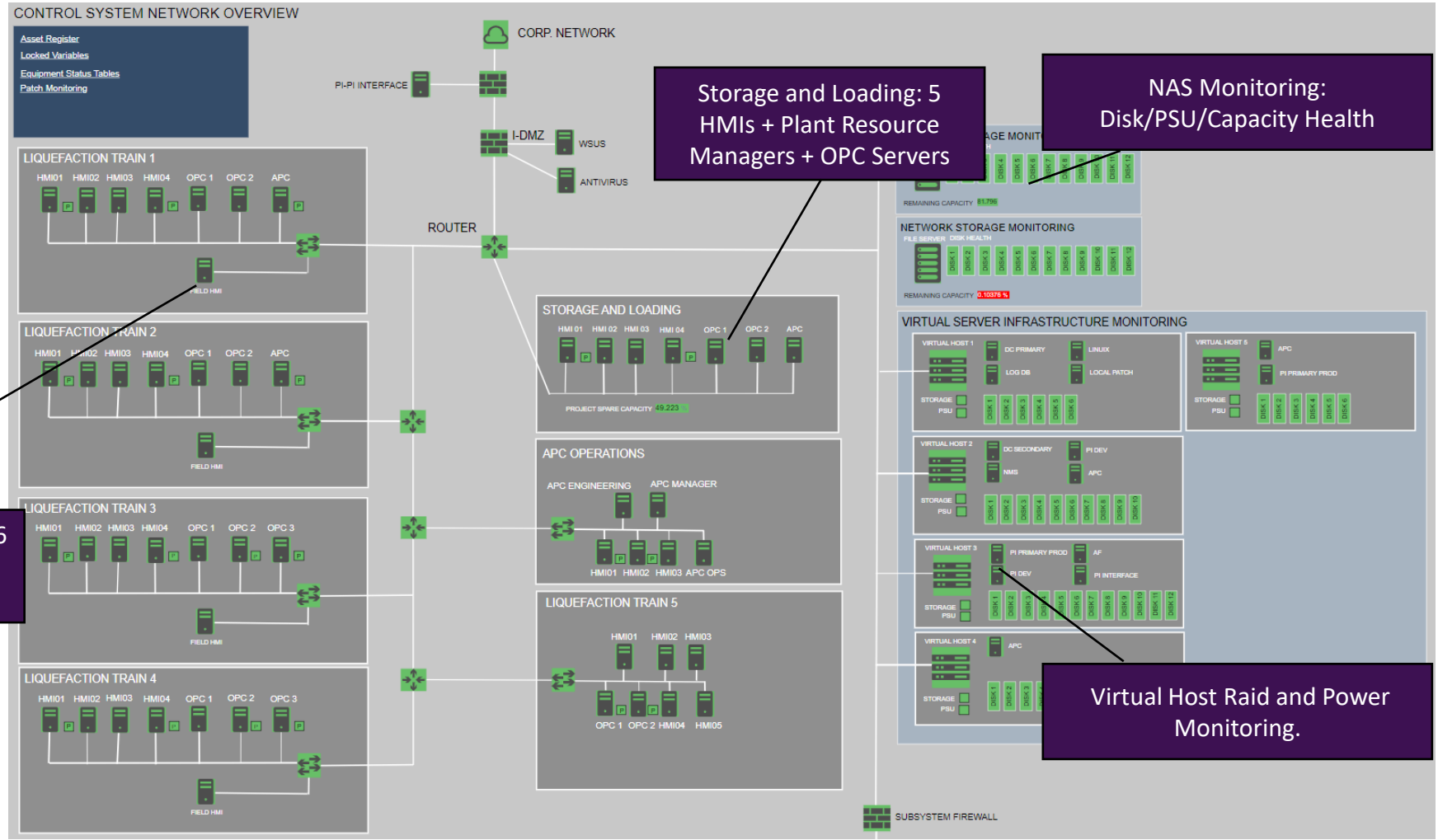
Introduction

- Initiative to provide visibility and observability to the control system
- Goals
  - Address many areas of industrial control system health
    - Network switches, servers, control system modules, and cybersecurity
  - Secure Environment
    - Provide information while maintaining a secure and limited access network
  - Real time
    - Provide continuous monitoring that can be viewed at any time and offsite
  - Single Pane View
    - Provide a single view for all control system equipment to be viewed and monitored
    - Provide mechanisms for monitoring items to be aggregated/rolled up and included in performance metrics



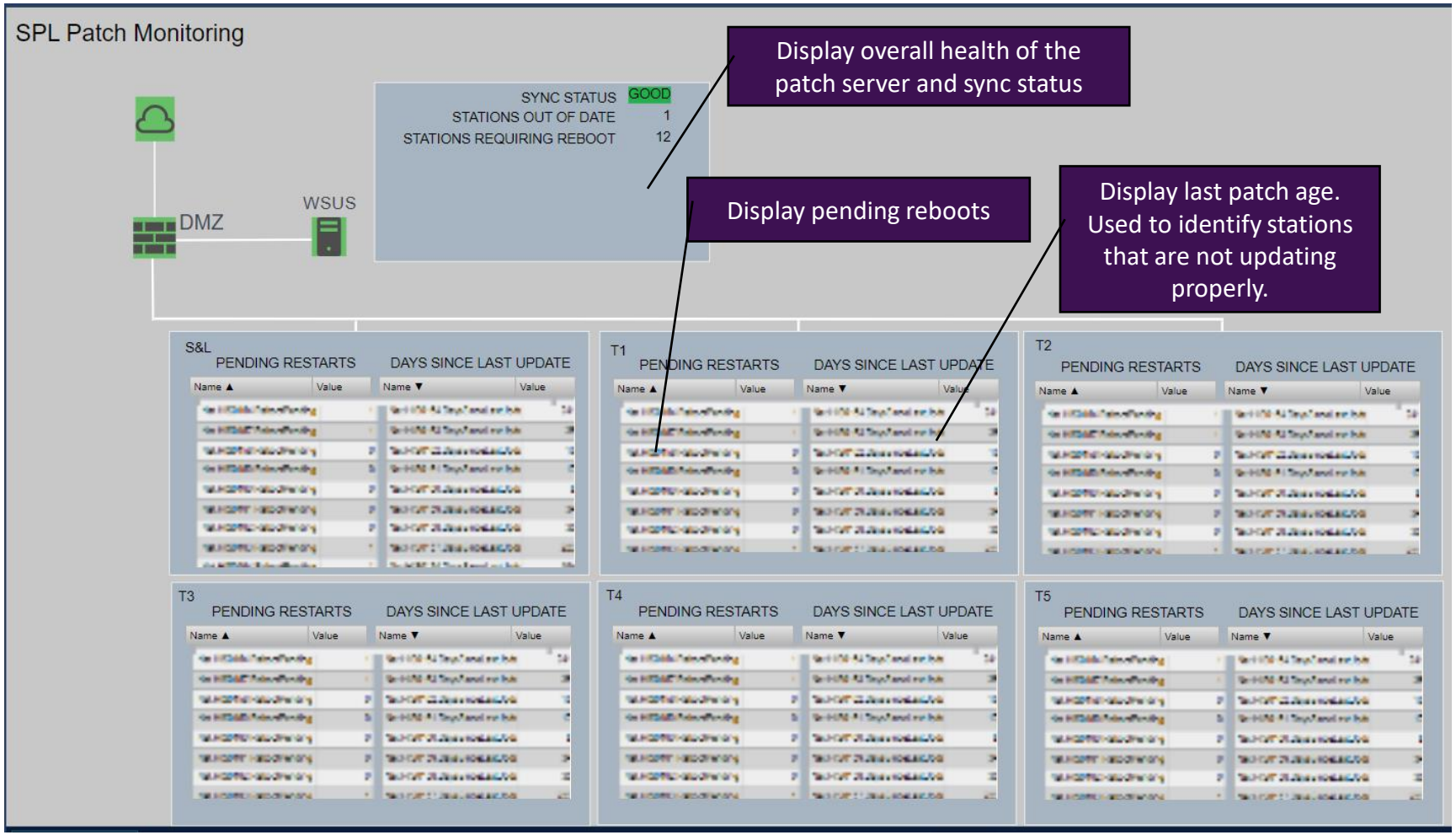
Network Overview

- Yokogawa DCS and SIS
- 6 Trains + Storage & Loading
- Mixed physical workstation and virtual server environment
- Many subsystems per Train



Patch Monitoring

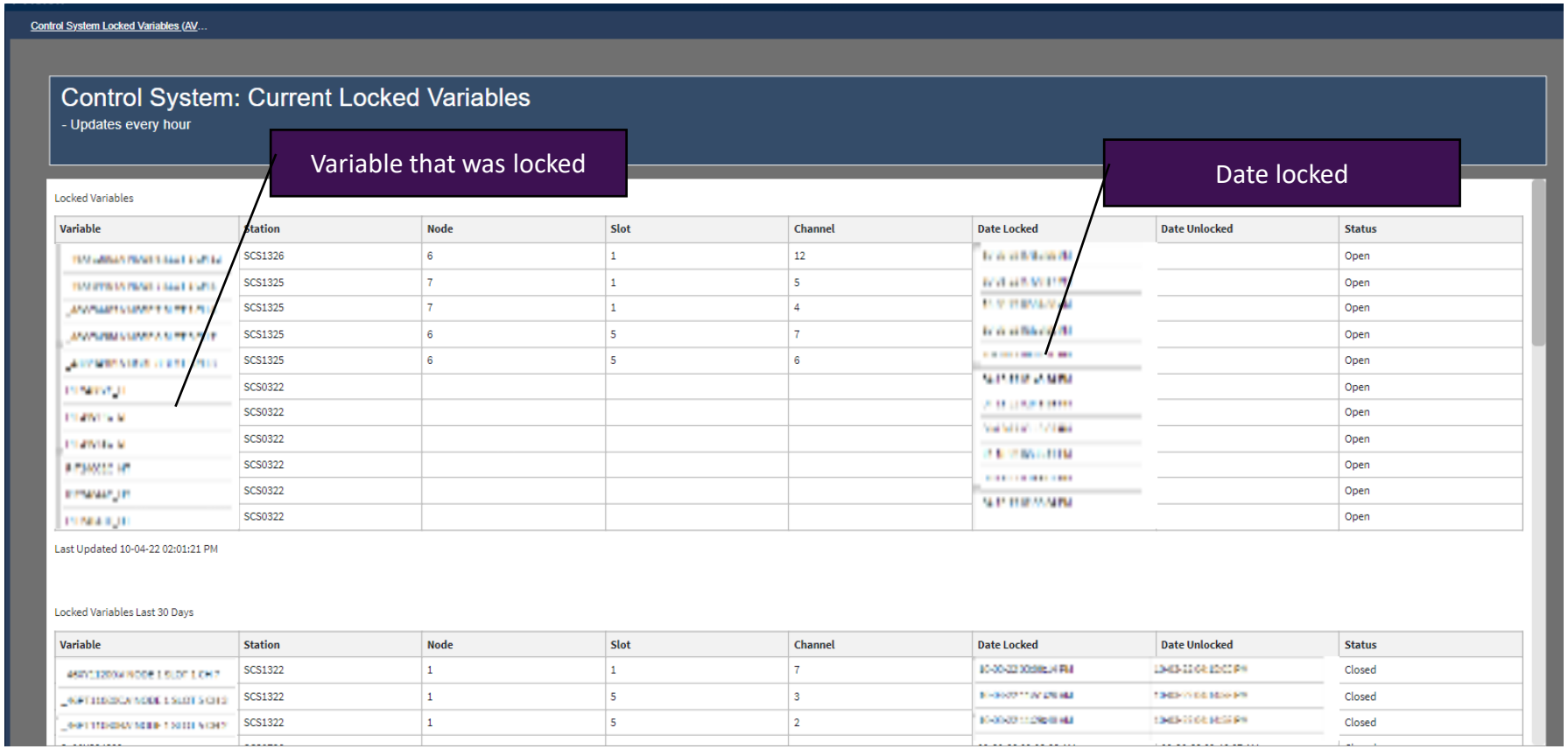
- Monitors all DCS stations for compliance
- Allows offsite users to monitor and plan for remediation or instruct on-site engineers
- Allows a historical account for auditing
- Allows additional analytics and rollups



SIS Bypass Event Tracking

PI Vision screen that tracks and displays current SIS bypass events and historical SIS bypasses.

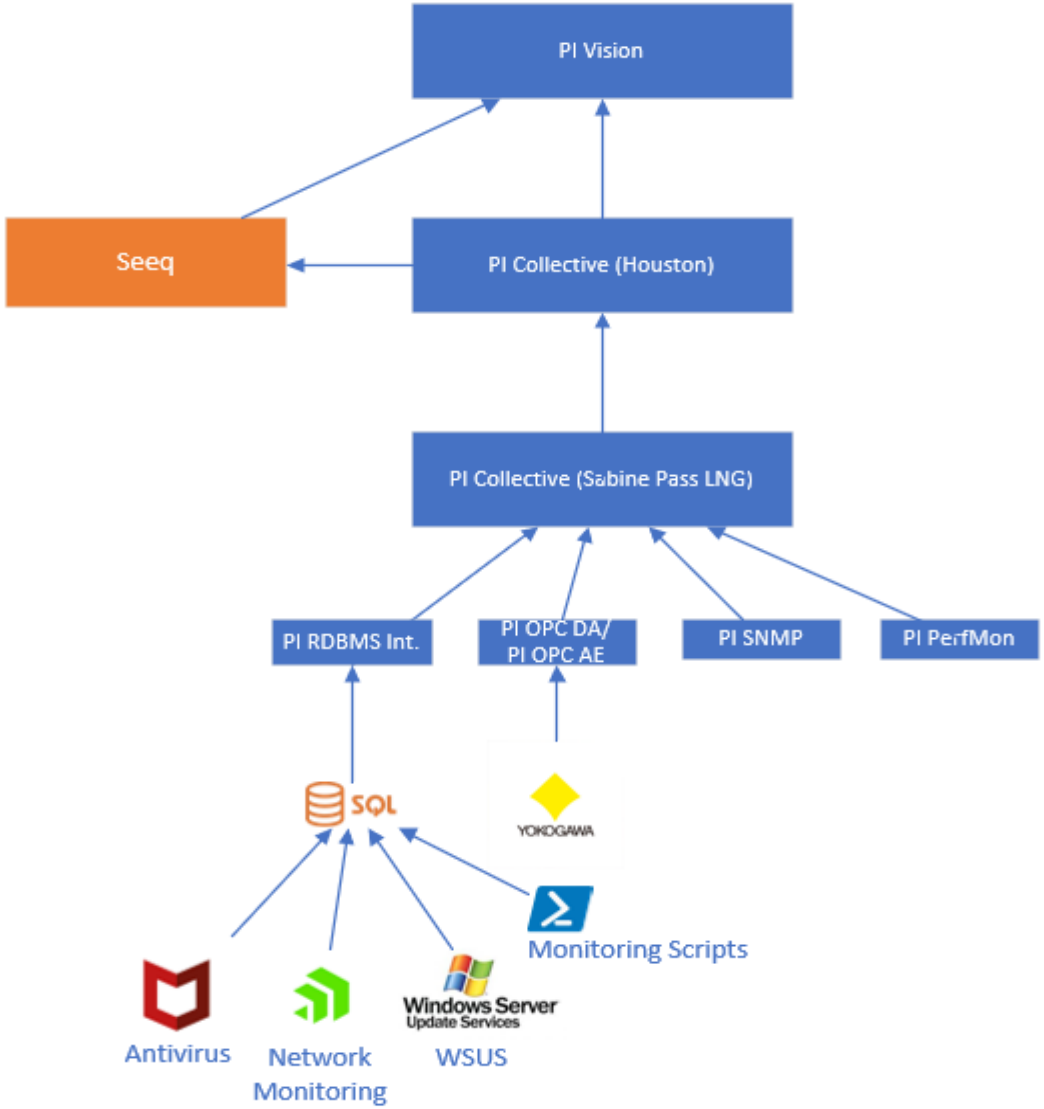
- Utilizes PI OPC Alarm & Event interface
- Uses Seeq Data Lab to process the alarm and event stream to detect and tabulate locked variable events.
- Pushes to a Seeq Organizer Topic
- Organizer topic embedded in a PI Vision display



Industrial Control System Monitoring

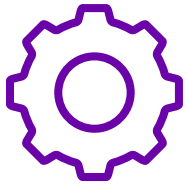
Interfaces Utilized

- PI Ping/SNMP/Perfmon Interfaces
- PI RDBMS Interface
  - Antivirus monitoring
    - Perform roll ups on number of non-reporting stations or out of date signatures
    - Signature sync status
    - Allows AV information to be included in continuous security performance monitoring
  - WSUS
    - Allows engineers to determine which stations are either out of date, need to be restarted, or failing to update.
    - Allows information to be included in continuous security performance monitoring
- PI Alarm & Event Interface
  - System Alarms
    - Uses Seeq to track SIS bypasses and unrecovered system alarms.



Overview, Questions & Answers

CHENIERE



Challenge

- From March 2016 to March 2022, Cheniere received 9 x 5mtpa LNG Trains and associated facilities, .
- Rapid growth in operations, maintenance, support & contractor teams.
- LNG was a new industry to the lower 48 states
- Manage early operational challenges while realizing upside production volumes.

Solution

- PI AF & PI Vision streaming calculations and events provide a foundation to easily replicate assets and tools.
- Proactive training and support to help build value adding tools.
- Emphasis on users developing and using templates to achieve organizational goals.
- PI Vision communicates real time operating status, providing a platform to drive understanding and alignment through all teams in the organization.

Benefits

- Consistent & transparent understanding of operations & challenges through the business.
- Efficient information transfer to business systems.
- Improved production & business outcomes.
- Achieved economies of scale quickly and efficiently.

AVEVA

Matthew Henderson

Lead Production Engineer

- Cheniere Energy – Sabine Pass Terminal
- Matthew.Henderson@cheniere.com

Gene Standley

Senior Rotating Equipment Engineer

- Cheniere Energy – Sabine Pass Terminal
- Gene.Standley@cheniere.com

Edward Rooker

Staff Control Systems Engineer

- Cheniere Energy – Sabine Pass Terminal
- Edward.Rooker@cheniere.com

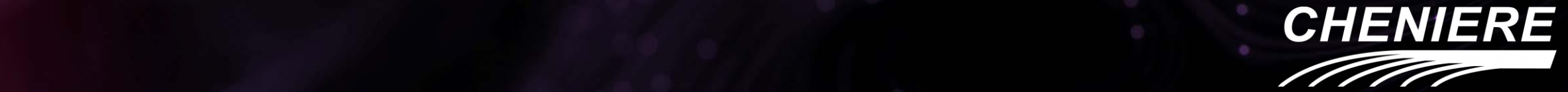
CHENIERE

AVEVA

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

AVEVA



linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com

AVEVA