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Navigating STOs: Achieving Smoother Shutdowns and Turnarounds

Speaker Introduction



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Solutions Engineer Team Lead, Prometheus Group



Agenda

- Prometheus Group Introduction
- What is an STO Event?
- Common Pain Points
- Key Aspects of an STO Event
- Poorly Managed STO Events
- Budget
- Desired End State of an STO Event
- Q&A

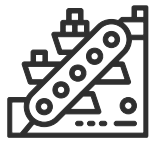
Prometheus Group

- Founded in 1998
- Headquartered in Raleigh, NC, USA
- 8 global offices and 1000+ employees
- Integrated and intuitive software
- Partnerships with industry leading companies



TOP 10

Oil & Gas



TOP 8

Mining & Metals



TOP 8

Pulp & Paper



TOP 8

Utilities



TOP 6

Chemical



TOP 5

Food & Beverage



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WE INTEGRATE WITH

SAP® Certified
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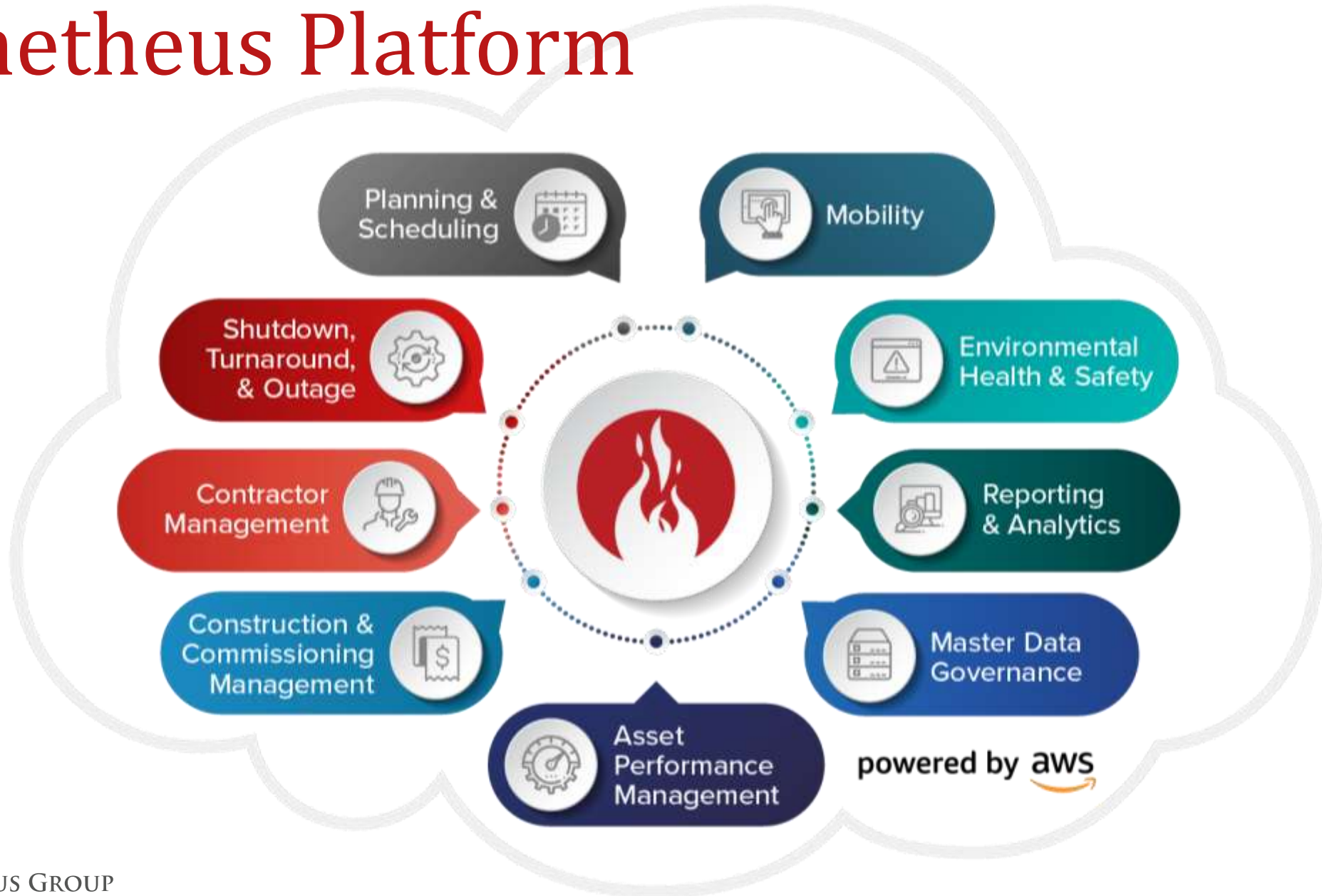
The Prometheus Journey



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Prometheus Platform



What is an STO Event?

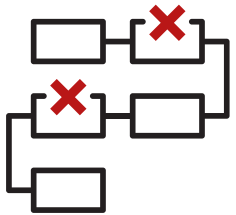
Primary goal of an STO project: **“Carryout work which cannot be done during normal operations or working conditions.”**

STO Projects are Complex



Large Scale

- Lots of moving parts, 1000s of tasks to be completed in days



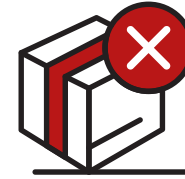
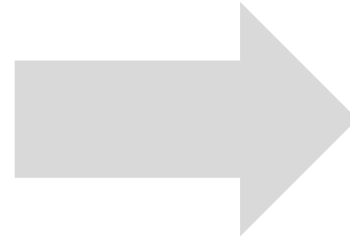
Complex

- Complex scopes
- Multiple dependencies



Constraints

- Time constrained
- Limited resources



Unwanted Delays



Loss of Revenue



Increasing Costs \$\$\$

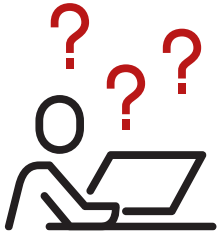


Common Pain Points



Difficult Material Management

- Manual material tracking
- Material data in multiple databases



Reliant on Tribal Knowledge/Undefined Process

- No means of enforcing (existing) structured process
- Transient position with loss of experience



No Integration with EAM/CMMS/ERP

- Data export/excel/middleware
- Data lag



Common Pain Points (Cont'd)



Poor Scope Management

- Fluidity of scope/poor gatekeeping
- Poorly enforced 'Freeze Dates'
- Frequent changes to Work Order (post-freeze)



Lack of Progress Tracking

- Inaccurate/poor progress reporting
- Late reporting
- Reduce time lost (between tasks)



Key Aspects of an STO Event



Scope Management

How is necessary work defined, justified and approved before and during the event?



Work Package Planning

How is work package planning and progress tracking being performed and monitored before execution start?



Material Management

How are materials requested, approved and tracked for your event?



QA/QC Packages

How is handover or QA/QC package generation and sign-off handled during hand off between operations and STO teams?



Inspection Planning & Execution

How are inspections and emergent work managed during an STO event?



Work Execution

How is your STO schedule being updated throughout the event to track completion and react to changes in critical path?



Poorly Managed STO Events



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The STO Situation

- STOs are the most strategic events in the life of a plant
 - Budgets can be 1-5x of annual routine maintenance budgets
- Due to size and scope of projects, Owner/Operators rely on contractors to plan and execute project work
- STO teams often rely on internally developed tools and spreadsheets that are not integrated to their ERP/CMMS to manage their projects

Problem With Poorly Managed STO Events

- Organizations struggle to enforce consistency between STO Events within a plant and across multiple plants
- Turnaround team often operates in an isolated process, disconnected from systems of record and change management processes
- Internally developed systems often rely on institutional knowledge to use and maintain

Budget



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“

“Approximately **half** of all shutdown projects are **delayed** by more than **20%** and **80%** go over budget by more than **10%**.”

-Jerry Wanichko, T.A. Cook Consultants



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Common Practices

- Turnaround Management Organizations often:
 - Leverage multiple systems/solutions
 - Create multiple datasets – lack a single source of truth
 - Isolate turnaround management practices from routine operations

Common Results

- These practices often lead to:
 - Rework or duplicate work
 - Increased efforts to approve scope and gain input
 - Increased efforts to track down critical information
 - Difficulty planning the pre-execution phases without insight into current project status



Communication & Consolidation

- Common Goals of STO Management Software:
 - Establish centralized system for communication and data capture
 - Develop clear processes and enforce them
 - Transition to a clear understanding of the “Plan-of-the-Plan”

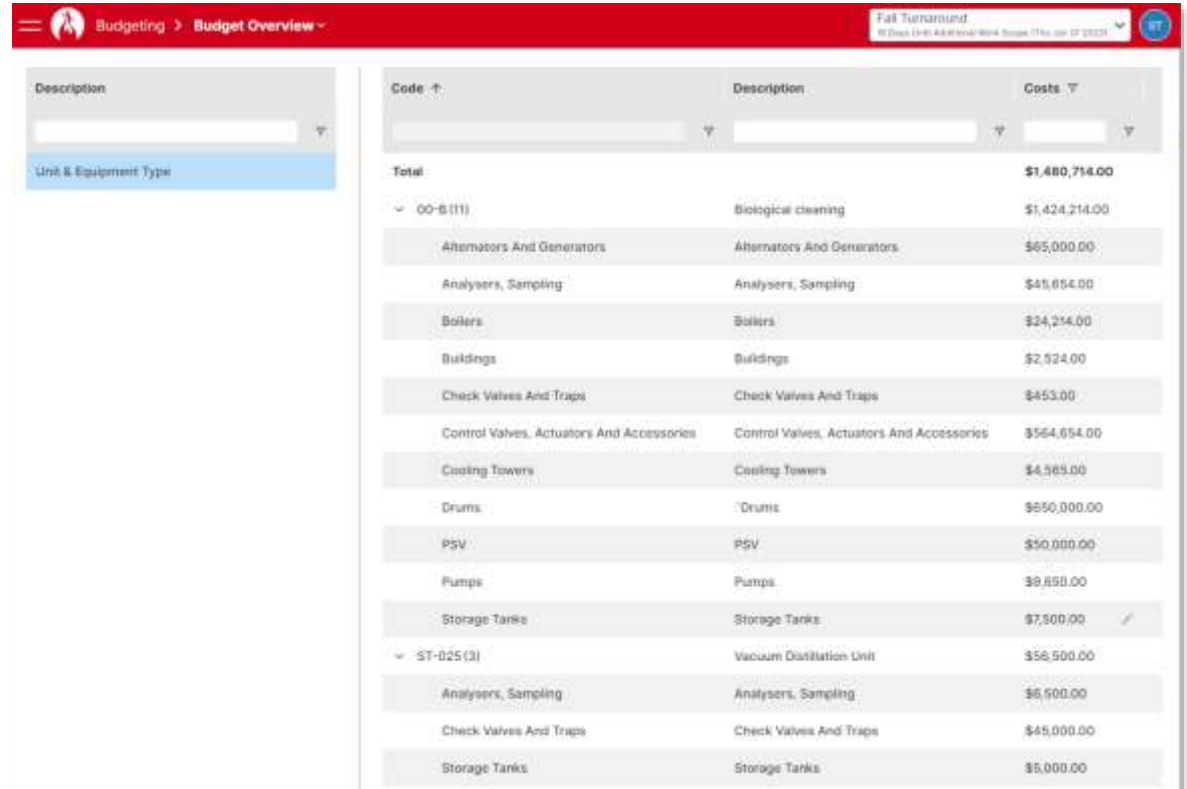
STO Cost Estimation Challenges

- Poor cost estimates can lead to including the wrong work in turnaround scope
- Blended labor rates do not account for costly disciplines
- Evaluating trends and changes can be cumbersome in spreadsheets
- Loading Rates/Contracts into ERP System can be challenging



Level 1 – Event

- Used for the long-term plan
- Comparable to AACE “Class 5 Estimate”
- Bottom-Up Budgeting by editing lowest level WBS
- +/- 50%



The screenshot displays a software interface for budgeting, titled "Budgeting > Budget Overview". The interface includes a search bar for "Unit & Equipment Type" and a table of budget items. The table has three columns: "Code", "Description", and "Costs". The total cost for all items is \$1,480,714.00. The items are categorized into two main groups: "00-B (11)" and "ST-025 (3)".

Code	Description	Costs
Total		\$1,480,714.00
00-B (11)	Biological cleaning	\$1,424,214.00
Alternators And Generators	Alternators And Generators	\$65,000.00
Analysers, Sampling	Analysers, Sampling	\$45,854.00
Boilers	Boilers	\$24,254.00
Buildings	Buildings	\$2,524.00
Check Valves And Traps	Check Valves And Traps	\$453.00
Control Valves, Actuators And Accessories	Control Valves, Actuators And Accessories	\$564,654.00
Cooling Towers	Cooling Towers	\$4,585.00
Drums	Drums	\$950,000.00
PSV	PSV	\$50,000.00
Pumps	Pumps	\$9,850.00
Storage Tanks	Storage Tanks	\$7,500.00
ST-025 (3)	Vacuum Distillation Unit	\$56,500.00
Analysers, Sampling	Analysers, Sampling	\$6,500.00
Check Valves And Traps	Check Valves And Traps	\$45,000.00
Storage Tanks	Storage Tanks	\$5,000.00

Level 2 – Scope

- Comparable to AACE “Class 4 Estimate”
- Event Level Parameters for scoping estimates
 - Direct Labor Rate
 - Indirect Labor Rate
 - Indirect to Direct Labor Ratio
 - Repair Allowance Percentage
 - PRE and POST TAR Factors
 - Operations Factors
 - Rental Equipment / Material Factor
 - Contingency Percentage



Level 3 – Work Package Details

- Comparable to AACE “Class 2-3 Estimates”
- Labor
 - Direct
 - Indirect
- Materials
 - SAP or Free text
- Rental Equipment and Other Fixed Cost



Sequence Number	Activity	Activity ID	Op /
001	Build Scaffold		

Sequence Number	Code	Resource	SAP Sub-Activity	Resource Memo	Circu
001	SCAF	Scaffolder			

> 002	Locate and Tag Work
> 003	Strip Insulation
> 004	Process Isolation & Equipment Prep
> 005	Tagging LOTO Valves & OPE Locations
> 006	Perform JJSV (Process & Mechanical)
> 007	Install Blinds
> 008	Install All Mechanical Isolation Tags (EID-M)
> 009	Set up Rigging
> 010	Open Manways
> 011	Disconnect Instrumentation
> 012	INSPECTION HOLD POINT - XOM Technical Document As-found
> 013	Install Ventilation Facilities

✓ Calculation Updated.

Rows: 67

Estimation: Scaffolder

001 - Build Scaffold

Estimated Hours	+	Calculated Hours	*	Correction Factor	=	Total Hours
(2.00		200.00)		1.00		202.00

Total Hours	*	Rate	*	Correction Factor	=	Total Cost
202.00		40.32		1.00		\$8,145

Number of Workers: 2 | Contractor: | Contract:

Resource Duration: 101.00

Estimate

Hours per Worker: 1.00 | Estimate Memo:

Calculations

Norm Set Type: Scaffold

Calculated Hours	Qua...	Calculation Main Group	Calculation Sub Group	Norm	Memo	Corre Facto
200.00	5000	Conventional	General - Install	Install Independen...		

Level 3 – Work Package Details

- Adding Rental Equipment and cost to resource
- Ability to view Level 3 details – slice & dice

Group	Activity Labor Type	Type	Resource Code	Qu...	Resource Primary Contractor	sum(Cost)	Activity Phase	Activity Expe
Total						\$400,548.90		
Turnaround (489)						\$400,548.90		
Direct Labor (448)						\$280,008.60		
00-B (448)						\$280,008.60		
Pumps (113)						\$119,767.50		
5 (15)						\$7,718.20		
	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P1 - Pre-TA	Turnaroun
	Direct Labor	Labor	OPE-FLD	2	Prometheus Group	\$108.00	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	16	Repcon	\$959.20	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	INS-TECH	6	Brock Industrial Ser...	\$795.60	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	16	Repcon	\$959.20	P2 - Decommissioning	Turnaroun
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	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P2 - Decommissioning	Turnaroun
	Direct Labor	Labor	ME-TECH	8	Repcon	\$479.60	P3 - TA	Turnaroun

Reports



Work Package TW-1250

Work Package Description: Tower TW-1250 Open, Clean, and Inspect

Planner: Stephen Taylor (staylor)

Functional Location: 00-B01

Work Order:

Labor

Activity Description	Phase	Labor Description	Contractor	Qty	Cost
Build Scaffold	P1 - Pre-TA - P2 - Staging	Scaffolder	Prometheus Group	1.00	¥48.85
Locate and Tag Work	P1 - Pre-TA - P2 - Staging	Mechanical Technician	Repcon	4.00	¥239.80
Strip Insulation	P1 - Pre-TA - P2 - Staging	Crane	Ohmstede Industrial Services	2.00	¥700.00
Process Isolation & Equipment Prep	P2 - Decommissioning - P2 - Decommissioning	Operator	Prometheus Group	8.00	¥432.00
Tagging LOTO Valves & OPE Locations	P2 - Decommissioning - P2 - Decommissioning	Operator	Prometheus Group	4.00	¥216.00
Perform JJSV (Process & Mechanical)	P2 - Decommissioning - P2 - Decommissioning	Mechanical Technician	Repcon	4.00	¥239.80
Install All Mechanical Isolation Tags (EID-M)	P2 - Decommissioning - P2 - Decommissioning	Mechanical Technician	Repcon	1.00	¥59.95
Disconnect Instrumentation	P3 - TA - P9 - Open	Electrical Technician	Brock Industrial Services	2.00	¥228.72
Reconnect Instrumentation	P3 - TA - P9 - Open	Electrical Technician	Brock Industrial Services	2.00	¥228.72
Loop Check	P3 - TA - P9 - Open	Electrical Technician	Brock Industrial Services	2.00	¥228.72
Turnover Jobpack	P3 - TA - P9 - Open	Mechanical Technician	Repcon	4.00	¥239.80
Walkdown & Signoff	P3 - TA - P9 - Open	Mechanical Technician	Repcon	4.00	¥239.80
Perform Mini Dryout	P3 - TA - P9 - Open	Operator	Prometheus Group	2.00	¥108.00
Install Blinds	P3 - TA - P9 - Open	Mechanical Technician	Repcon	2.00	¥119.90
INSPECTION HOLD POINT - Final/Closure inspection	P3 - TA - P9 - Open	Inspection QA/QC	Ohmstede Industrial Services	8.00	¥680.00
Allowance - Make Repairs	P3 - TA - P9 - Open	Mechanical Technician	Repcon	8.00	¥479.60
Pull Blinds	P3 - TA - P9 - Open	Mechanical Technician	Repcon	4.00	¥239.80

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Asset Management Strategies

- Establish Shutdown/Turnaround/Outage Preventative Maintenance plans
- Create tangible processes for turnaround-specific work
 - Example: notification or work request priority
- Master Data clean up
 - BOMs
 - Asset Hierarchy
 - Process Evaluation

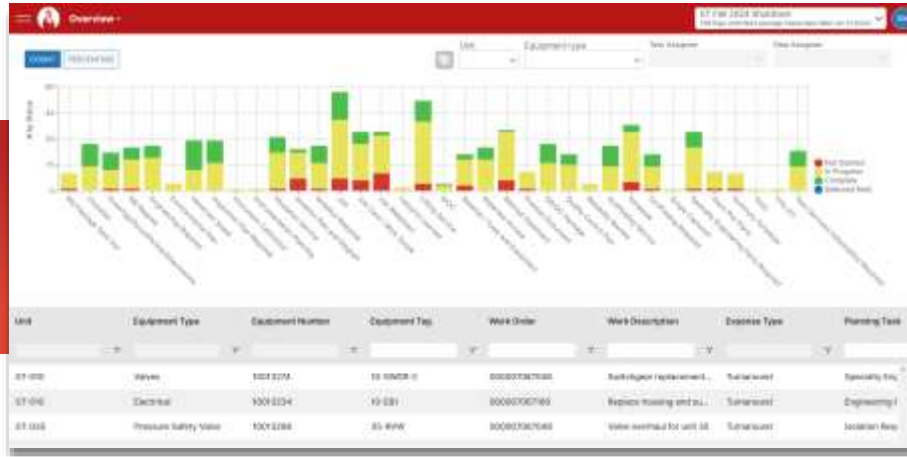


Communication & Consolidation

- Common Goals of STO Management Software:
- Establish centralized system for communication and data capture
- Develop clear processes and enforce them
- Transition and visibility of a clear understanding of the “Plan-of-the-Plan”
- End to end approach

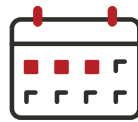


Shutdown, Turnaround, & Outage Manager



Scope Management

Robust, configurable approval for generating STO scope. Integrates with your ERP system to convert routine work into STO work.



Planning Progress Tracking

Transform your turnaround planning from “gut feeling” to data driven. Know that your plant is ready for your upcoming STO.



Detailed Work Package Planning

Leverage a rich library of existing work packages and standards to fast-track planning. Push planning changes to scheduling tools on-demand.



Inspection Planning & Execution

Prepare for inspection jobs and be ready to handle “discovered” work.



Work Execution & Progression

Allow contractors to update and progress your STO schedule from contractor access to maintain data integrity.



Budget Management

Integrate budgeting at all phases of the event from project planning to detailed work package estimates.



Prometheus STO Suite Advantages

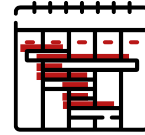
- Direct integration with EAM, CMMS, ERP
 - Elimination of duplicate work and data silos
- Configurability to adapt processes from multiple workgroups
 - Flexibility to accommodate and grow current processes
 - No “One-size-fits-all” approach
- Establish accountability for individuals and groups
- Communication of project status and information for all stakeholders, even external resources

STO Planning



Scope Management

Robust, configurable approval for generating and managing STO scope. Integrates with your ERP system to convert routine work into STO work.



Planning Progress Tracking

Transform your turnaround planning from “gut feeling” to data driven. Know that your plant is ready for your upcoming STO.



Materials Management

Request, approve, and track materials for your STO. Integrates with your ERP system to provide real-time status.



QA/QC Packages

Minimize production system downtime by building and tracking QA/QC package completion.



Work Execution

Allow contractors to update and progress your STO schedule from contractor access to maintain data integrity.



Inspection Planning & Execution

Prepare for inspection jobs and be ready to handle “discovered” work.



Desired End State of an STO Event



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Desired End State of an STO Event

Ability to Enforce STO Process



- Knowledge is preserved, and process enforced
- Deliver agreed scope (safely) on time and within budget

Enhanced Data Integration



- Real time information/data
- Improved asset information for informed troubleshooting & repair

Improved Auditability



- Know who approved what and when
- Monitor changes to scope

Increased Efficiency



- Reduce wait time between tasks
- Increase maintenance 'wrench-time' or reduce under-utilization of personnel
- Increase asset availability

Reduced Paper Based Transactions



- Reduce or eliminate human error due to paper transactions

Cost Savings



- Avoidance of unnecessary costs
- Optimization of inventory - Minimize expedited procurement
- Facilitates identification of obsolete inventory

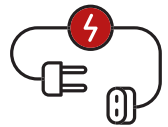
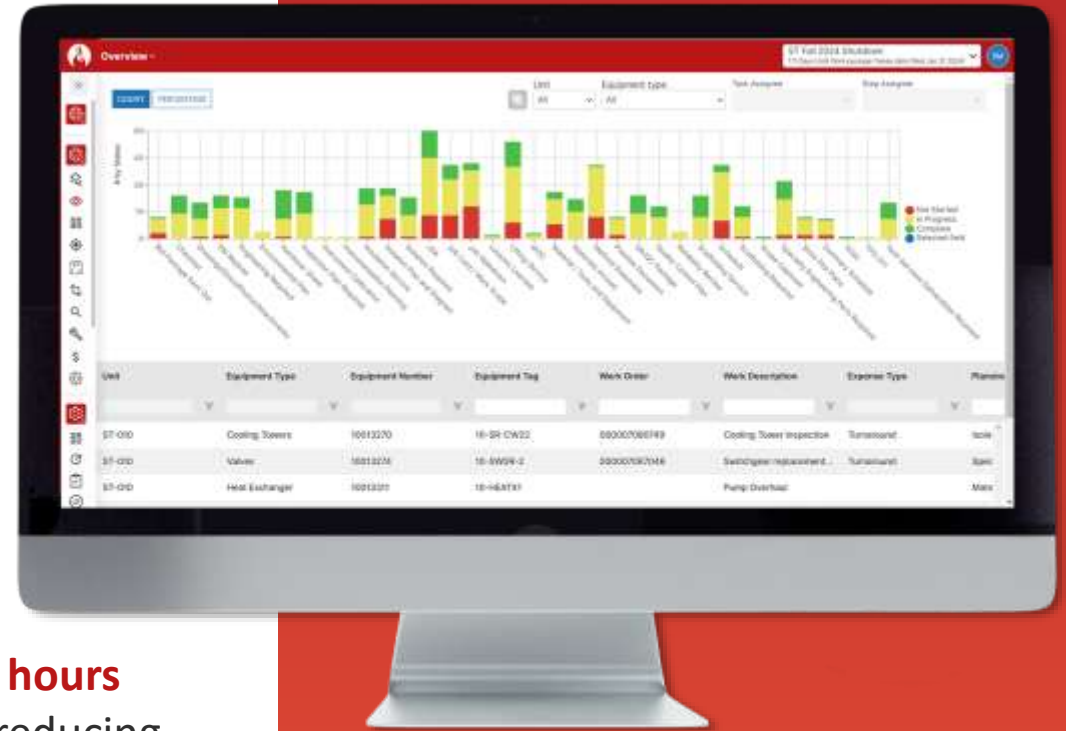
STO Manager

Create Alignment Between Your STO Plan, Process, and Team

Perform shutdown and turnaround planning, budgeting, execution, and isolations all within one system while maintaining your ERP as your single source of truth.

"The communication aspect of the tool and having live data has made a huge different from an awareness standpoint and being able to react to problems quickly."

- Jarrett Heitzman, Senior Project Manager | Susquehanna Nuclear (Talen Energy)



Reduced
outage
duration
by **13%**



Reduced
shift turnover
time by
1 hour



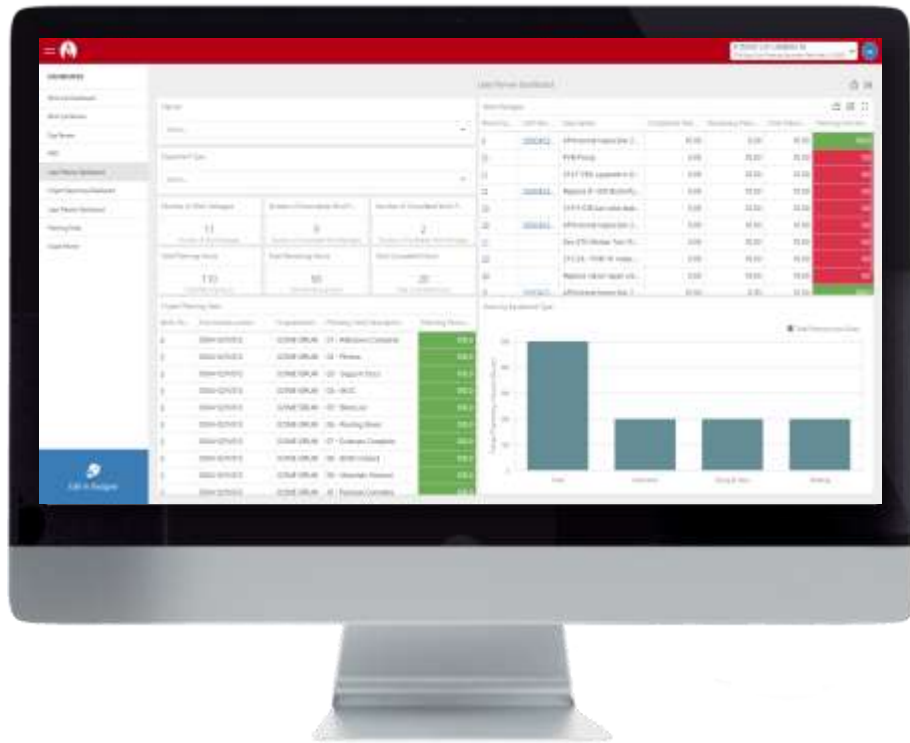
Saved 700+ hours
of labor by reducing
OCC/MOCC
meetings

*Talen Energy achieved these results with Prometheus Group's legacy STO solution, Syntempo

AS REALIZED BY **TALEN ENERGY**

“ With Prometheus STO, Gunvor Group has all historical turnaround data stored and accessible, making it easier to plan for the next turnaround. ”

Book a Personalized STO Demo



www.prometheusgroup.com/request-demo

Thank You!

Questions?



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