

# 13<sup>th</sup> Chemical Process Safety Sharing (CPSS)

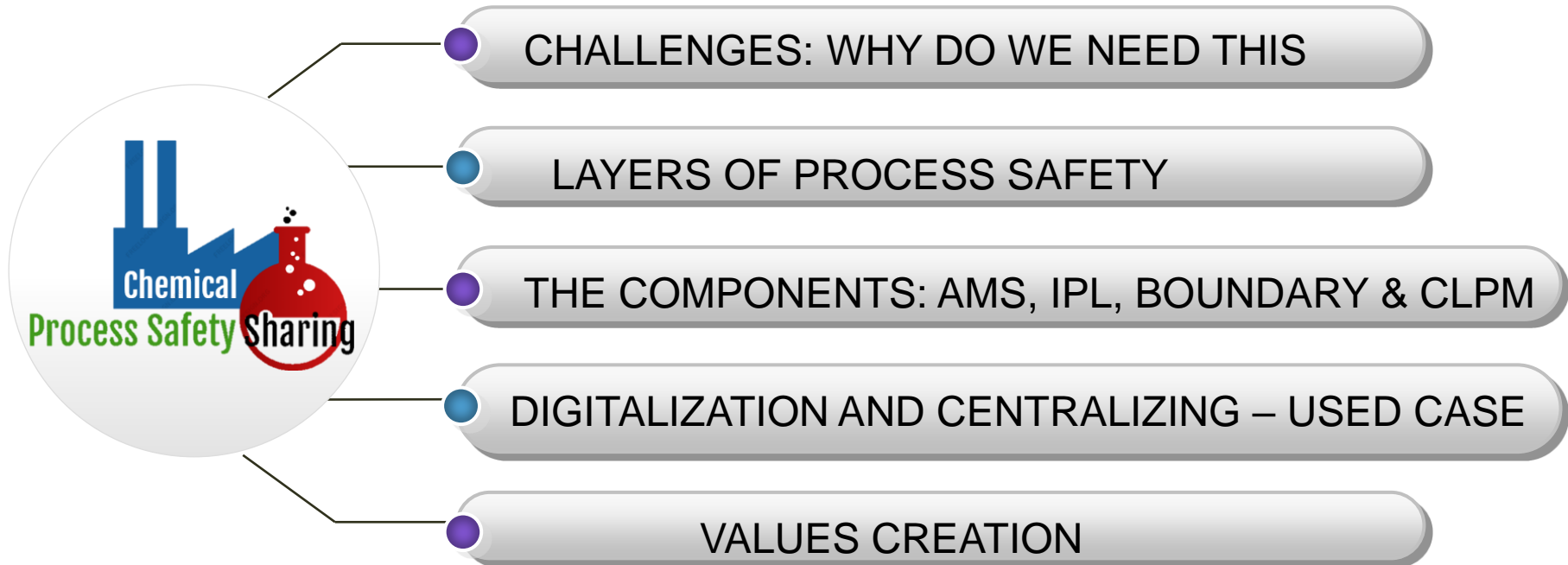
**Topic: Digitalization of Tier 3 Process Safety Management (PSM) for Operational Excellence & Process Safety**

**Presenter Name: Misuari Rahman**

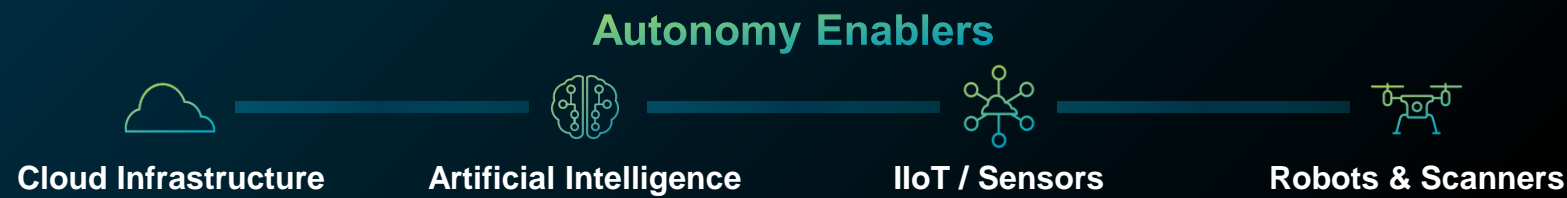
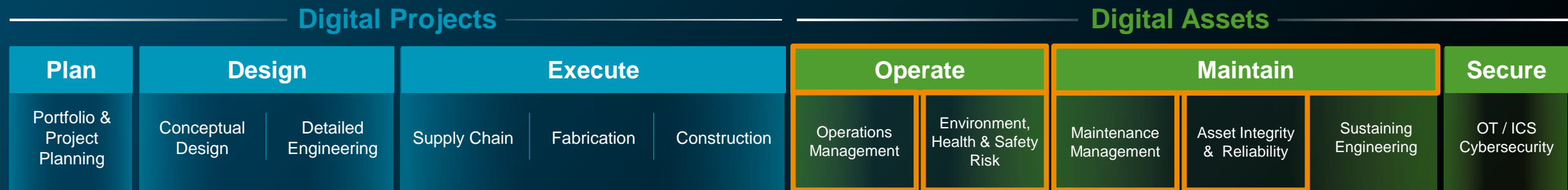
**E-mail: [nur.misuari.abd.rahman@hexagon.com](mailto:nur.misuari.abd.rahman@hexagon.com)**

**Company : Hexagon ALI**





# HEXAGON: Smart Digital Reality for Autonomous Industrial Facilities





## WHY DO WE NEED THIS?

Digital Transformation in Industrial Facilities provides significant gains in improvement

30

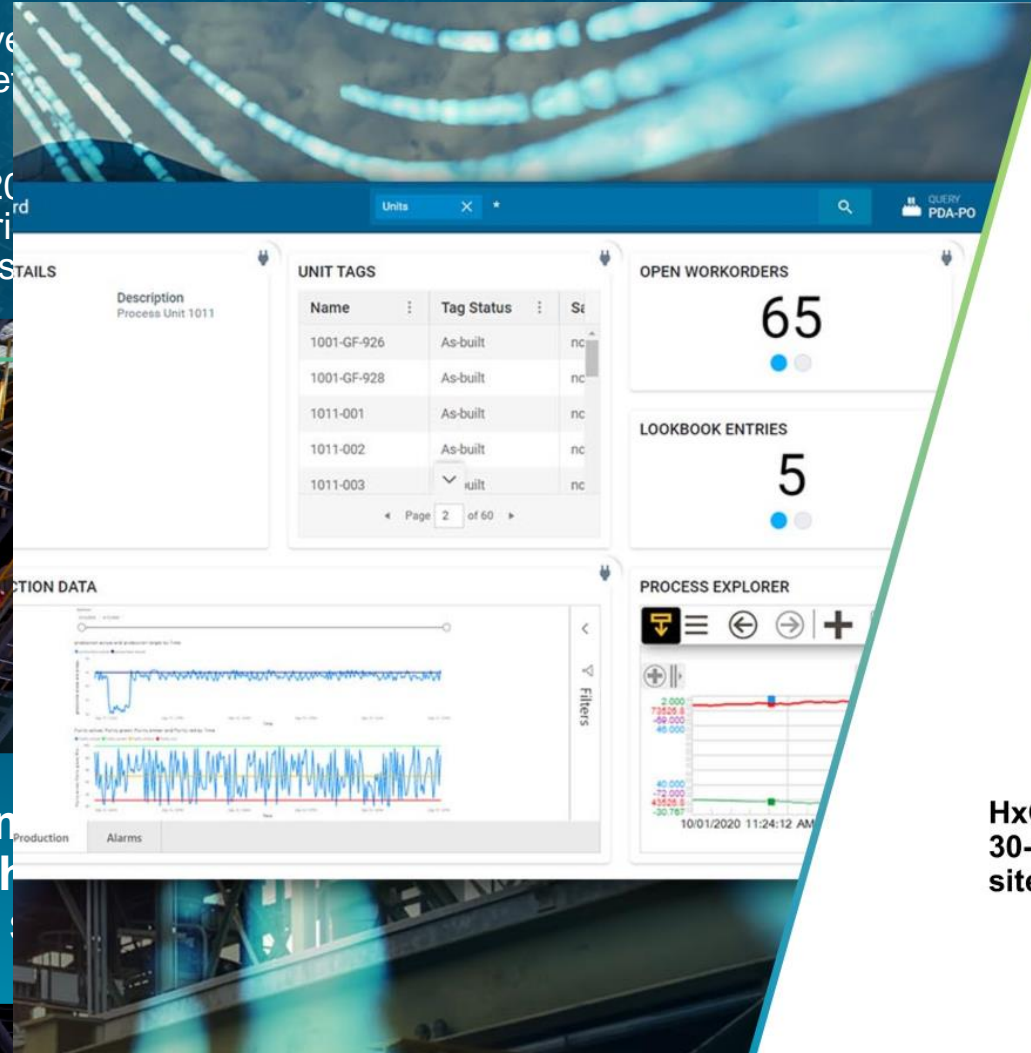
Engineers typically spend 30 percent of their time looking for information. A digital thread provides a means to significantly reduce this waste.

100

Prevention of defects

625

By 2025, the metric costs



Operate, Maintain



*Engineers typically spend 30 percent of their time looking for information. A digital thread provides a means to significantly reduce this waste."*

– ARC Advisory Group, 2021

We need to leverage automation technologies to address the challenges and reliably throughout a more

HxGN SDx customers locate data and documents 30-50% faster and reduce personnel travel time to sites by 50%.

# Operations Management Vision



Effective Alarm System

Optimized Control Loops

Safe Operating Limits  
Managed & Monitored

Effective Operator  
Situation Awareness

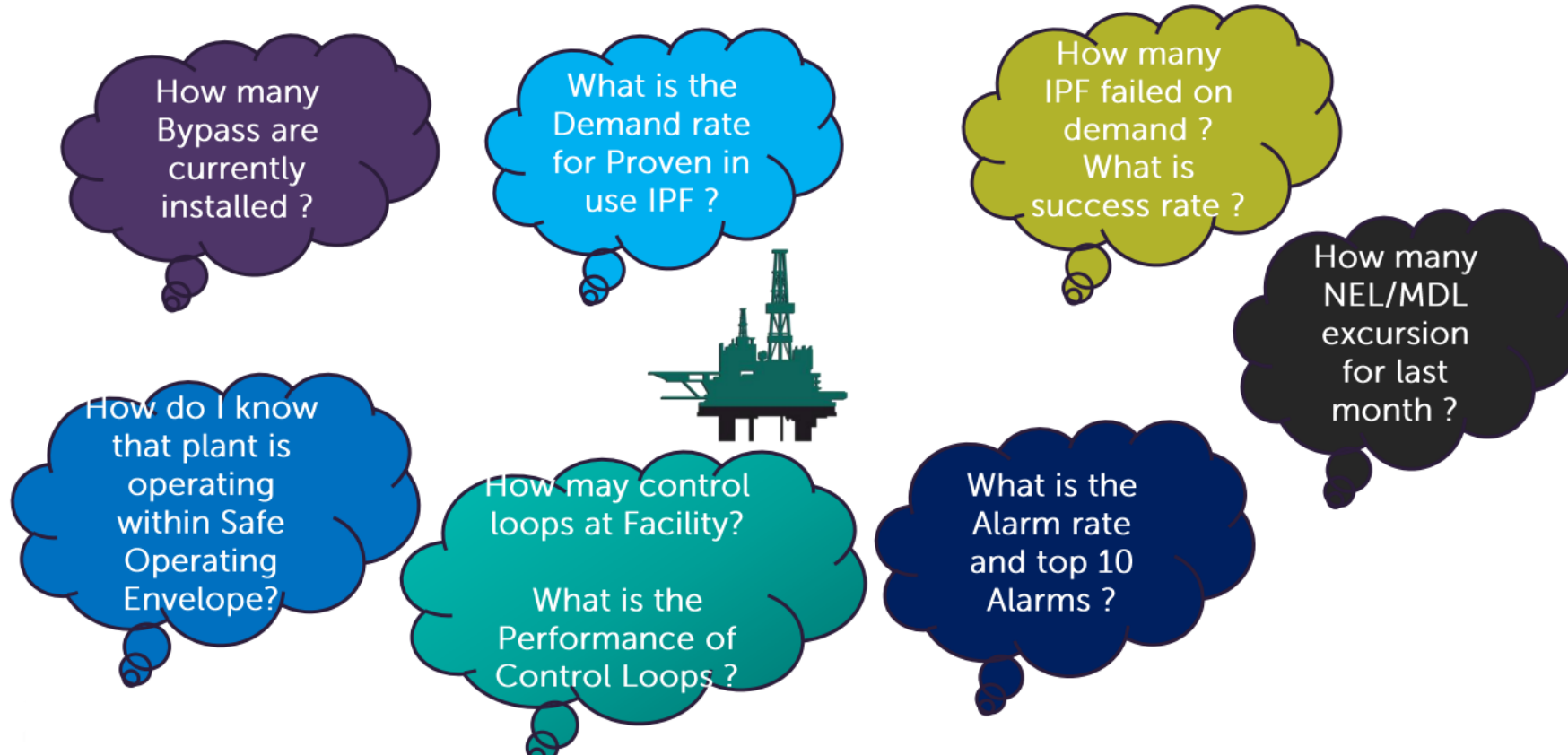
Full Visibility and Control  
of Safety System Status

Fully Digitalized Logbooks,  
Permits, Duties, etc.

Actionable KPI's

# O&M CHALLENGES: PROBLEM STATEMENT

## PROBLEM STATEMENT *Fundamental Question of site Process Safety, Technical Integrity and Operational Performance??*





# Case for Change

## Key Challenges in Performance Monitoring

### Manual

80% time spent on data extraction & reporting, lead to human error



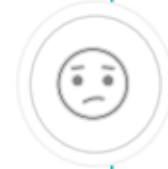
### Automation

Automated data retrieval and report generation with virtual analyzer functionality



### Localized

Data resides in local machine, not available online for interaction with other digital initiatives



### Centralized

Online server with hourly data generation, ready for integration with digital tools



### Reactive

No early warning on equipment performance and deterioration



### Predictive

Visualizing integrity & performance of Instrumentation & Control system to make informative decisions



# Layers of Process Safety

Upper Impending Failure Zone

Upper Shutdown Zone

Mechanical failure occurs

High Mechanical Integrity Failure Point

High Mechanical Integrity Design Limit

Process is shut down

Evacuation

Process Relief & Containment

Safety Shutdown Systems

Alarms & Operator Interventions

Regulatory Controls

Procedures & Management Systems

ALARM Summary

ACK ALL

SILENCE

UNIT A

UNIT C

SysA16 Con M5

10:04:45 02/12/16

ACK SELECTED

RE-SORT

UNIT B

UNIT D

System Alarm

SUPPRESSION

TIME	EVENT	POINT	DESCRIPTION	TYPE	PRI	AREA	UNITS	TIA	STATE	INDEX
02/10/16 15:44:12	ALM	42PHI01	PH AGUA DE ANTIVIA 2	ALM	1	W8	PSI	0.00101		
02/10/16 15:44:12	ALM	42PHI02	DENSIDADE SODA DIUTERKA	ALM	1	W8	PSI	0.00101		
02/10/16 15:44:05	ALM	148ZAL06	DOSANDO CLORO	OFFNRM	2	ED77	STATE	0.09:17		
02/10/16 15:44:06	ALM	42PHI02	PH AGUA SERVICO P/ CEMAP	PVLO	2	ED77	PPH	0.00:06		
02/10/16 15:44:05	ALM	148LAH20	148TB01A SEM ESCORVA	OFFNRM	2	BH71	STATE	0.00:07		
02/10/16 15:44:00	ALM	42A104	PH AGUA DESCARBONATADA	PVLO	3	K14	MMHG	0.00:12		
02/10/16 15:43:59	ALM	42PHI03	PH AGUA CLARIFICADA	PVLO	3	L27	FTS/5	0.00:13		
02/10/16 15:43:58	ALM	42PHI01	PH AGUA POTAVEL	PVHI	3	TT78	MKS	0.00:14		
02/10/16 15:43:57	RTN	148LIC11	NIVEL DO 148V03A	PVLO	3	ED77	PSI	0.00:15		
02/10/16 15:43:56	ALM	42PHI06	PH 42-TQ-148	PVHI	3	BH71	PSI	0.00:16		
02/10/16 15:43:55	ALM	74PAL11	FECHA MINIFLUX 74PV20/21	PVHI	3	Y77	STATE	0.00:17		
02/10/16 15:42:55	ALM	170FX22	CONDUITV 42V05AA	ROC+	3	87N		0.01:17		
02/10/16 15:40:55	ALM	42PDH112	PRES DIF ALTA SEG ESTAG	BADPV	4	N11	STATE	0.08:17		
02/10/16 15:39:55	ALM	42PHI06	PH 42-TQ-148	BADPV	4	K14	DEGC	0.04:17		
02/10/16 15:38:55	ALM	42PHI01	PH AGUA POTAVEL	BADPV	4	L27	PSI	0.05:17		
02/10/16 15:37:55	ALM	42PHI03	PH AGUA CLARIFICADA	BADPV	4	TT78	DEGC	0.06:17		

Process Diagram

Operator at Control Panel

Industrial Plant

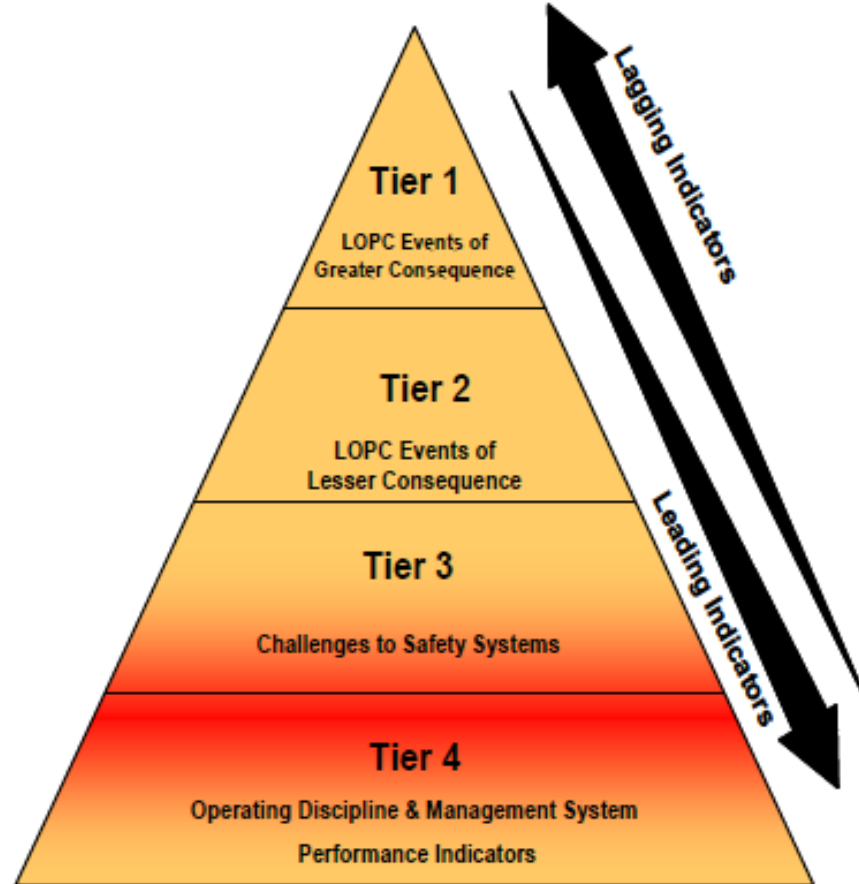
HEXAGON

8



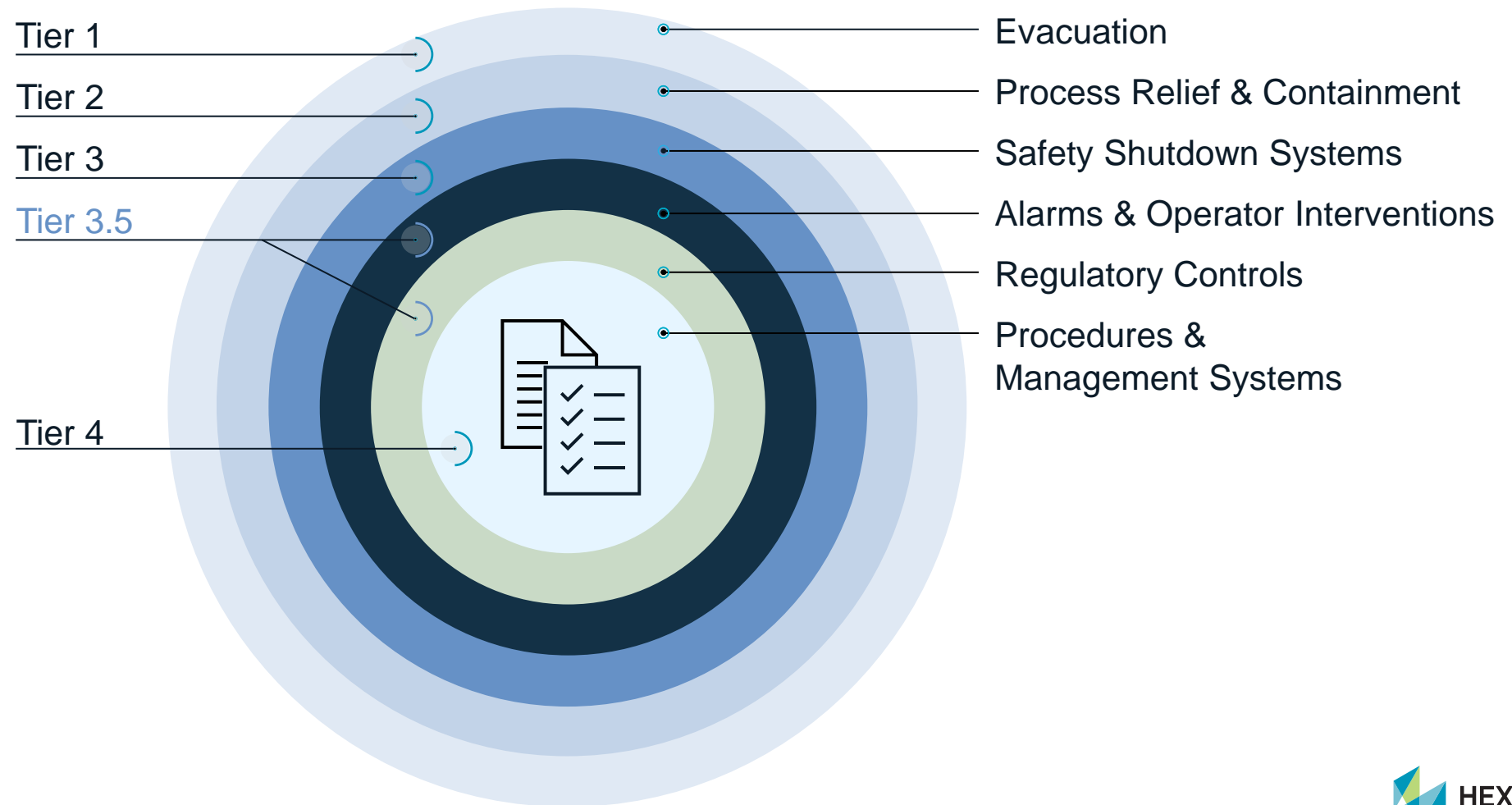
# API 754

## Process Safety Performance Indicators for the Refining and Petrochemical Industries

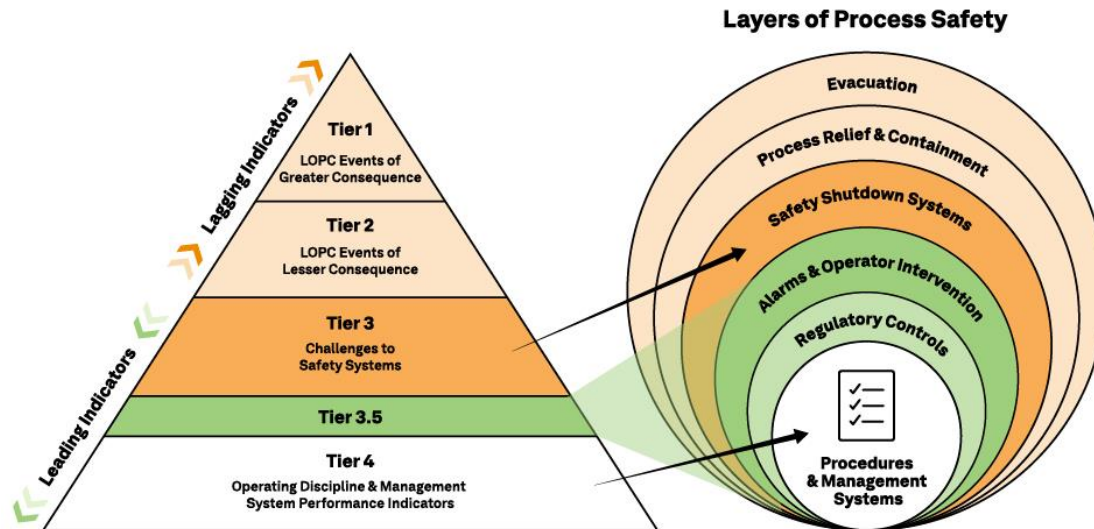


- Conceptually based on the “incident pyramid”
- Identifies leading and lagging process safety indicators to drive performance
- Tier 1 is the most lagging, Tier 4 is the most leading
- Tiers 1 and 2 are measure of actual releases and may be used for national reporting
- Tiers 3 and 4 are intended for internal or site use

# Layers of Process Safety



# Tier 3.5 Leading Indicator Examples



- **Regulatory Controls**
  - Loops in Manual
  - Loop Stability
  - Loop Response
  - Activation of Override Loops (min flow, pressure relief, etc.)
- **Alarms and Operator Interventions**
  - Alarm Floods
  - Alarm Suppression
  - IPL Related Alarms
  - Active Bypasses
  - Operator Loading
  - Audit Mismatches



# Alarms – The Origin





# Why Alarms are important


## 2005 BP Texas City Refinery Explosion 1B\$ economic loss, 15 people killed

**Honeywell**

### Texas City Incident

**15th Body Pulled from Refinery Rubble**  
By KEVIN MORAN  
Copyright 2005 Houston Chronicle

TEXAS CITY - The only worker still missing after the explosion of BP's Texas City refinery was found dead in the plant's rubble today, bringing the death toll to 15. At least seven other blast victims, meanwhile...



**InTech**  
www.intech.com

Alarms weren't working at Texas City plant  
16 August 2005

## 1994 Texaco Milford Haven Refinery Explosion £ 400M economic loss

- 275 alarms in the 11 minutes before the explosion
- "... warnings of the developing problem were lost in the plethora of instrument alarms triggered in the control room, many of which were unnecessary and registering with increasing frequency, so operators were unable to appreciate what was actually happening ..."



## 1984 Union Carbide Bhopal Isocyanate Plant Over 3800 people killed

- Few alarms or interlocks in critical locations that might have warned operators of abnormal conditions
- Alarms sounded so many times a week (20 to 30) that no way to know what the siren signified
- Emergency signal was identical to that used for other purposes, including practice drills.
- Alarm at flare tower was non-operational



## 2010 BP Deepwater Horizon Oil Spill: 40B\$ in economic loss, 11 people killed

- Vital warning systems on the Deepwater Horizon oil rig were switched off at the time of the explosion in order to spare workers being woken by false alarms, a federal investigation has heard.
- The revelation that alarm systems on the rig at the centre of the disaster were disabled came in testimony by a chief technician working for Transocean, the drilling company that owned the rig



# Alarm Management Documents – Timeline

Texaco  
Milford  
Haven



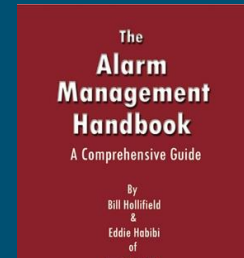
EEMUA 191  
1st Edition  
2nd: 2007  
3rd: 2013



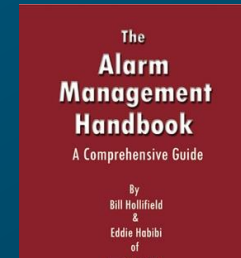
NA102  
Germany  
Rev. 2008



1st ED.



2nd ED.



In  
German!  
2012

IEC 62682  
Begins 2010



**NOT POLICING BUT TO MAKE USE FOR  
OPERATION/MAINTENANCE EFFICIENCY**



YA-711  
Principles for Alarm  
System Design

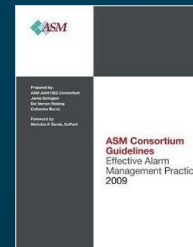
Work  
Begins  
on ISA-  
18.2



2008  
Electric  
Power  
Guidelines  
Issued  
Co-authored  
by PAS



ISA-18.2  
Issued!



2009 ASM  
Alarm Book  
Issued



API RP-1167  
Pipeline  
Alarm Mgt.



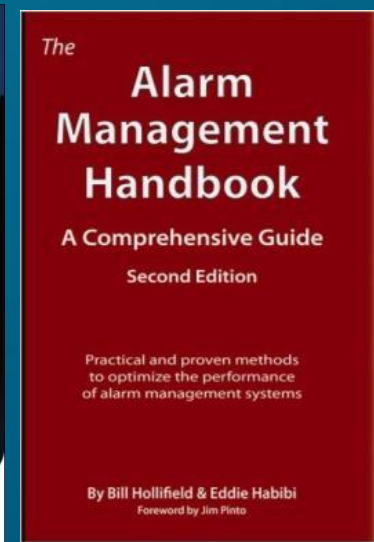
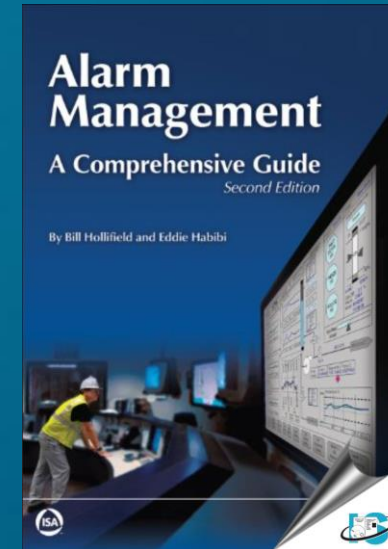
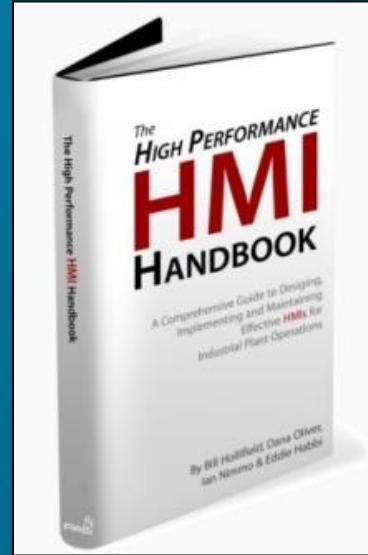
ISA-18.2  
Expected  
Update  
4Q 2015



Japanese  
Language

# A Proven Approach: The Hexagon PAS Seven Steps (ISA 18.2 Standards)

- 1 Develop, use, and maintain an alarm philosophy
- 2 Collect data and benchmark your systems
- 3 Perform “bad actor” alarm resolution
- 4 Document and rationalize alarms
- 5 Implement audit and enforcement technology
- 6 Adopt real time alarm management
- 7 Control and maintain your improved system





# Use Case: 1. Alarm Management Analysis Tools

## PlantState Integrity Alarm Management

Alarm and Event Analysis/Metrics

Documentation and Rationalization

Audit and Enforce

Dynamic Alarming

Alarm Shelving

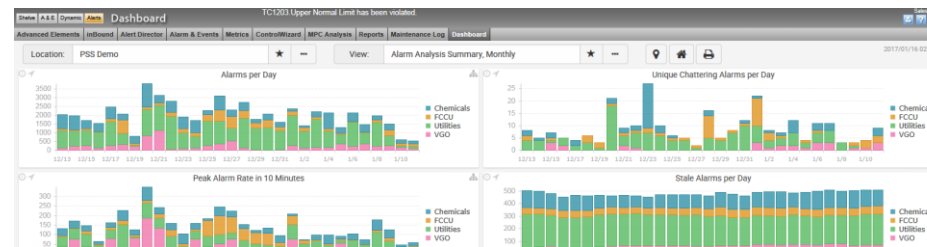
Alert Director

## Challenge

- No Guideline, wrong configuration, too many alarms & Operator lost confidence
- Silo Rationalization DB and Alarm Management Event Analysis

## Solution

- Comprehensive Alarm Management program aligned with ISA 18.2 and IEC 62682
- People, Processes and Technology to support the Alarm Management Lifecycle
- Integrated Alarm Management Suite & Rationalization DB = MADB



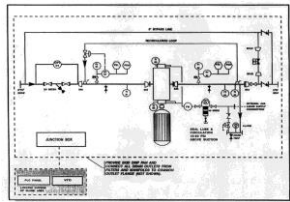
PvtLO	Detail	Feed	Equipment	Tag Parameter	Actions
PvtLO	H-1 DOWN	Feed	Feed		Confirm
Upper Tag Limit					
Upper Design Limit					



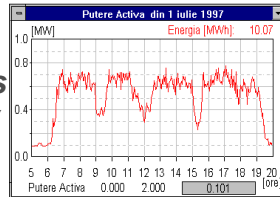
# Alarm Documentation & Rationalization

- DEFINE YOUR ALARMABLE TAG
- Ensures your actual alarms comply with your alarm philosophy (operator actions, priorities, time to respond, etc.)
- Documents your alarms (Set Points, Causes, Consequences, Corrective Actions), creating a Master Alarm Database.

P&IDs



Process History

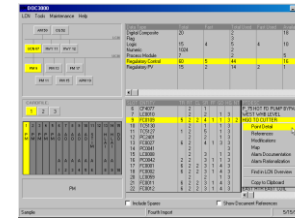


SOP/EOP/HAZOP/...

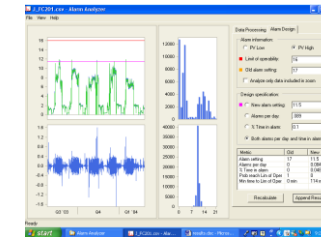


Heavily relies on teamwork

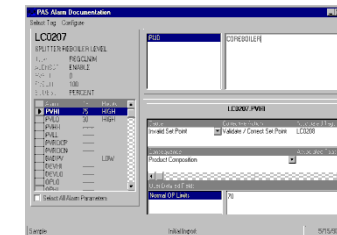
- Facilitator
- Board Operators
- Process & Control Engineers
- Safety, Health, Environmental rep
- Production & Maintenance Engineers



Control and Alarm Configuration



Alarm Statistical Analysis



D&R Tools

## Plant Experience & Knowledge

Process, Equipment, Operations, Procedures

# Integrated AEA & D&R = MASTER ALARM DATABASE (MADB)

## • Document Alarms

- Causes
- Consequences
- Corrective Actions
- Classification

## • Classify Alarms

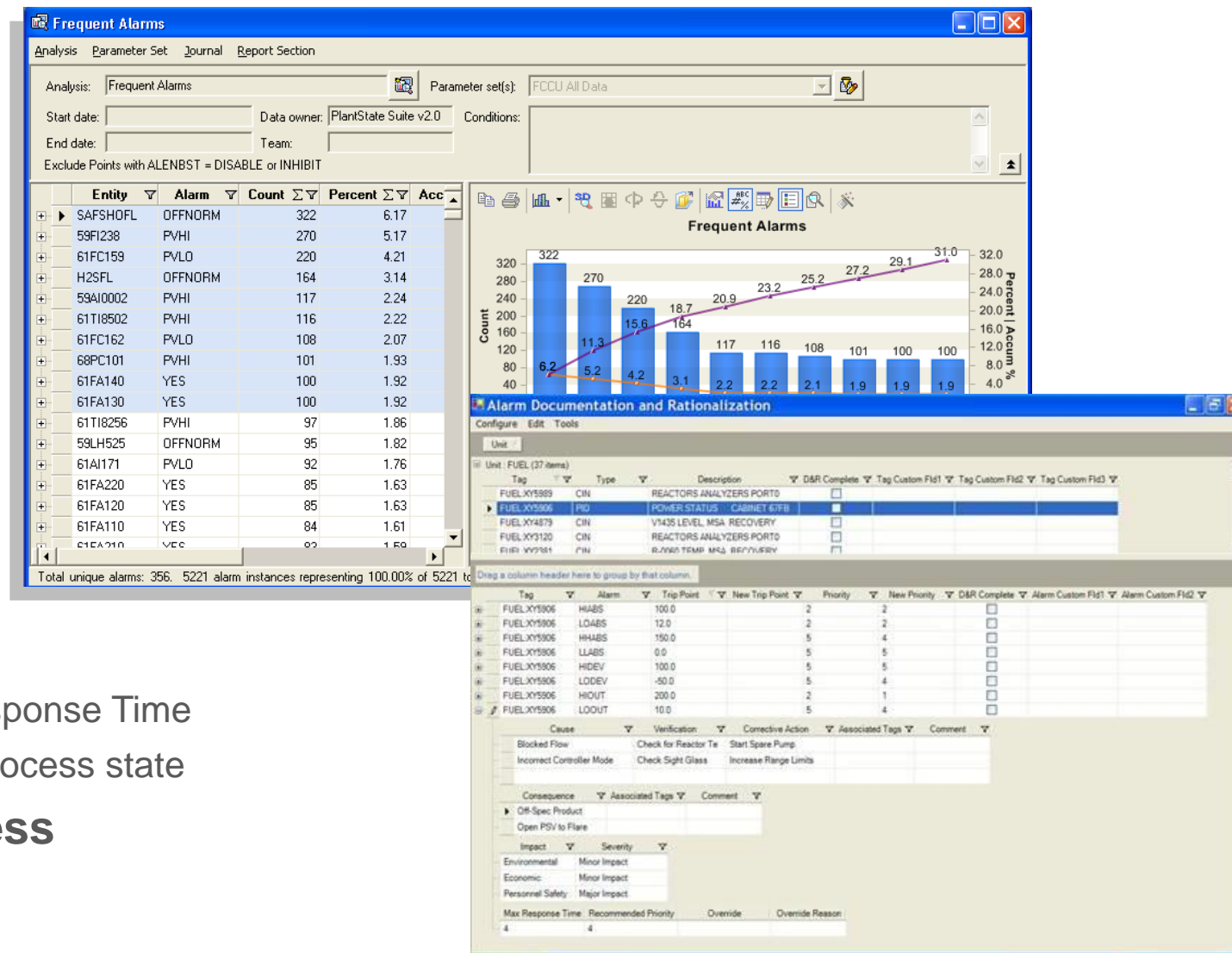
- Process Performance
- Equipment safety
- Your Classification System

## • Rationalize Priorities

- Impact / Severity / Maximum Response Time
- Priority and Trip Point for each process state

## • Template based work process

- Create templates from any alarm
- Apply templates to any alarm



# Automated Realtime MADB Audit

# Use Case: 2. Control Loop Performance Management

## Challenge

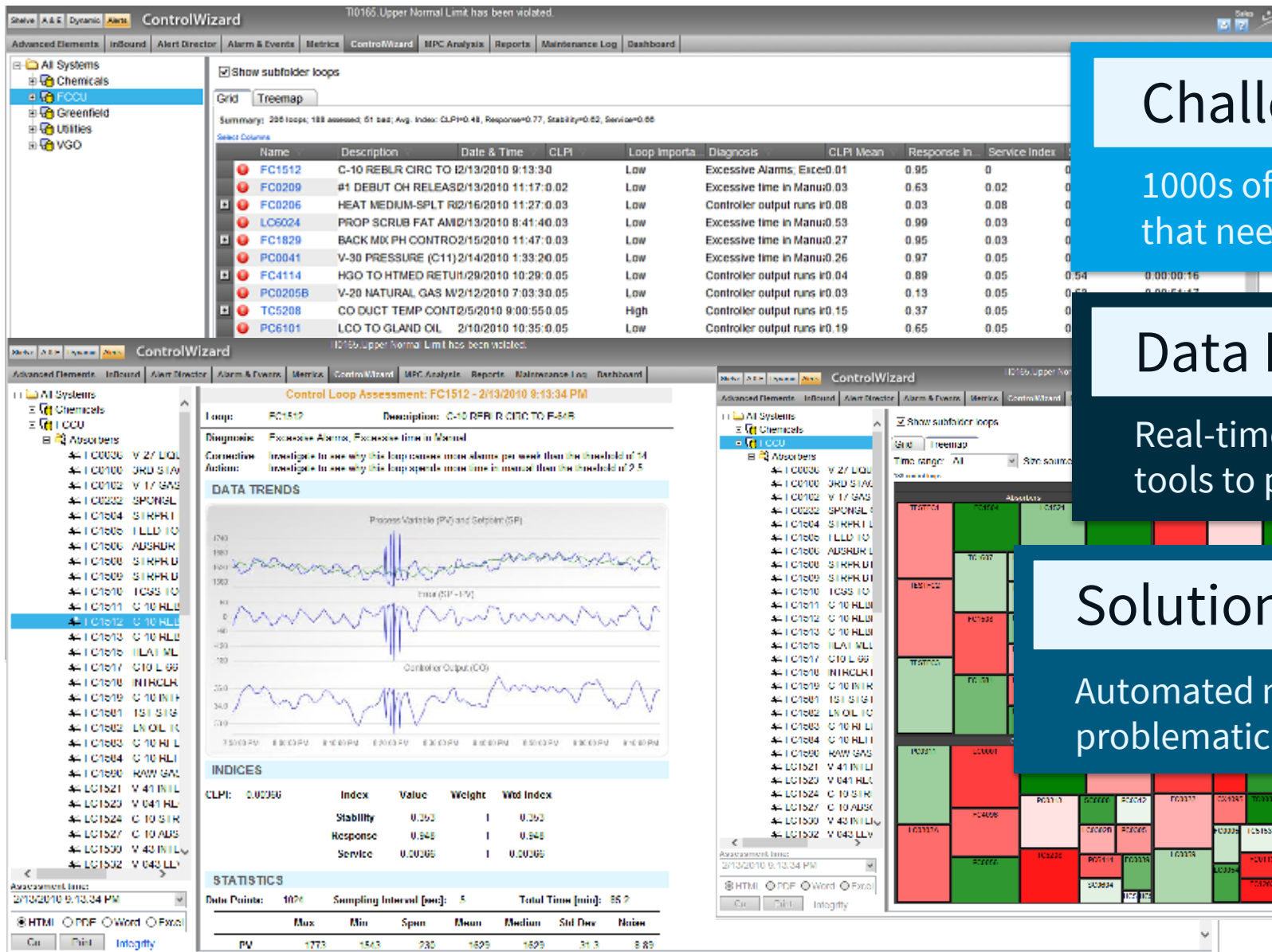
1000s of interrelated control loops plantwide that need performance monitoring

## Data Required

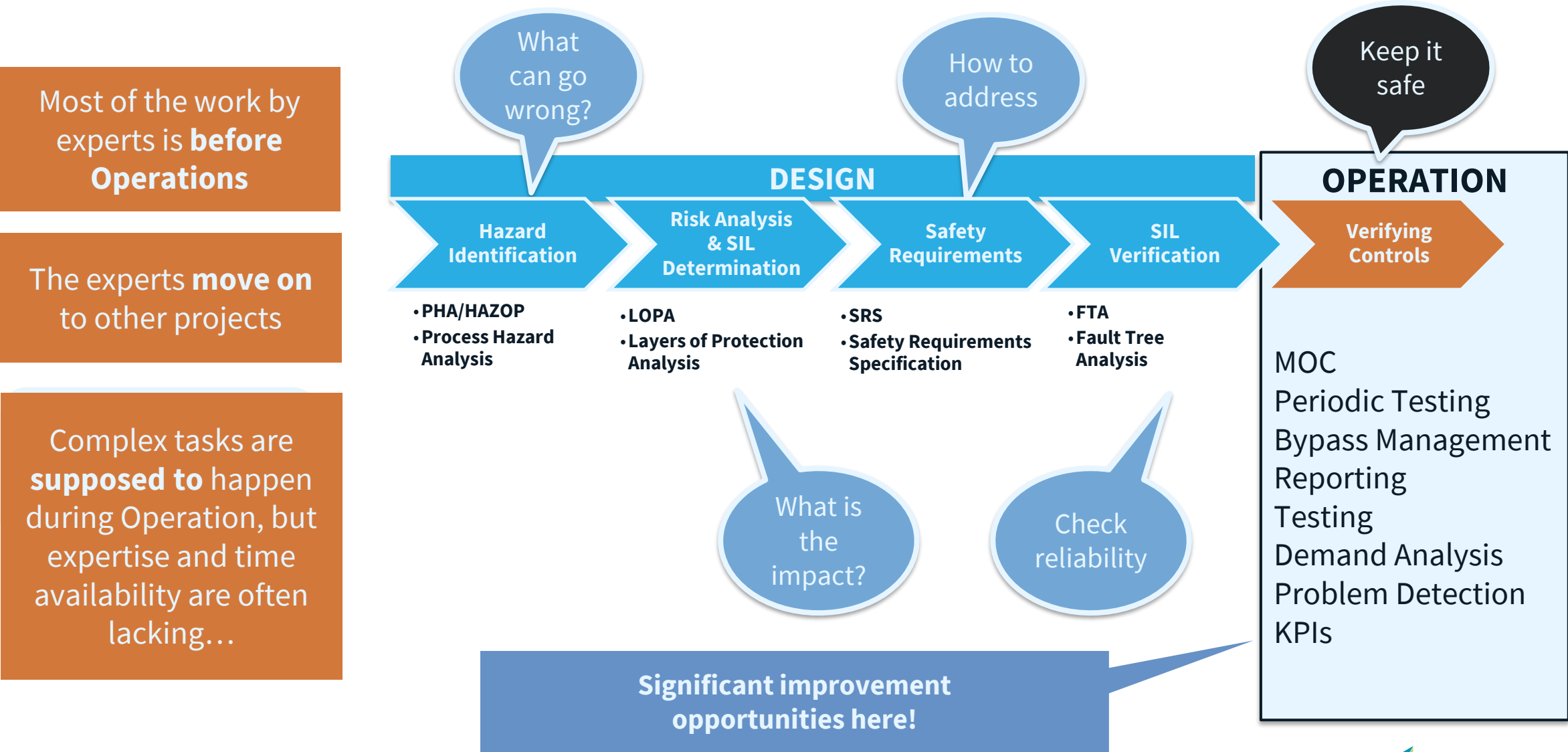
Real-time, high frequency data collection and tools to provide actionable information

## Solution

Automated monitoring and reporting of problematic loops with potential corrective action

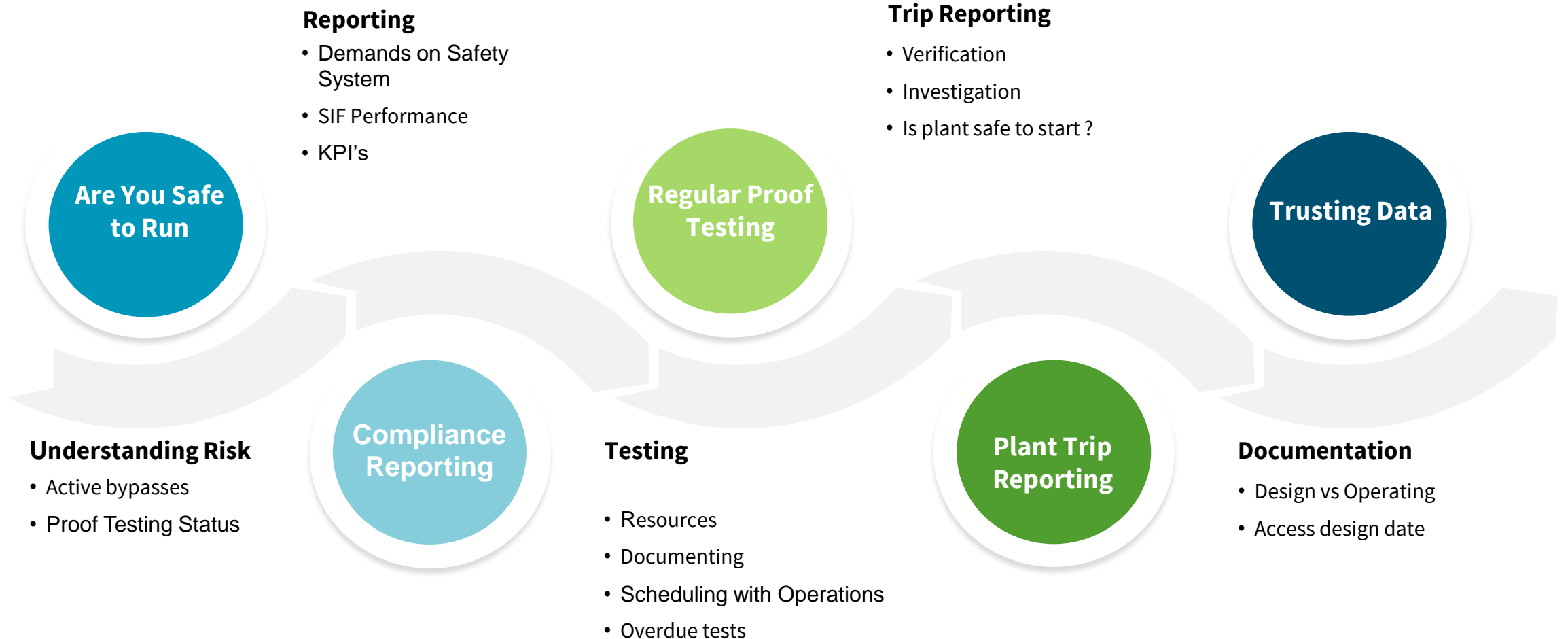


# Use Case 2. IPL - Safety Lifecycle Management in Operations





# Challenges – Managing Safety System



# How is All of this Managed Today?

- Spreadsheets
- Written Procedures
  - Operating
  - Bypass
- Manual Testing
  - Maintenance
    - Online
    - Offline
    - Full/Partial stroke
    - Etc.
- Process Drawings
- Work order systems
- Handwritten notes
- Homegrown applications



Disparate solutions...

- no input controls
- no interoperability
- limited change tracking
- limited functionality

Work Order and Assessment: A1940			
When finished, report the case #, volunteers, hours worked, and initials of resident present during work			
Case #	A1940	Entered by: MHH-Brooklyn NY Stake	Claimed by: MHH-Brooklyn NY Stake
<b>Personal Information</b>			
Today's Date	2013-01-18	Requested Date	2012-11-24
Resident Name	C. [REDACTED]	Primary Work Type	Flood
Address	52 Brooklyn, NY 11229 (Kings County)	Cross Street	
Phone Number	917 [REDACTED]	Priority (1=high)	3
Best Time to Call		Member	-
Disabled	-	First Responder	-
Special Needs		Over 60 Years Old	-
<b>Description of Work</b>			
Flood Height (ft)	Appliance Removal	Trees Down	0
Unpaved Removal	Standing Water	Large Trees Down (>18")	0
Unpaved Floor	Mold Remediation	Roof Damage	-
Unpaved Removal	Pump Requested	Tarps Needed	0
Heavy	Floors Flooded		
Other Notes			
Power on	<input checked="" type="checkbox"/>	Downed Wires	<input type="checkbox"/>
Work Without Homeowner	<input type="checkbox"/>		
<b>Homeowner Release</b>			
I, the undersigned, including their representatives and agents, harmless from any damage or injury that may occur on my property.			
I have taken any photos (circle one): May			
Signature of home owner (or			

These must be consolidated into a single point source of the truth

SIF/SIL Documentation



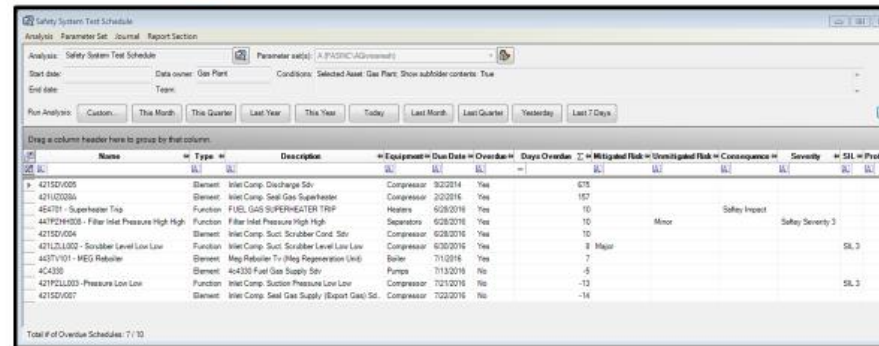
# Digitized Safety System Management

## IPL Analytics

### Configuration and Design Data for Each SIF

Design Time, Process Safety Time, Testing Interval, Risk, Consequence, Severity, SIL Level, etc.

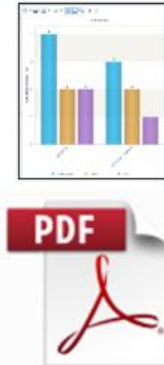
### Safety System Performance Analysis and Reports



Name	Type	Description	Equipment	Due Date	Overdue	Days Overdue	Mitigated Risk	Unmitigated Risk	Consequence	Severity	SIL
42152/005	Element	Inlet Comp. Discharge Sd.	Compressor	9/20/16	Yes	675					
421102036	Element	Inlet Comp. Seal Gas Superheater	Compressor	2/20/16	Yes	157					
454701 - Superheater Trip	Function	FUEL GAS SUPERHEATER TRIP	Heaters	6/28/2016	Yes	10					
443P2H405 - Filter Inlet Pressure High	Function	Filter Inlet Pressure High High	Separators	6/28/2016	Yes	10	Minor		Safety Impact	Safety Severity 3	
42152/004	Element	Inlet Comp. Suct. Scrubber Cond. Sd.	Compressor	6/28/2016	Yes	10					
421L2L302 - Scrubber Level Low Low	Function	Inlet Comp. Suct. Scrubber Level Low Low	Compressor	6/30/2016	Yes	8	Major				SIL 2
443TV101 - PES Reloiter	Element	Mag. Reloiter Tr. (Mag. Regeneration Unit)	Boiler	7/13/2016	Yes	7					
454305	Element	454305 Fuel Gas Supply Sd.	Pumps	7/13/2016	No	-5					
421P2L203 - Pressure Low Low	Function	Inlet Comp. Suction Pressure Low Low	Compressor	7/21/2016	No	-13					SIL 2
42152/007	Element	Inlet Comp. Seal Gas Supply (Export Gas) Sd.	Compressor	7/22/2016	No	-14					

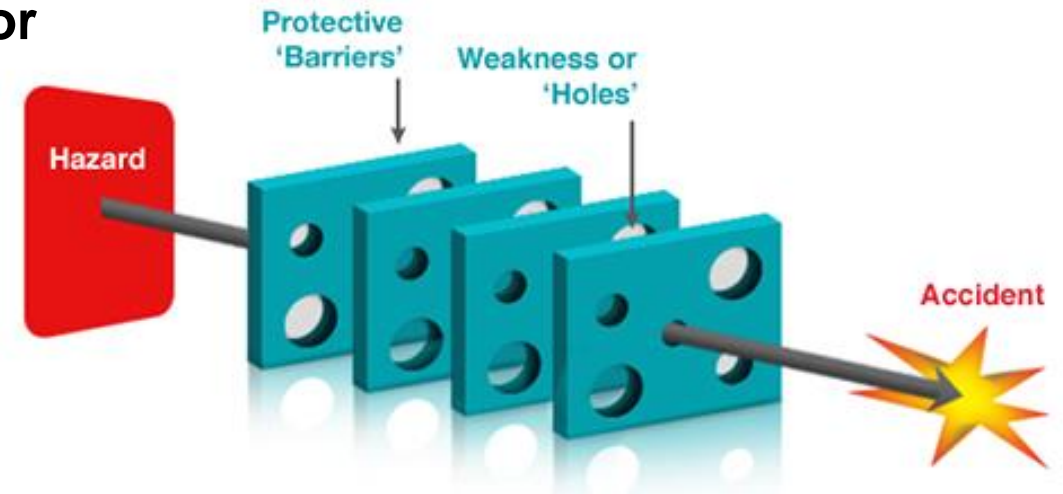
### Process and Event Data from the control system

SIF Activation, Success or Failure Verification, Bypass, Un-Bypass, Test, etc.



# Safety Instrumented System Challenges

- Standards require tracking to **verify proper design**
- Tracking requires accurate data for **SIS Demand Rate** and **SIS Failure Rate**
- This data is **difficult to collect** and **often overlooked**
- SIF Validation (Periodic) Testing is **expensive, labor intensive** and **creates risks**
- Some testing can be done **online** –
  - reliability risks
  - and potential lost production
- Some tests can be **done only during a shutdown**
  - Consumes Technical and Maintenance resources
  - EXTENDS shutdowns – **lost \$\$\$**
- SIF BYPASSES must be carefully managed
  - Many bypass ways exist
  - Can be overlooked





# Where to Consolidate it? The Master Alarm Database!

## MADB Capabilities

- Secure, with controlled access
- Create a new section for mapping SIS/SIF/IPLs
- Link to the **correct DCS and SIS sensor points for monitoring and analysis**
- Correct “single truth” is now in an MOC-controlled environment

Tag	Description	Type	Unit	Equipment	D&R Complete	Source	Is Constrained	Has Boundaries	PV Ass
FALS755	FT-5755A/B/C PRETRIP ALM	DIGINHG	Cobolier	Cobolier	<input type="checkbox"/>	Import	<input type="checkbox"/>	<input type="checkbox"/>	
FC0001	WEST HTR EAST COIL	REGCLNIM	H-1	H-1	<input type="checkbox"/>	Import	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FC0002	WEST HTR WEST COIL	REGCLNIM	H-1	H-1	<input checked="" type="checkbox"/>	Import	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FC0003	H1 SE COIL	REGHG	Main Frac OH	Main Frac OH	<input type="checkbox"/>	Import	<input type="checkbox"/>	<input type="checkbox"/>	

Tag	Alarm	State	Configured	Imported Trip Point	Proposed Trip Point	Approved Trip Point	Imported Priority	Proposed Priority	Approved Priority	Alarm Classes
FC0001	PVLL	Default	No	250.0000	0	0	2	NOACTION	NOACTION	IPL Reliability
FC0001	PVLO	H-1 Startup	Yes	250.0000	0	0	2	NOACTION	NOACTION	IPL Reliability
FC0001	PVLO	H-1 DOWN	Yes	250.0000	250	250	2	1	1	IPL Reliability

Cause	Verification	Corrective Action
1 Coke buildup in the tubes	Check pressure trends	Notify supervision. May need to take the coil down for maintenance.
2 Plugged Strainer	Check differential pressure trends	Contact outside operator to swap and clean strainers.
3 Valve malfunction	Check locally	Contact the outside operator to check the function of the control valve and control manually as needed.

Impact	Severity
1 Personnel Safety	None
2 Environmental	None
3 Cost	High

Max Response Time	Recommended Priority	Override Priority	Override Reason
< 5 minutes	1		

Constrained By	Constraint Value	Validation Expression
FC0001 Low Flow Trip Limit Default	100	(V) > (C) + 5
FC0001 Lower Normal Limit Default	300	(V) < (C)

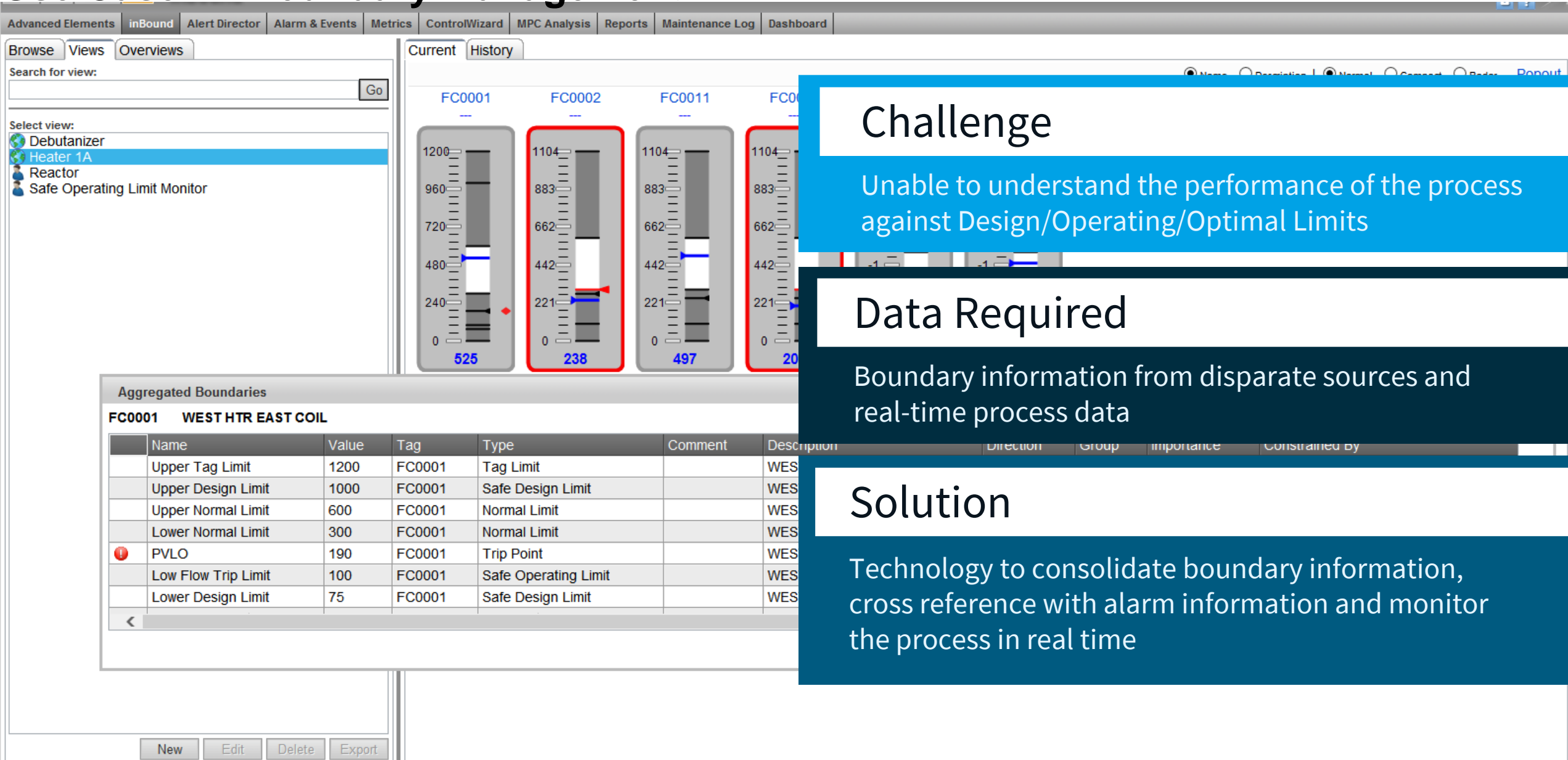
Boundary Excursions are detected, analyzed, and automatically reported.

SIF Activations are detected, analyzed, and automatically reported.

**New Boundary Section**

**New IPL Section**

# Use Case: 4. Boundary Management



## Challenge

Unable to understand the performance of the process against Design/Operating/Optimal Limits

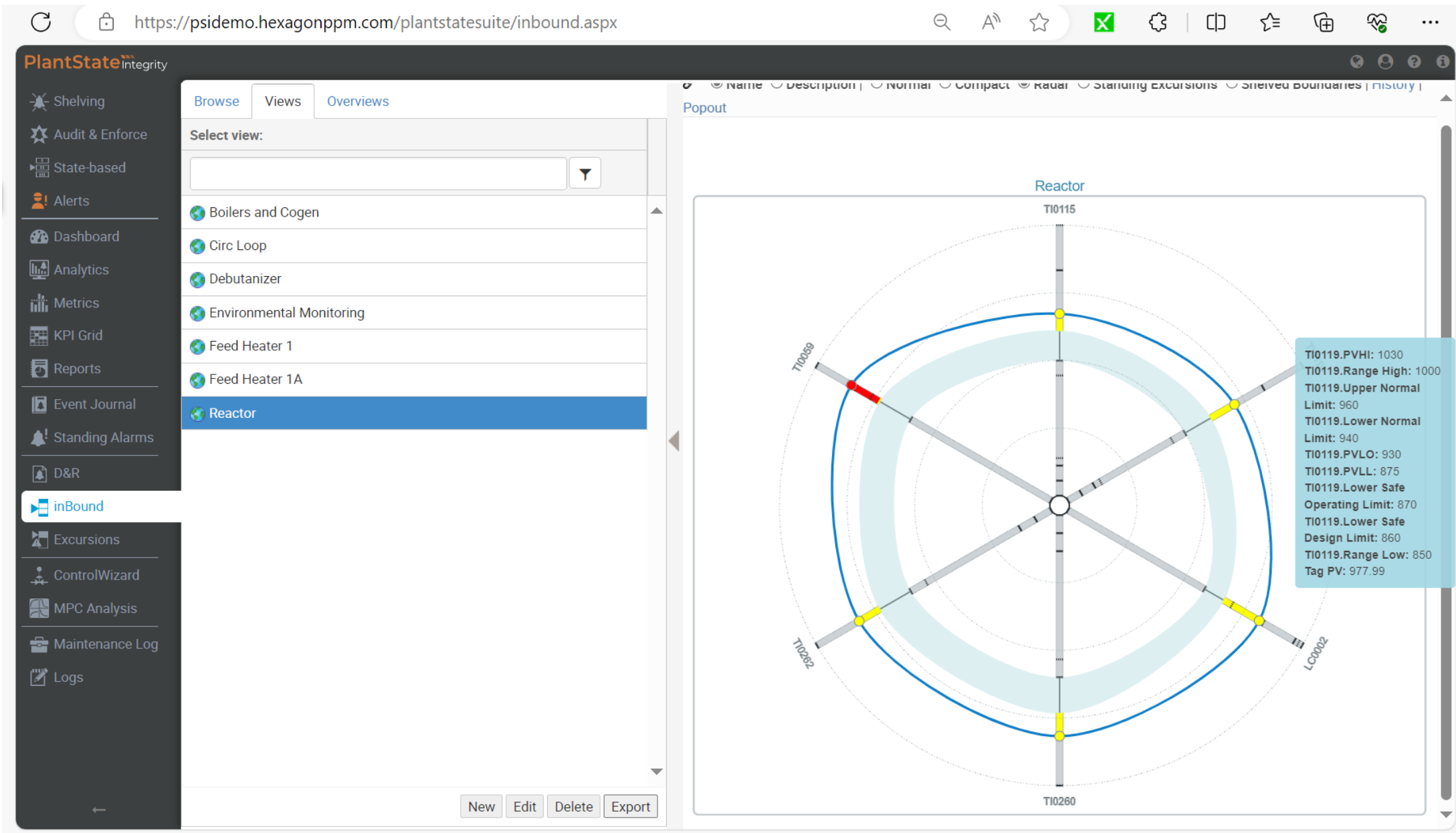
## Data Required

Boundary information from disparate sources and real-time process data

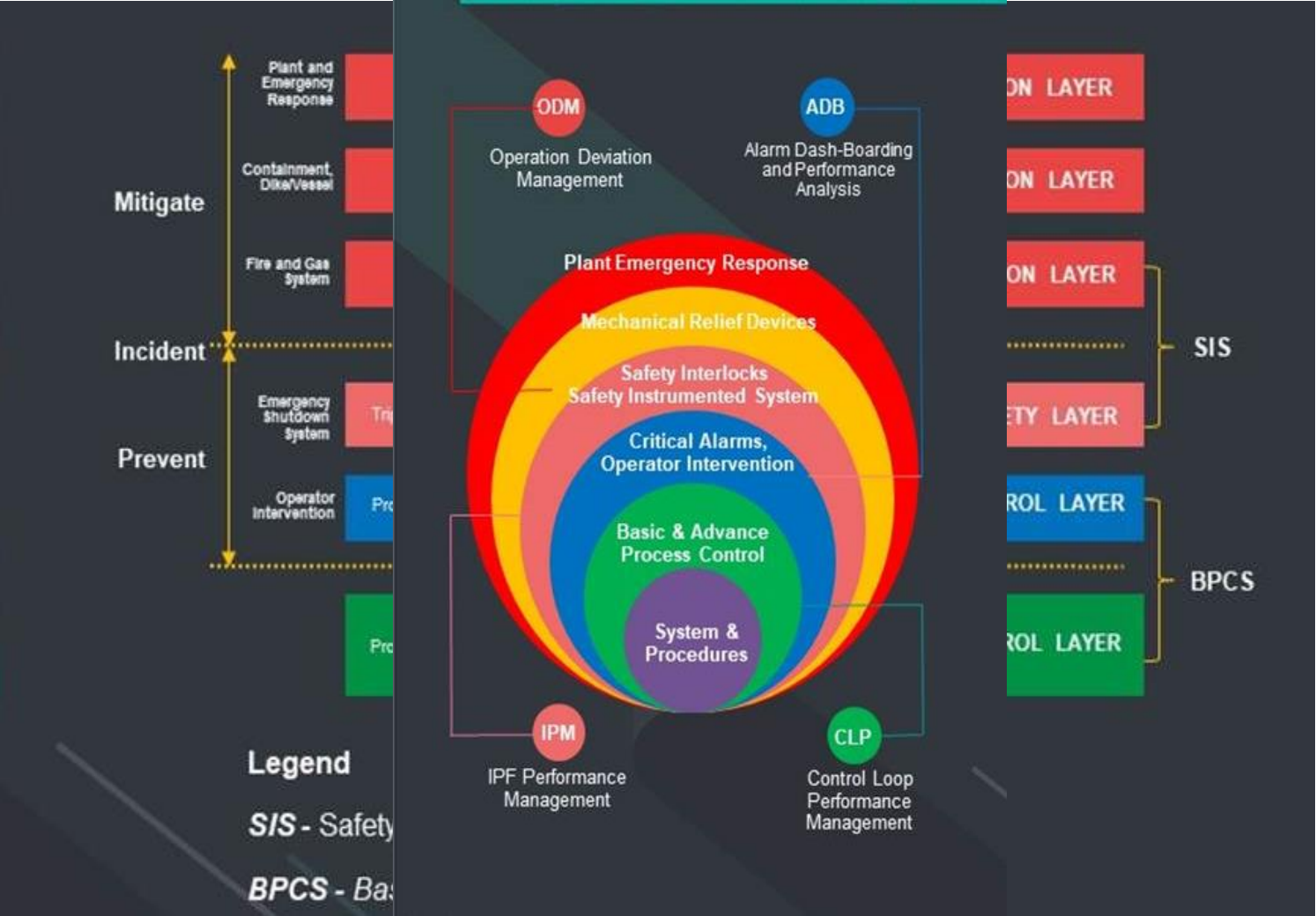
## Solution

Technology to consolidate boundary information, cross reference with alarm information and monitor the process in real time

# Inbound – integrating SOL/NEL/MDL



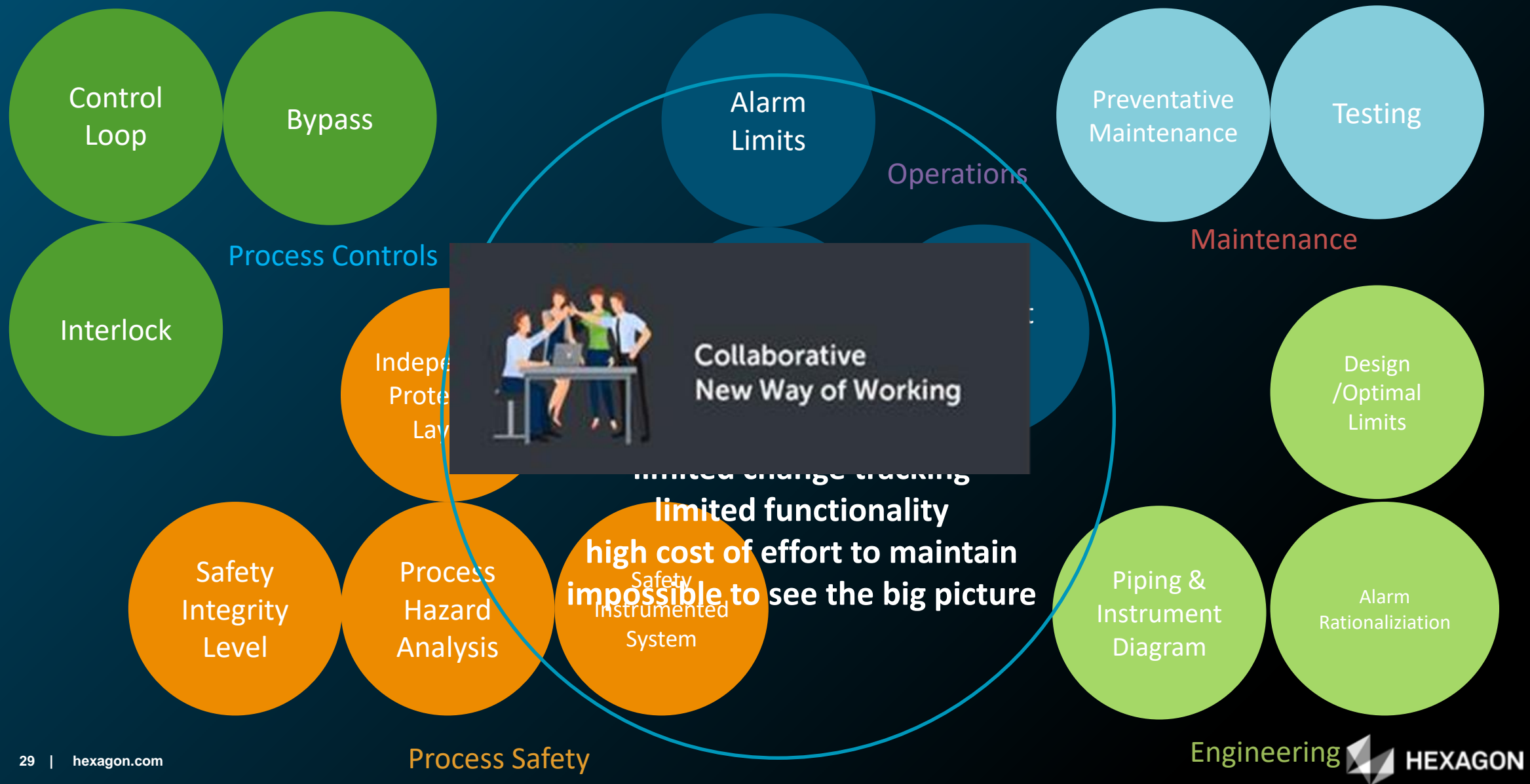
# Case Study – Process, Refineries, PetChem Industries Company



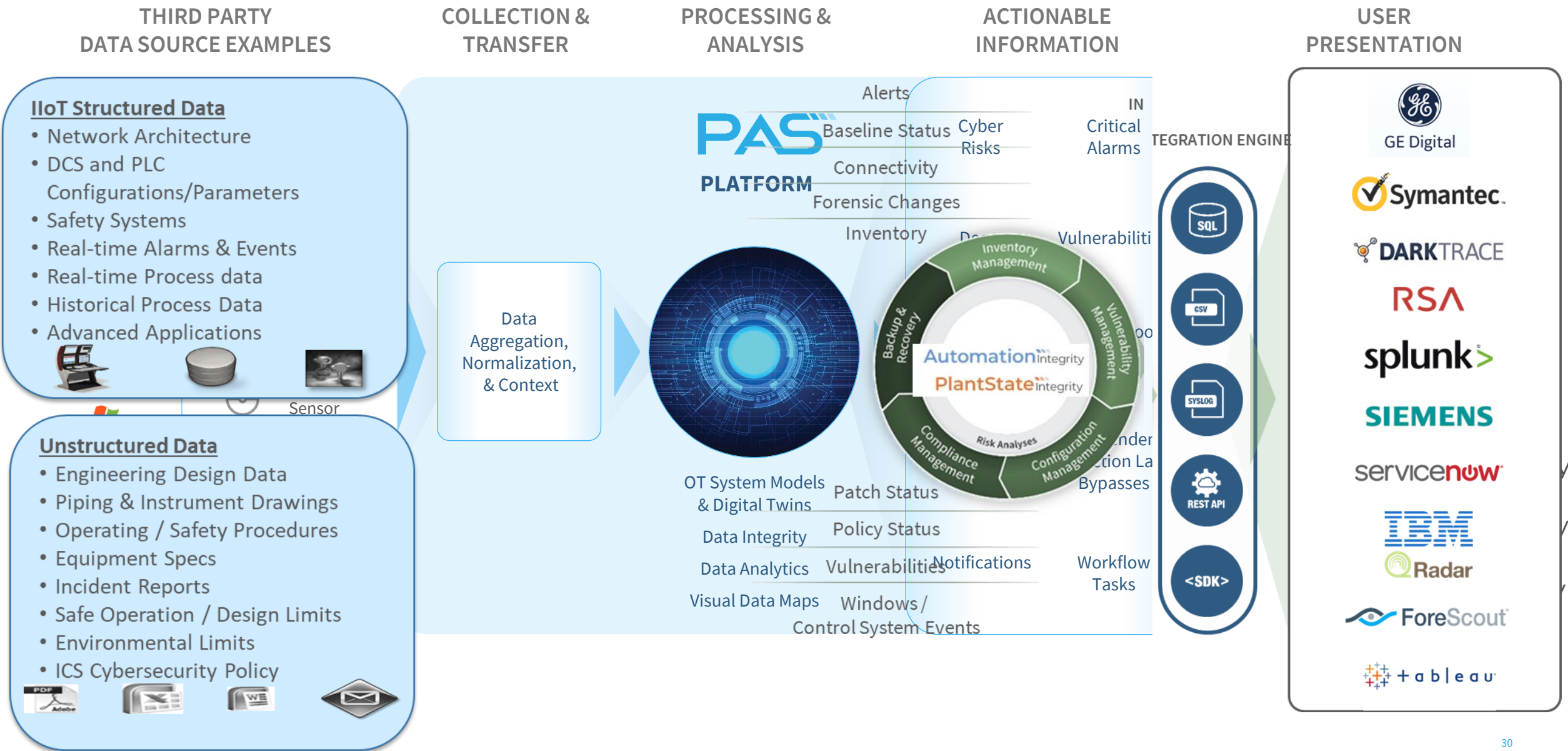
1. **Improve safety** by reducing Process alarm per hour per operator and having real time critical data, Managing Bypass and Critical Boundary
2. **Improve production** by monitoring and react on the non performing controller
3. **Reduce Unplanned Shutdown** by reacting to analysis on every Protection Layer as and indication of Performance
  - Process Alarm – Loop Performance – Boundary – Safety System Analysis



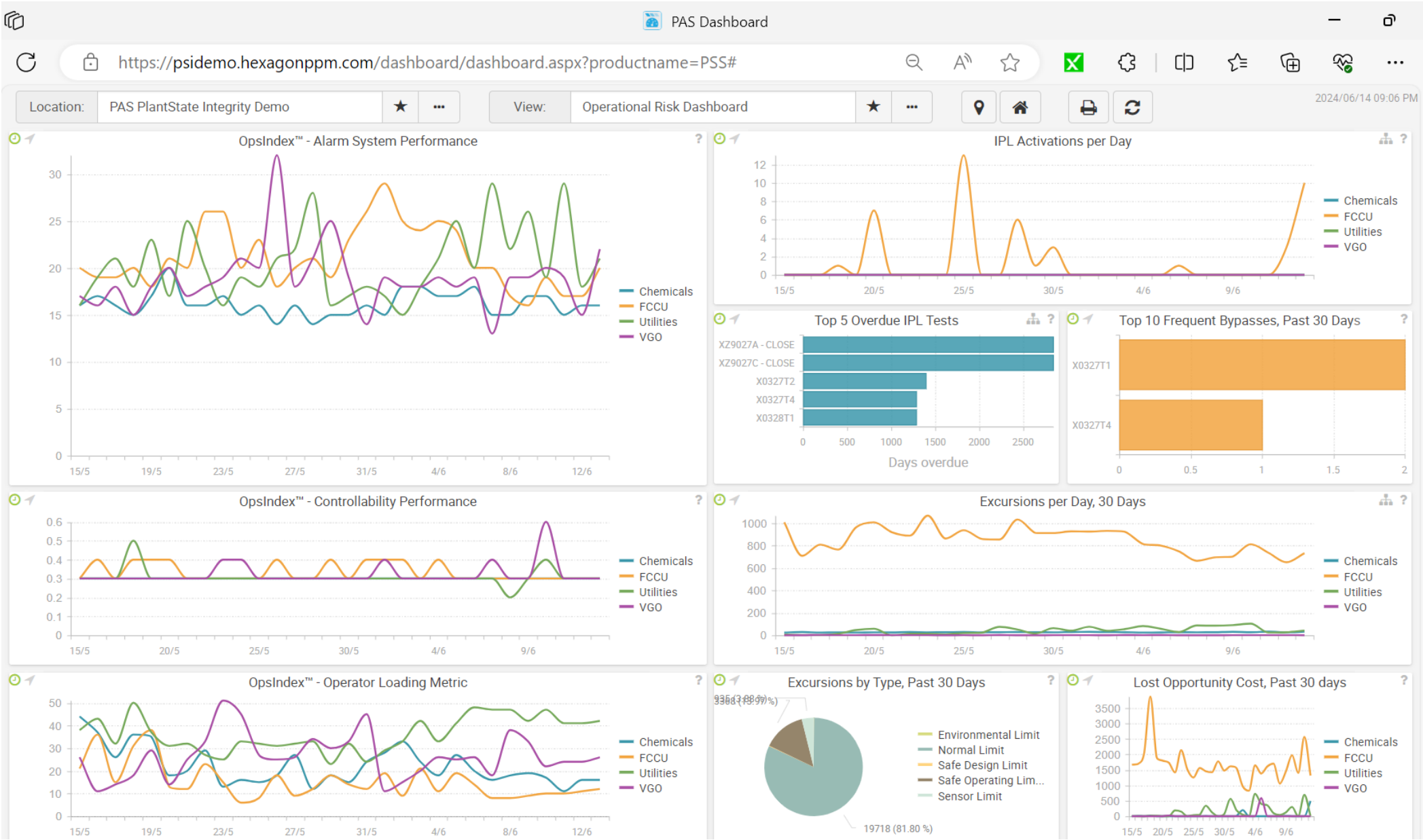
# Components of Operational and Maintenance Management - VISION



# Plant Digital Data Model Structure Overview



# OPERATIONAL RISK DASHBOARD



# Alarm Management & IPL case study

## Win the Day: ADB – LP Separator Level Transmitter

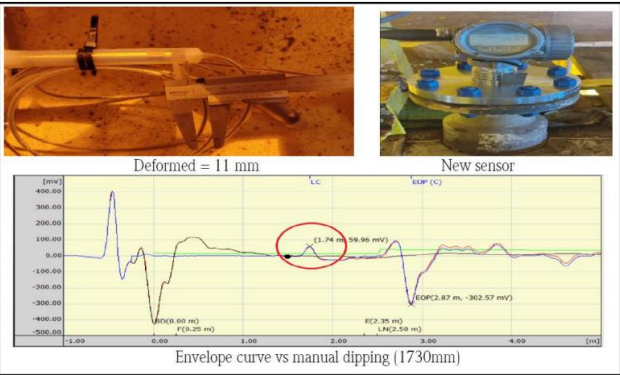
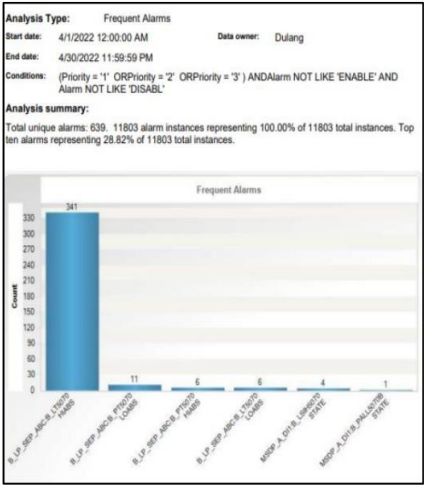
Approx. Value Creation: **RM 700k**

Upstream Indicative Process Safety Performance Indicators						
Back to Monthly View						
Alarms			Total Alarms	Average Alarm Rate	Alarm Type	
			2,090	1	All	
Tag	Alarm	Alarm Type	Point Description	Priority	Count	Chattering Repetitive First Timestamp
TC2_A11.B_T15521	HIABS	Process	TRN 2 1ST STG DISCH TEMP	3	402	4/25/2022 6:12:30 AM
B_HOT_OIL_B_LT4400	LOABS	Process	V-607 INTERFACE LEVEL	2	147	4/23/2022 9:34:43 PM
B_LP_SEP_ABC.B_LT5070	HIABS	Process	V-507 INTERFACE LEVEL	2	138	4/23/2022 2:44:24 PM
B_OILY_WTR.B_LT5850	HIABS	Process	V-585 INTERFACE LEVEL	3	79	4/25/2022 4:53:39 PM
CSDP.CGCEPZT6031_EN	HIABS	Process	PZT-6031 ENGINEERING VALUE	2	43	4/23/2022 9:17:50 AM
489MF_CIN.XS_54320_B	STATE	Others	TURBINE1 ENCLOSURE COM.AIR 60%LEL	2	42	4/23/2022 7:06:56 AM
489MF_CIN.XS_54321_B	STATE	Others	VENT EXH 60% LEL	2	42	4/23/2022 7:07:00 AM
PRE_TREAT.PT6070	HIABS	Process	A6070 CO2 REMV FUEL GAS INLET	2	42	4/23/2022 9:17:49 AM
DLB_WHCP_DI1.BPZT045_MC	STATE	Others	MOS CNFIRM-WELL B04S HI-LO PILOT	2	39	4/23/2022 8:21:41 PM
FUEL_GAS.PT6030	LOABS	Process	V6030 FG SCRUBBER TO FLTR COALS	2	37	4/23/2022 9:36:03 AM
FUEL_GAS.PT6030	HIABS	Process	V6030 FG SCRUBBER TO FLTR COALS	2	35	4/23/2022 9:17:51 AM
CGCE_TCP_AIPT2450	LOABS	Process	HPC 1 SUCTION GAS PRESS	2	29	4/23/2022 7:06:32 AM
TC2_A11.B_T15575	HIABS	Process	TRN 2 2ND STG SUCT TEMP	2	25	4/23/2022 2:12:42 PM
CGCE_CSDPB_PZAHH6075D	STATE	Process	PZT-6075 HIGH-HIGH ALARM	1	19	4/23/2022 11:17:56 A
CSDP.CGCEPZT6075_EN	HIABS	Process	PZT-6075 ENGINEERING VALUE	1	19	4/23/2022 11:17:56 A
TC2_A11.B_XL55311	STATE	Others	GCM TRAIN 2 STOP	2	19	4/23/2022 9:40:11 AM
B_SURGE_ABC.B_LT5080	LOABS	Process	V-508 CRUDE LEVEL	2	17	4/23/2022 9:23:19 AM
CSDP.CGCEPZT6075_EN	LLABS	Process	PZT-6075 ENGINEERING VALUE	1	17	4/23/2022 9:37:04 AM
B_HP_SEP_ABC.B_LT5041	LOABS	Process	V-504 CRUDE LEVEL	2	14	4/23/2022 10:27:43 A
GAS_CONDB_FT5532	LOABS	Process	SEAL GAS FLOW (SKID 2)	1	14	4/23/2022 9:39:13 AM
B_OILY_WTR.B_LT5851	HIABS	Process	V-585 CRUDE LEVEL	2	13	4/23/2022 10:58:19 AM
CGCE_TCP_AIPT2435	HIABS	Process	LPC 2 SUCTION GAS PRESS			
CGCE_TCP_AIPT2436	LOABS	Process	LPC 2 DISCHARGE GAS PRES			
PRE_TREAT.B_PT6071	LOABS	Process	A6070 CO2 REMV FUEL GAS I			
TC2_A11.B_P15521	LOABS	Process	TRN 2 1ST STG DISCH PRESS			
TC2_A11.B_P15575	LOABS	Process	TRN 2 2ND STG SUCT PRESS			
TC2_A11.B_P155301	CTATE	Others	TRN 2 1ST STG DISCH PRESS			
Legends						
COP						
Region PMA Field Dularing Year 2022 Month April Last Update 7/8/2022 11:54:38 AM						

- Frequent alarms appear for consecutive weeks. Steps by steps troubleshooting initiated.
- PRIME ADB has helped PMA in **EARLY DETECTION** of deformed transmitter

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Approx. Value Creation: **RM 700k**

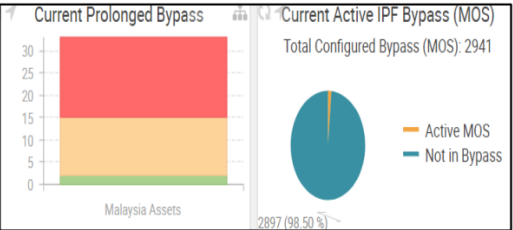
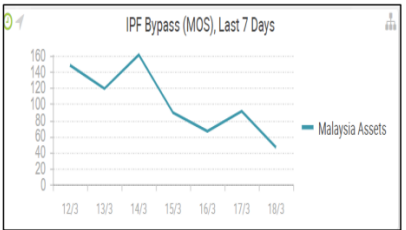


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## Win the Day: IPM – High SCE Bypass

Approx. Value Creation: **USD 10mil**

- 29 prolonged bypasses has been identified during bi-weekly sitting of Offshore platforms.
- Collaboration between Instrument, Frontliners, Asset team, Process Technologist to chart way forward for each tags.
- 17 bypassed has been normalized related to current operating and parameter and setpoints.
- 12 SSBoc with details discussion between SMES, PTS-PSM and Operations.





# Process Safety KPI Reporting from 9 days to 1 day with accuracy and validated data – via Hexagon PSI

## Process Safety KPI

[Open]

### PSPI KPI Reporting Flow

Manual PSPI Management Reporting

Process Owner : Process Safety Engineer, Prod Supt., Instrument Technician, Instrument Engineer, HSE Process Safety Engineer

No	Required Data Input	PSPI Reporting Process											
		Data Collection				Data Processing & Analysis				Output Collection			
		Method	PIC	Lead Time	Accuracy	Method	PIC	Lead Time	Accuracy	Method	PIC	Lead Time	Accuracy
1	Average Alarm/hour/operator	Manual Extraction from DCS	Prod Supt / Instr Tech	3 Days	Accurate	Manual analysis using Excel	Instr Eng	3 days	Less Accurate	Manual Collection from PIC	Process Safety Engineer	1 Day	Less Accurate
2	Peak Alarm rate/10 minutes	Manual Extraction from DCS	Prod Supt / Instr Tech		Accurate	Manual analysis using Excel	Instr Eng		Less Accurate	Manual Collection from PIC	Process Safety Engineer		Less Accurate
3	IPF Fail on demand	Manual Extraction from DCS	Prod Supt / Instr Tech	2 Days	Less Accurate	Manual analysis using Excel	Instr Eng	1 Day	Less Accurate	Manual Collection from PIC	Process Safety Engineer		Less Accurate
4	IPF activation on demand	Manual Extraction from DCS	Prod Supt / Instr Tech		Accurate	Manual analysis using Excel	Instr Eng		Accurate	Manual Collection from PIC	Process Safety Engineer		Accurate
5	NEL Excursion	Manual Extraction from DCS	Prod Supt / Instr Tech		Less Accurate	Manual analysis using Excel	Instr Eng		Less Accurate	Manual Collection from PIC	Process Safety Engineer		Less Accurate
TOTAL LEAD TIME & ACCURACY LEVEL				6 Days	Less Accurate			4 Days	Less Accurate			1 Day	Less Accurate

Process Owner : Process Safety Engineer, Prod Supt., Instrument Technician, Instrument Engineer, HSE Process Safety Engineer

No	Required Data Input	PSPI Reporting Process											
		Data Collection				Data Processing & Analysis				Output Collection			
		Method	System	Lead Time	Accuracy	Method	PIC	Lead Time	Accuracy	Method	PIC	Lead Time	Accuracy
1	Average Alarm/hour/operator	Automatic data capturing from DCS	PRIME	Real Time	Accurate	Automatic Analysis using Software	PRIME	Real Time	Accurate	Manual Analysis Using PRIME report/Dash board	Process Safety Engineer/HSE Process Safety Engineer	1 Day	Accurate
2	Peak Alarm rate/10 minutes												
3	IPF Fail on demand												
4	IPF activation on demand												
5	NEL Excursion												
TOTAL LEAD TIME & ACCURACY LEVEL				Real Time	Accurate			Real Time	Accurate			1 Day	Accurate

# 3 Take-aways

- **Digitalization** - Hexagon can help customers expand and interconnect their digitalization, unlocking new potential for their business and increasing potential benefits through a holistic and integrated approach.
- **Interoperability** - Centralize and visualize all types of asset information from data historians, the CMMS, the DCS, EAM, PLC and SCADA systems.
- **Smart Digital Reality**: Bringing It All Together - Using our Smart Digital Reality, you can deploy a comprehensive digital twin with Current Technology that enables an information management data ecosystem that's built and maintained throughout the asset lifecycle, allowing for a continuous journey of operational excellence.





# Thank you

## Let's start building your Smart Digital Reality.

### Q & A

