

Introduction – barrier model

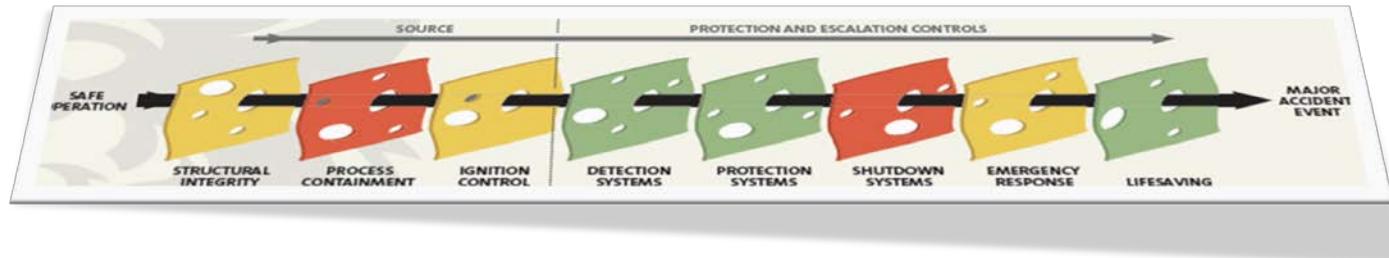
- Asset Integrity Guidelines
- Barrier Model Dashboard Components
- Colours (RAG) Definitions
- Barrier Model Risk Application short Overview

Introduction

Barrier Model forms part of the asset integrity tool kit that allows The Customer to effectively monitor, evaluate and manage operational risks across their entire portfolio of complex integrated facilities & environments, assets including people, plant and equipment; ensuring ‘fit-for-service’ decision based performance.

The solution visualizes “fit for service” using **Red | Amber | Green** coded ‘Swiss Cheese’ barriers, identifying the conditions and accumulated risk status for assets within the operational hierarchy.

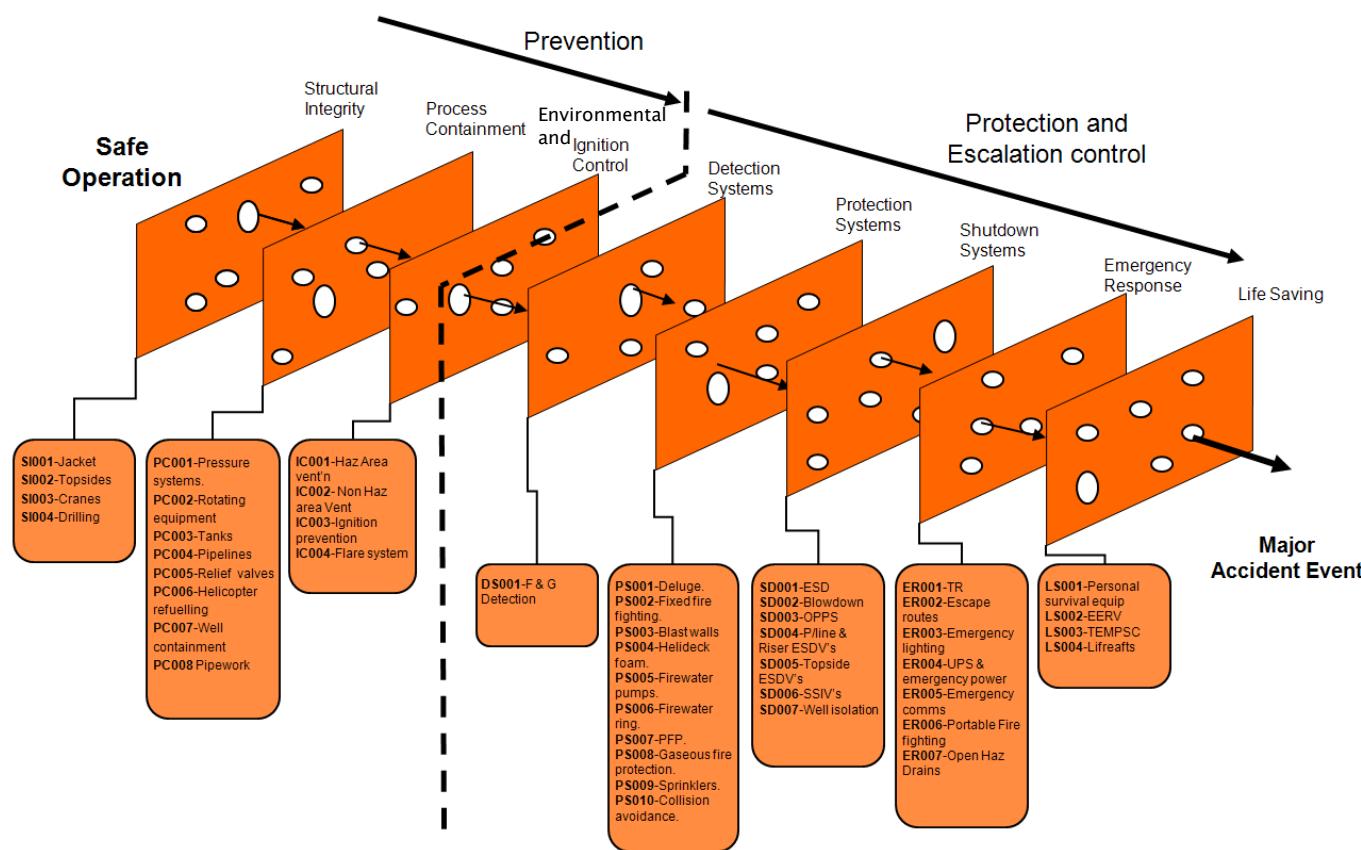
Introduction



In this model each barrier is defined as a functional grouping of safeguards and controls selected to prevent, or limit the effects of a Major Accident or Environmental Event. Each barrier typically includes a mix of: plant (equipment), processes (documented and 'custom and practice') and people (personal skills and their application).

The selected combination of these ensures the barrier should be suitable, sufficient and available to deliver its expected risk reduction. The barrier is the high level function group (e.g. Fire Suppression) and can be divided into separate Critical Systems (e.g. Deluge System), and further sub-divided into the Critical Elements (which generally be the tagged items representing the lowest level to which the Barrier can be sensibly sub-divided)

ORIGINAL Barrier Model Concept – Prevention of Major Accident Hazards



Nine barriers to major accident hazard (MAH):

- Structural integrity
 - Process containment
 - Ignition control
 - Environmental
 - Detection systems
 - Protection systems
 - Shutdown system
 - Emergency response
 - Lifesaving systems
- Prevention barriers – hardware barriers to MAH
- Protection and escalation barriers – control and mitigation barriers to MAH

Barrier Model Concept

- ▶ Question posed by the HSE –

“How do you assess and demonstrate the cumulative effect of the risks on your assets?”

adoption of the “Swiss Cheese” barrier model

- ▶ Customers needed to:
 - develop a consolidated view on asset risks
 - pull the information from ORAs and SCRAs*
- ▶ To consolidate and assess cumulative risk in an easy-to-use and informative way

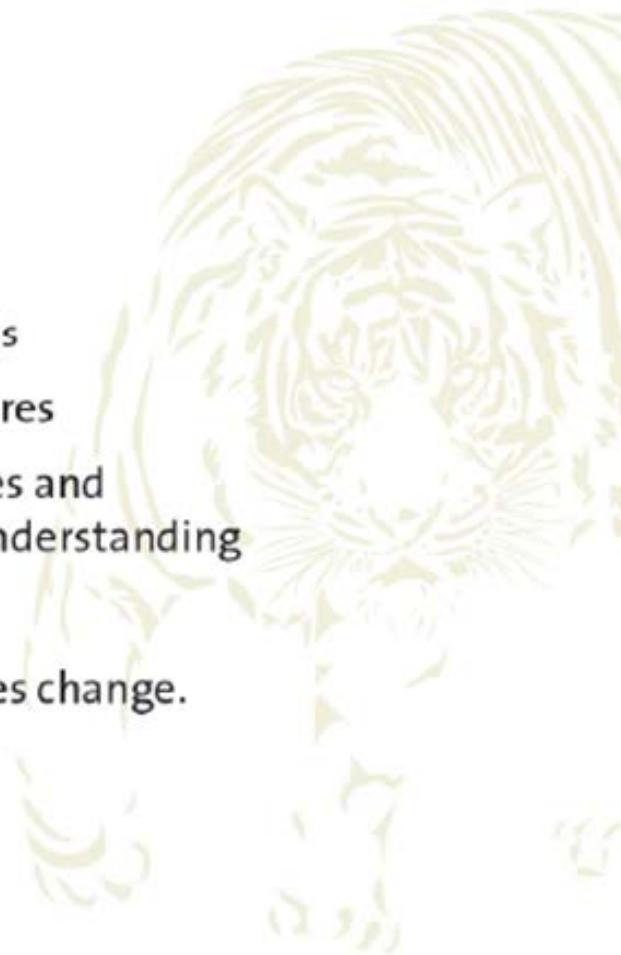
*ORA = Operational Risk Assessment

SCRA = Safety Critical Risk Assessment

Asset Integrity

Risk Management

- Understanding of the risk
- Suitable and sufficient controlled mitigation measures
- Communication to area technicians
- Management of mitigation measures
- Review / audit mitigation measures and management by demonstrating understanding
- Maintain awareness
- Re-assessment when circumstances change.



**We are in control and
we can demonstrate it.**

Management Communication of the Cumulative Risk Model

Daily/weekly

- Provides OIM with up-to-date information on installation condition so they can assess suitability to continue operations

Fortnightly

- Informs onshore Operations Manager of installation status, progress of ongoing remedial scopes and gives opportunity to prioritise and escalate issues with on and offshore teams

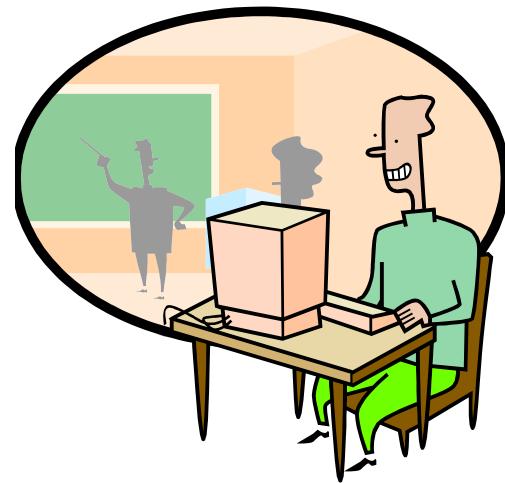
Monthly

- Operate Business Delivery Unit – provides current asset integrity and status of the operated assets' SCEs and barriers to major accident hazards. Provides progress update on remediation of barrier impairments

Monthly

- Provides Asset General Manager and Leadership Team with management overview of asset condition

Barrier Model

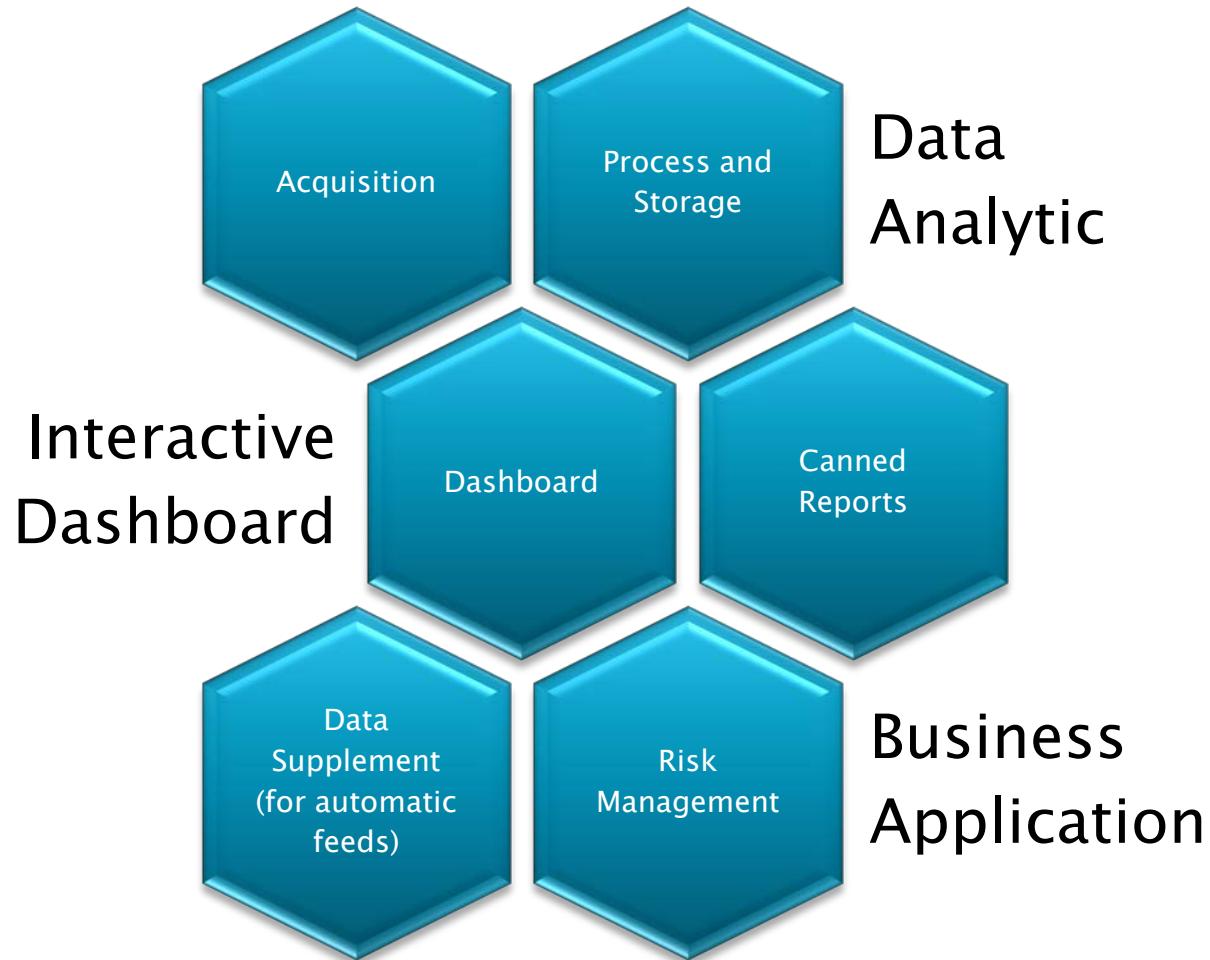


Dashboard

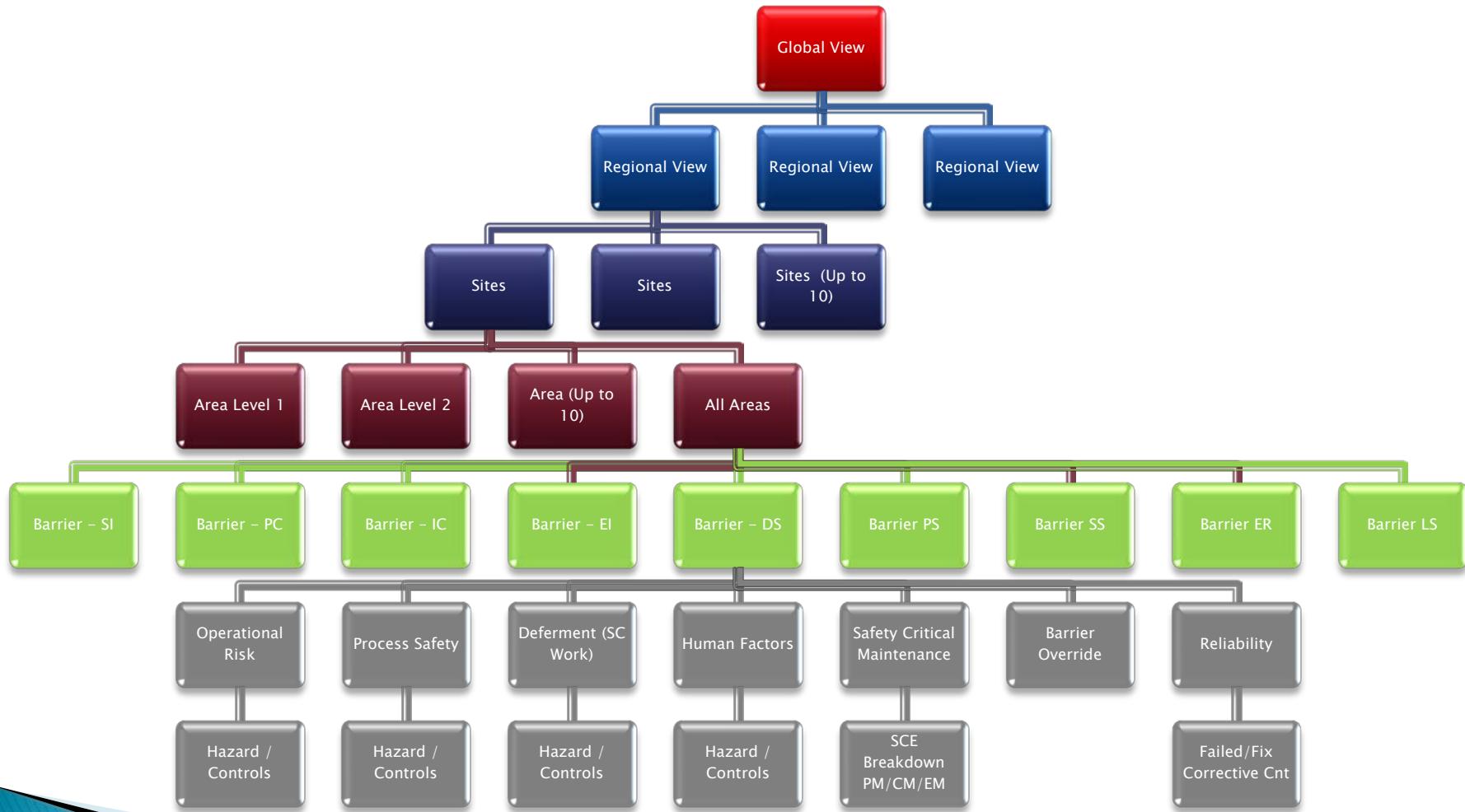
★ Why use Dashboard technology ?

- Provide visual cues for business
- Encourage conversation
- Frame content in a single place
- Communicate culture and awareness
- Simple to use
- Touch screen enabled for both big monitors or mobile devices

Components



Data Structure



Barrier Model



Barrier Model

Barrier Model Global View

OMV Refresh Print

August 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	1

Asset Integrity

ROMANIA

Romania

Init	Res
Structural Integrity	■ ■
Process Containment	■ ■
Ignition Control	■ ■
Environment Impact	■ ■
Detection Systems	■ ■
Protection Systems	■ ■
Shutdown Systems	■ ■
Emergency Response	■ ■
Life Saving Systems	■ ■

Press to DrillDown to the Regional View

PFS-3

Initial | SI | PC | IC | EI | DS | PS | SD | ER | LS

Initial	Yellow Diamond	Red Diamond	Green Diamond	Yellow Diamond	Yellow Diamond	Yellow Diamond	Yellow Diamond	Red Diamond	Red Diamond
Residual	Yellow Diamond	Red Diamond	Green Diamond	Yellow Diamond	Yellow Diamond	Yellow Diamond	Yellow Diamond	Red Diamond	Red Diamond

Asset I Crisan Banet AS1 B

Asset II Oltenia AS2 B

Asset III Muntenia Vest AS3 B

Asset IV Moesia Sud AS4 B

Asset V Moesia AS5 B

Asset VI Muntenia Cnt AS6 B

Asset VII Muntenia Est AS7 B

Asset VIII Moldova Nort AS8 B

Asset IX Moldova Sud AS9 B

Asset X MEDIA PCF-CENTRALPESCARUS PFS-3 PFS-4 PFS-6 PFS-7 PFS-8 B

Close

Barrier Model

Turnpoint Solutions **Barrier Model**

Unallocated PS Codes 

ALL COGEN CONTROL BUILDING ALL SITES

ALSHN Manage Data Barrier Report All Barriers Refresh Print What's This? Deck Vie

July 2015

Mon	Tue	Wed	Thu	Fri	Sat	Sun
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Regional Level Display Containing All Sites.

COGEN LOCATION1 LOCATION2 TERMINAL

Initial Resid Initial Resid Initial Resid Initial Resid

Structural	Yellow	Yellow	Red	Yellow	Green	Green	Green	Green
Process Containment	Red	Yellow	Red	Red	Yellow	Yellow	Red	Yellow
Ignition Control	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Green	Green
Environmental Impact	Green	Green	Green	Green	Green	Green	Green	Green
Detection Systems	Green	Green	Yellow	Green	Yellow	Yellow	Green	Green
Protection Systems	Yellow	Yellow	Red	Yellow	Green	Green	Red	Yellow
Shutdown Systems	Red	Red	Red	Yellow	Green	Green	Green	Green
Emergency Response	Yellow	Yellow	Green	Green	Green	Yellow	Green	Green
Lifesaving Systems	Green	Green	Yellow	Yellow	Yellow	Green	Green	Green

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Barrier Model



What's this? - Displays the date and time in which information was processed by the background data analytic. It also displays an explanation on the integrity score of the dashboard. This equates to the percentage of records collected versus the ones allocated correctly to a PS code.

Print – Will print the dashboard page exactly as it's displayed.

Refresh – Refresh data from the server.

All Barriers – Is an option where the user can filter transactions based on the barrier selected. The switch is a toggle and only affects the risk records tab. The toggle can be triggered at any time.

Barrier Report – Displays barriers compared between 2 dates. There are 2 functions, summary of detail and this determines if the report lists all the details between the dates selected.

Manage Data – This allows the user to open the barrier model risk application in which a number of data entry functions can be performed

Barrier Model

Turnpoint Solutions Barrier Model

Unallocated PS Codes

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

ALL Accommodation Bridge

SITE - LOCATION1

Initial

Barrier

- Structural
- Process Containment
- Ignition Control
- Environmental Impact
- Detection Systems
- Protection Systems
- Shutdown Systems
- Emergency Response
- Lifesaving Systems

Residual

Message

Reports Risk Record SC Backlog Reliability

SI001 DF 112222 PS - SI001 Integrity impairment of C8 Caisson SI003 OP 101832 Operate North Crane with damaged Buffer Bar SI001 OP 114294 Dropped Object Threat from Riser Platform Caissons	PC001 DF 109481 PS - PC001 IVI deferral of TEG Contactor 1. PC001 DF 109483 PS - PC001 IVI deferral of HP Separator Vessel PC007 DF 112754 PS PC007 - Operational Well Containment T2 PC001 DF 110807 PS-	IC003 DF 108774 PS- IC003 Ignition Control Platform Main Generators IC003 OP 92087 Operation of Non Atex certified Containers IC OP 112958 Operation of Lab w/o being connected to platform F&G	DS001 DF 111314 PS - DS001 Failure of Gas Detector (GD- 6601) DS001 PS 108775 PS - DS001 Failure of Flame Detector (IR-7503)	PS007 DF 113313 PS - PS007 Impairment of compressor engine enclosures PS004 PS 112698 PS004 - Operate NEV with Reduced Fire Water Pump B avail. during C1 replacement PS010 PS 114528 PS010 Air and Sea Collision	SD002 DF 111970 PS - SD002 Depressurisation Systems Everest Deferral SD002 DF 108857 PS- SD002 XV- 03558 Fails to Close on demand SD002 DF 112225 PS - SD002 - Operate South Ev with excessive blowdown time	LS003 PS 108773 PS- LS003 TEMPSC (Lifeboat 2) LS003 PS 117083 PS LS003 Continued Operation with TEMPSC not complying - RISER
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Barrier Model

Turnpoint Solutions Barrier Model

Unallocated PS Codes  ALL COGEN CONTROL BUILDING

ALSHN Manage Data Barrier Report All Barriers Refresh Print What's This? Deck Vie

July 2015 Mon Tue Wed Thu Fri Sat Sun

6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SITE - COGEN

Structural **Return to Barrier**

Process Containment

Correctives PMs: 3 / OP Count: 2 / HF Count: 0 / PS Count: 1

Messages Reports Risk Record SC Backlog Reliability

Selected row details: DS DS001 COG-TRK-6220
Details: ISSUE NOTES 1.1

Mitigation: MCDougallS01
Mitigation: MIT NOTES 1.1

Recovery Plan:

Barrier pscode	ORA/SCRA	ITEM	Details	Mitigation Control	Recovery Plan	Actionee	Raised Date	Target Date	Update
DS DS001		COG-TRK-	ISSUE NOTES 1.1	MIT NOTES 1.1		MCDougallS01	04/11/2014	30/10/2014	
IC IC003	HF	COG-13-00	Electrical Resource limitations	Mitigation control information entered here	Recovery plan information entered here		08/11/2013	01/01/1900	
PC PC001	PS	COG-15-00	Failure of Process container	The PSV appears to be functioning	It is believed to a bridle originally installed to provide bulls-eye gauge glass nozzles and relocate the low level alarm.		30/06/2015	01/01/1900	
				Increase the set point margin above the low level trip at which the alarm	Work scheduled for a shut-down in September.				
				Increase the margin below the high pressure trip at which the alarm is tri	Establish a new bridle on the gauge glass nozzles and relocate the low lev				
				Remove any scaffolding not required for the Cor under Ins inspection.	Re-calibrate the PSV and high pressure trip transmitter.				
				Barrier off the area. Work in the area only under permit.					

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Barrier Model

Turnpoint Solutions **Barrier Model**

Unallocated PS Codes  ALL COGEN CONTROL BUILDING SITE - COGEN

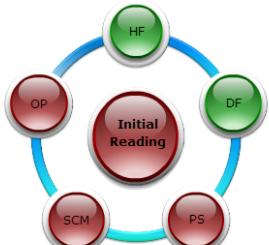
ALSHN Manage Data Barrier Report All Barriers Refresh Print What's This? Deck View 

Process Containment

Structural 

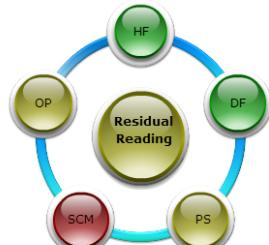
Process Containment Ignition Control Environmental Impact Detection Systems Protection Systems Shutdown Systems Emergency Response Lifesaving Systems

Initial Reading



HF
OP
DF
SCM
PS

Residual Reading



HF
OP
DF
SCM
PS

Notes for Central Barrier Color: If any nodes are red - centre is red. If 3 nodes are amber - centre is red. If any node is amber and no nodes are red - centre is amber. Otherwise centre is green. Overrides are possible by user.

Colour Key as Per Risk Matrix (Volume contributes to status)
 1-4 5-14 15-25

Centre Override = NO OVERRIDE

OP Details COG-15-00006 Failure of Process process control and shut down on the 1st stage separator (Tag VZ X01) causing overpressure of downstream separator.
 ALARP 10-5

PS Details COG-15-00003 Failure of Process containment barrier on the 1st stage separator (Tag V-49001) causing over pressure of downstream separator.
 ALARP 10-5

The SCM score is RED because there are 3 safety critical work orders with a priority from 1

Close Window

Correctives PMs 33
 OP Count 2
 DF Count 0
 HF Count 1
 PS Count 1

Messages Reports Risk Records SC Backlog Reliability

Area	Barrier	PS Code	Item	Details	Initial Score	Residual Score	ALARP	Status	Approved	Valid To	Extensions	Duration	Type
Barrier Selection - ALL BARRIERS													
PROCESS AREA	IC	IC003	COG-13-00001	Electrical Resource limitations	12	9	354	Review	07/07/2015	18/04/2016			Human Factors
PROCESS AREA	PC	PC001	COG-15-00003	Failure of Process containment barrier on the 1st stage separator (Tag V-49001) causing over pre	16	8	435	Pending Ap	08/07/2015	30/10/2015			Process Safety
PROCESS AREA	PC	PC005	COG-15-00006	Failure of Process process control and shut down on the 1st stage separator (Tag VZ X01) causin	16	8	436	Approved	03/07/2015				Operation
PROCESS AREA	PC	PC002	COG-15-00007	Test Separator -Excessive pump vibration from Oil leg pump in test separator when testing low pr	8	4	437	Review		12/12/2015			Operation
PROCESS AREA	SD	SD001	COG-15-00002	Compressor backflow risk on gas compression train.	16	16	438	Review	08/07/2015	07/01/2016			Process Safety
<input type="button" value="ALL"/>													

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Barrier Model

Barrier Model

Turnpoint Solutions Barrier Model

Unallocated PS Codes

ALL COGEN CONTROL BUILDING SITE - COGEN

ALSHN Manage Data Barrier Report All Barriers Refresh Print What's This? Deck View

July 2013

Structural Process Containment Ignition Control Environmental Impact Detection Systems Protection Systems Shutdown Systems Emergency Response Lifesaving Systems

Return to Barrier

Protection Systems

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Colour Key as Per Risk Matrix (Volume contributes to status)

1-4	5-14	15-25
-----	------	-------

Centre Override = NO OVERRIDE

The SCM score is RED because there are over 10 preventative and corrective safety critical work orders in backlog, there is 1 or more P1-3 corrective safety critical work orders open as at today

Close Window

Messages Reports Risk Records SC Backlog Reliability

Safety Critical Break Down for Protection Systems

12 Month Rolling Average derived from the reliability information stored in the CMMS. Average is based on the number of passed tests per asset divided by the number of failed and fixed + failed inspections.

PS001 - DELUGE SYSTEM	0
PS002 - STRUCT ELEMENTS PROVIDING F AND E PROTECTION	0
PS003 - FOAM SYSTEMS	0
PS004 - FIREWATER PUMPS	1.28
PS005 - FIREWATER RING MAIN	8
PS006 - PASSIVE FIRE PROTECTION	3.65
PS007 - NITROGEN BLANKET	0
PS008 - SPRINKLER SYSTEM	100
PS009 - DRY POWDER SYSTEM	0
PS010 - COLLISION AVOIDANCE (INCLUDING NAV AIDS)	0
PS012 - MET OCEAN DATA GATHERING SYSTEM	0

Failed and Fixed Percentage

To drill down click on the numbers.

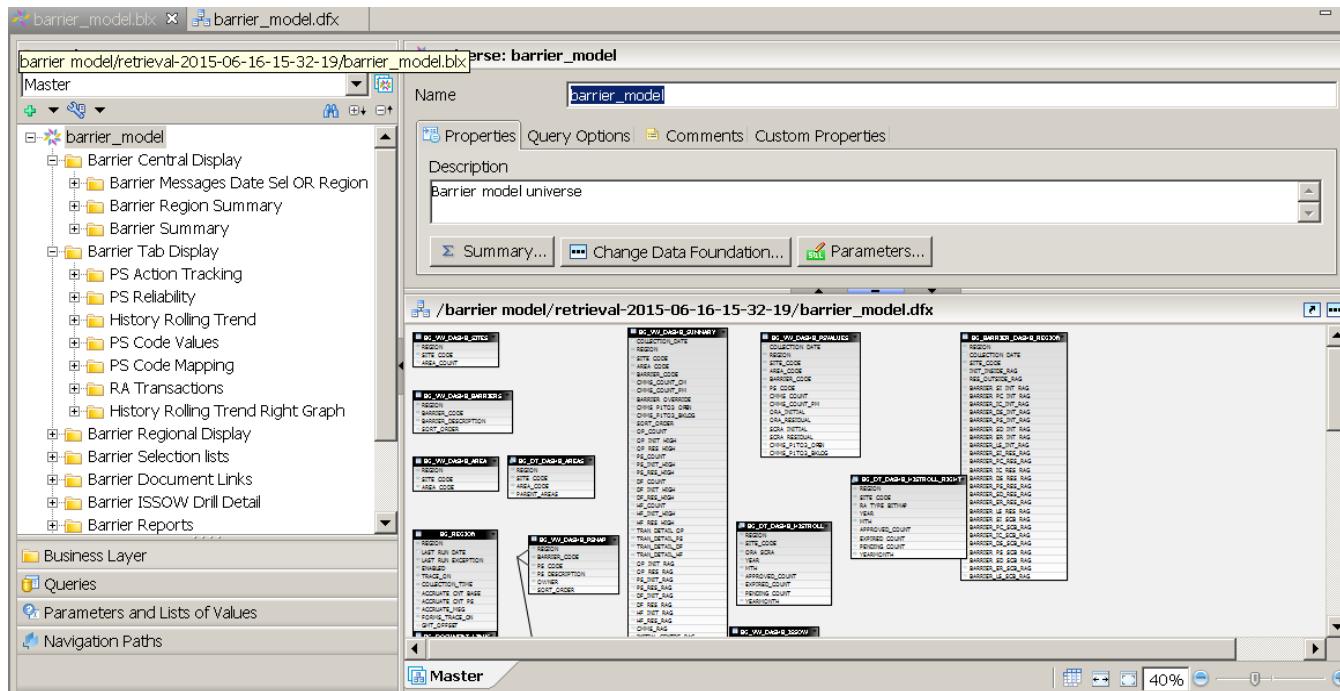
Corrective break down WO Counts

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Barrier Model

Barrier Model - Universe

- Optional Ad-hoc Reporting – Barrier Model can be supplied with a dedicated Business Objects Universe as the system database is Oracle.
 - TPSCO would suggest a 2 day training course on structures and system configuration.



Barrier Model – Reports

- **Histogram** – Trend over a rolling year
- **SC Backlog Drill Down** – Safety Critical CM & PM work orders
- **SCE Status** – Measure of Pass, Fail / Fixed and Fail statistics taken from Work Management history reporting over a rolling year.
- **Action Tracker** – Current status of issues
- **TA Report** – Specific report by discipline to allow Technical Authorities to be better informed for their areas of responsibility
- Associated Standards – hot links to standards relevant to risk management
- **PS Code Allocation** – summary report with records not allocated to Performance Standard
- **Yearly Barrier Model Report** – Requires a selection of dates and region to run. This report holds enough details to support an end of year HSE analysis.
- **History Report** – Requires a selection of dates and region. Provides a history report hard copy of the same information found in the histogram.
- **Barrier Report** – Called from the main menu on the barrier, this report is used to compare between months.

Barrier Model

Turnpoint Solutions Barrier Model

Unallocated PS Codes July 2015 ALL COGEN CONTROL BUILDING

ALSHN Manage Data Barrier Report All Barriers Refresh Print What's This? Deck View SITE - COGEN

Structural Return to Barrier

Process Containment

Initial Reading Residual Reading

HF HF
OP DF
SCM PS

Correctives OP Count HP Count PS Count

PMs 3 2 0

Notes for Central Barrier Color: If any nodes are red - centre is red. If 3 nodes are amber - centre is red. If any node is amber and no nodes are red - centre is amber. Otherwise centre is green. Overrides are possible by user.

Colour Key as Per Risk Matrix (Volume contributes to status)
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Centre Override = NO OVERRIDE

OP Details COG-15-00006
Failure of Process process control and shut down on the 1st stage separator (Tag VZ X01) causing overpressure of downstream separator.
ALARP 10-5

PS Details COG-15-00003
Failure of Process containment barrier on the 1st stage separator (Tag V-49001) causing over pressure of downstream separator.
ALARP 10-5

The SCM score is RED because there are 3 safety critical work orders with a priority from 1

Close Window

Messages Reports Risk Records SC Backlog Reliability

RA History SC Backlog Drill down Reliability Drill Down Action Tracker Report TA Report Associated Standards PS Code Allocation Yearly Barrier Report

Count

2014-06-JUN 2014-07-JUL 2014-08-AUG 2014-09-SEP 2014-10-OCT 2014-11-NOV 2014-12-DEC 2015-01-JAN 2015-02-FEB 2015-03-MAR 2015-04-APR 2015-05-MAY

Months - Current Year Records

Operation Process Safety Deferment

Counts

2014-06-JUN 2014-07-JUL 2014-08-AUG 2014-09-SEP 2014-10-OCT 2014-11-NOV 2014-12-DEC 2015-01-JAN 2015-02-FEB 2015-03-MAR 2015-04-APR 2015-05-MAY

Months - Current Year (All Records)

Operation Deferment Process Safety

Approved Pending Expired

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Barrier Model - Action / ta report

Selected Region = for selection 31/10/2014 Friday, 31 October

SI Structural Integrity PC Process Containment IC Ignition Control DS Detection systems PS Protection systems SD Shutdown systems ER Emergency Response LS Life Saving Systems

Initial Residual

Control & Instrumentation

Barrier Code	Issue Notes	Item	MIT Notes	Item Notes	Target Date	Actions
4 DS	test 1 test risk summary	ARM-13-00217	aduHUSOkQqjdGJQgqfKc	test 1 test risk 1	01/01/1900	imported
	Risk summary entered	ARM-13-00218	woqfsof	whvmtjyt klygk u taz	01/01/1900	
	Risk summary this is a further update	ARM-13-00227	Mitigation Context Summary entered	Recovery Summary	01/01/1900	
	test risk 1 test risk summary	ARM-13-00217	Mitigate context	recovery	01/01/1900	imported
		ARM-13-00212	test risk 2 test mit sum 1	test rec plan risk 3	01/01/1900	
		111427			14/12/2014	
		ARM-13-00210			31/02/2013	
		ARM-13-00212				
6 SD	Delay in the initiation of ESD0 due to THIS WILL APPEAR ON THE	ARM-13-00235	The following signals from Hobsons will remain active i.e. Push Button MITIGATION CONTROL DATA WILL APPEAR	BGT&T and Vendor Support Engineers are currently engaged RECOVERY SUMMARY ATA WILL APPEAR	01/01/1900	
		105699			30/12/2014	BERRYMAN

File Size: 79.12 KB of 117.43 KB : http://tmwdbarm51/barrier/BARRIER_EEP/BM_ACTION_BY_DISCIPLINE.PDF
Unknown Zone | Protected Mode: Off

Barrier Model - history Report

BM_BARRIER_HISTORY.PDF - Adobe Reader

File Edit View Window Help

Bookmarks

Comment

Friday, 24 July

Barrier Model History Report

Operational Process Safety Deferment

Site Code	Area Code	Barrier Code	BS Code	Status	Detail	Initial Score	Revised Score	Obs Score
ARMADA	Level 1	PC	PO002	Live	PC002-1.5 Compressor Export Pump Motor A (PM-480)	4	2	OP
	Level 2	PC	PO005	Live	Gas Export PZV-00012-A leaking pilot pipe work	16	8	PS
	Level 2	PC	PO005	Requested	K9S Suction Strainer PZV-00002-A leaking pilot pipe work	16	8	DF
NEVA-Accommodation	IC	IC002		Exceeded Validity	IC002 - Internal accommodation the barrier not fully close	8	4	PS
NEVA-Bridge	PC	PO008		Live	Operate River Platform with temporary Diesel Supply	9	2	OP
NEVACATI ESY Deck	PC	PO008		Live	South Eweat SJ Wall Annulus management	10	5	PS
NEVACATI ESY Deck	PS	PS008		Exceeded Validity	PS - PC004 and PS008 38"	10	5	DF
NEVACATI ESY Deck	SD	SD002		Exceeded Validity	PS - SD002 - Operate South by excessive breakdown	9	3	PS
NEVACATI ESY Deck	SD	SD003		Exceeded Validity	PS-SD003 - Annada Compressor RESOV XV-2280 Low	16	4	DF
NEVACATI ESY Deck	SD	SD003		Pending	PS-SD003 - Annada Compressor RESOV XV-2280 Low	16	4	PS
NEVACATI ESY Deck	SI	SI001		Exceeded Validity	Continued operation of Everett with River CDS isolated	9	4	PS
NEVACATI ESY Deck	SI	SI001		Exceeded Validity	PS - PS004 - Operate with degraded CATS Calcium C1	20	10	PS
NEVACATI ESY Deck	SI	SI001		Live	Dropped Object Threat from River Platform Calcium	12	4	PS
NEVACATI ESY Deck	SI	SI001		Live	Dropped Object Threat from River Platform Calcium	12	5	PS
NEVACATI Upper Deck	PC	PC001		Exceeded Validity	PC001 / PC004 - Leaked / Annada Gas Pig Receiver & Line	12	4	DF
NEVACATI Upper Deck	PC	PC008		Exceeded Validity	PC008 - V-53722 River Closed Drain Pipeworks Anomalies	12	4	DF
NEVACATI Upper Deck	PC	PC008		Live	PC008 / PC004 / PC004 - H1 Defense & River Platform	12	4	DF
NEVACATI Upper Deck	SD	SD002		Live	Controlled Depressurisation of Everett	12	4	PS
NEVACATI Upper Deck	SD	SD004		Live	Continue operation of Annada Pipelines on Everett River	12	4	PS
NEVACATI Deck	ER	ER007		Live	Operate North Everett without Open Draine Pump	12	5	OP
NEVACATI Deck	ER	ER007		Live	Operate North Everett without Open Draine Pump	12	5	OP
NEVACATI Deck	PC	PC001		Exceeded Validity	PC 001 / 142 - Uncertainty of Lower Master Valve (LMV)	12	4	DF
NEVACATI Deck	PC	PC002		Exceeded Validity	Use of air driven pump on Closed drain system	12	6	OP
NEVACATI Deck	PC	PC007		Exceeded Validity	PS PC007 Operate ET-05 Well with Line "A" Annulus Pre	12	9	PS

Barrier Model – reliability report

File Edit View Window Help

1 / 394 48.4% Comment

Reliability Breakdown 12 months consolidation.

Selected Region - Friday, 24 July

Platform	Buster	PIS Code	Owner	Green Pass	Amber Failed	Red Fail	FF_percent	Cm Failed
1 SI Structural Integrity	S1001 - SUBSEA STRUCTURE	Structural		10	0	0	0.00%	0
	S1002 - TOPSIDE STRUCTURE	Structural		5	0	0	0.00%	0
	S1003 - CRANES AND LIFTING EQUIPMENT	Cranes & Lifting Equipment		204	0	0	0.00%	0
	Sum:			219	0	0	0.00%	0
Platform	Buster	PIS Code	Owner	Green Pass	Amber Failed	Red Fail	FF_percent	Cm Failed
2 PC Process Containment	PC001 - PRESSURE VESSEL, HEAT EXCHANGER	Pressure Systems		100	0	0	0.00%	14
	PC002 - ROTATING EQUIPMENT	Rotating Equipment		68	0	2	2.86%	0
	PC003 - TANKS	Pressure Systems		4	0	0	0.00%	0
	PC004 - PIPELINES WITHIN THE 500M ZONE	Pipelines		0	0	0	0.00%	2
	PC005 - RELIEF VALVES	Process & Production Chemistry		115	0	0	0.00%	0
	PC006 - HELICOPTER REFUELING	Pressure Systems		365	0	0	0.00%	0
	PC007 - OPERATIONAL WELL CONTAINMENT	Well Integrity - Completions, Testing & Interventions		47	0	2	4.08%	0
	PC008 - PIPING INC SMALL-BORE TUBING AND F	Pressure Systems		0	0	0	0.00%	3
	Sum:			898	0	4	0.67%	16
Platform	Buster	PIS Code	Owner	Green Pass	Amber Failed	Red Fail	FF_percent	Cm Failed
3 IC Ignition Control	IC002 - NON-HAZARDOUS AREA VENTILATION	HVAC		188	0	0	0.00%	0
	IC003 - IGNITION PREVENTION (EX EQUIPMENT)	Electrical		340	0	0	0.00%	0
	TE001 - TEMPORARY EQUIPMENT	Process & Production Chemistry		318	0	0	0.00%	0
	Sum:			746	0	0	0.00%	0
Platform	Buster	PIS Code	Owner	Green Pass	Amber Failed	Red Fail	FF_percent	Cm Failed
4 DS Detection Systems	DS001 - FIRE AND GAS DETECTION SYSTEMS	Control & Instrumentation		426	0	3	0.70%	0
	Sum:			428	0	3	0.70%	0
Platform	Buster	PIS Code	Owner	Green Pass	Amber Failed	Red Fail	FF_percent	Cm Failed
5 PS Protection Systems	PS001 - DELUGE SYSTEM	Technical Safety		84	8	0	8.70%	0
	PS002 - STRUCT ELEMENTS PROVIDING F AND E	Structural		46	0	0	0.00%	0
	PS003 - HELIDECK FOAM SYSTEMS	Technical Safety		54	0	0	0.00%	0
	PS004 - FIREWATER PUMPS	Technical Safety		218	0	0	0.00%	0
	PS005 - FIREWATER RING MAIN	Pressure Systems		25	0	0	0.00%	0
	PS006 - PASSIVE FIRE PROTECTION	Structural		0	0	0	0.00%	0
	PS007 - GASCOUS FIRE PROTECTION SYSTEM	Technical Safety		37	0	0	0.00%	0
	PS008 - SPRINKLER SYSTEM	Technical Safety		22	0	0	0.00%	0
	PS009 - DRY POWDER SYSTEM	Technical Safety		1	0	0	0.00%	0
	PS010 - COLLISION AVOIDANCE (INCLUDING NA)	Electrical		81	0	0	0.00%	0

Barrier Model - work order drilldown

Work Order Drill Down by Site and Barrier Code.

Selected Region = for Total work orders 161

Monday, 27 May 2013

LS003

Barrier Level	Workorder	Workdesc	Safety Critical	Area Code	Maintenance Type	Asset No	Lfd	Job Plan No	Priority	Pfto3 Blklog Ind
2 - Preventive	WA-1032405	LIFEBOAT/DAVITS TWO YEARLY CHECKS S-69002	SAFETY CRITICAL	S-69002	PREVENTATIVE	100857	23 May 2013	M-R013-LS003-1A	N	
	WA-1032408	COMPREHENSIVE LIFEBOAT TESTING - S-69001	SAFETY CRITICAL	S-69001	PREVENTATIVE	101384	23 May 2013	M-R003-LS003-1A	N	
	WA-1032411	COMPREHENSIVE LIFEBOAT TESTING - S-69002	SAFETY CRITICAL	S-69002	PREVENTATIVE	100857	23 May 2013	M-R004-LS003-1A	N	

PC001

Barrier Level	Workorder	Workdesc	Safety Critical	Area Code	Maintenance Type	Asset No	Lfd	Job Plan No	Priority	Pfto3 Blklog Ind
1 - Emergency	WA-1031770	UT PI0 LAUNCHER PL-1225 ARM-V-50001 AS PEER WORKPACK ARM-PL-WS	SAFETY CRITICAL	V-50001	CORRECTIVE	105770	1 Feb 2013		3	Y

PC005

Barrier Level	Workorder	Workdesc	Safety Critical	Area Code	Maintenance Type	Asset No	Lfd	Job Plan No	Priority	Pfto3 Blklog Ind
2 - Preventive	WA-1031631	2013 SD Fit Replacement PZV-07005-C Export Gas Cooler Comp Train-A-X-9000	SAFETY CRITICAL	PZV-07005-C	PREVENTATIVE	122644	15 May 2013	M190-PC005-004A	N	

SD001

Barrier Level	Workorder	Workdesc	Safety Critical	Area Code	Maintenance Type	Asset No	Lfd	Job Plan No	Priority	Pfto3 Blklog Ind
2 - Preventive	WA-1027302	PM ROUTE SCE: NWIS ASPHALTENE SKID - SIL RATED INSTRUMENT CALIBR	SAFETY CRITICAL	Z-54469	PREVENTATIVE	23 Mar 2013	I520-SD001-010A	N		
	WA-1027308	PM ROUTE SCE: FUNCTION TEST GAUGE SUBSEA PIPELINE DEPRESSURIS	SAFETY CRITICAL	U-05002	PREVENTATIVE	102060	23 Mar 2013	I103-SD001-312A	N	
	WA-1027315	PM ROUTE SCE: FUNCTION TEST SIL REMOTE EMERGENCY SHUTDOWN P	SAFETY CRITICAL	H25-54365	PREVENTATIVE	116782	23 Mar 2013	I520-SD001-015A	N	
	WA-1027317	PM ROUTE SCE: FUNCTION TEST MARIA EMERGENCY SHUTDOWN PUSHBU	SAFETY CRITICAL	U-05002	PREVENTATIVE	102060	23 Mar 2013	I103-SD001-314A	N	

... (truncated)

Barrier Model - risk hard copy

BM_RISK_RECORD_HARDCOPY.PDF - Adobe Reader

File Edit View Window Help

1 / 186 48.4% Comment

Risk Assessment

Control Certificate

ID	122431
Co Type	DF
State	Exceeded Validity
Description	PC001 / PC008 M/ defer/ Glycol system Vessels and pipework
Detailed Description	<p>1. Reason for deferral - NEV internal Vessel inspections and remedial work scopes were scheduled for Oct 2014 std. This scope has not completed. SCRA's have been raised to identify all overview IVI requirements and pipework anomalies.</p> <p>2. Consequence - Delayed inspection of glycol system and pipework anomalies could result in a failure to detect integrity degradation of the equipment. This in turn could lead to failure of the the afore mentioned plant which would result in potential hydrocarbon release.</p> <p>3. Mitigation / Justification -</p> <ul style="list-style-type: none">10-183-2014 - 1-2-KO-X2802-GCA will be completed before startup10-183-2014 - 2-2-KO-X2802-GCA Glycol Flash Separator V2802 to Exchangers / WA-111343 will be completed before startup10-183-2014 - 2-2-KO-X2805-GCA Glycol Sock Filter V-2808 to Exchange / WA-1156793 will be completed before startup10-183-2014 - 2-2-KO-X2804-GCA Charcoal Filter V-2807 to Sock Filter V-2808 / WA-1156795 will be completed before startup10-183-2014 - 2-2-KO-X2803-GCA Glycol Flash Separator to Drains / WA-1156796 will be completed before startupPipework listed is available for use / Instrument checks listed in RA below have to be completed (see attached) <p>4. Details -</p> <ul style="list-style-type: none">PC001 / PC008 M/ defer/ Glycol system Vessels and pipework, V-2802 - glycol flash separator to V-2808 via Glycol pumps3-KO-X2808-O-C3 and 4-KO-X2808-O-C3 from V-2808 to Glycol pumps4-KO-X2810-O-C4 Glycol Exchangers to pumps2-KO-X2821-GCA Glycol to Sock Filter V-2806 <p>5. Location -</p> <p>SCRA is 2 for Section 28, there are 2 un-inspected pipework lines associated with corrosion loop NEV-TB02 (see attached).</p> <p>6. Workstream - WBS2 and WBS4 - (see attached)</p> <p>7. Rectification Plan -</p> <p>M/ Inspectors and repairs for IQs will be completed in prior to start-up</p> <p>8. Note - can Charcoal Filter be bypassed.</p>

Mitigation Notes

Recovery Notes

Installation North Everest

Location NEV-Main Deck

Location Shortname NEV-Main Deck

Number Of People 2

Equipment Section 28 - Glycol system filters and flash gas separator vessels, pipework

Date Valid To 07/07/2015

Selected ID = for site 24 Jul 2015 1/186

Risk Assessment

Risk Assessment Team Members

Name	Andrew Grant
	Chris Moat
	Clayton Tunnicliffe

Hazard / Control

	Initial		Residual				
	BV	LH	Risk	BV	LH	Risk	ALARP
1. Prescribed vessel or system failure	4	4	16	3	4	12	10-4
PSV-28501 last received 14/02/12, next due 14/02/17							Supp
PSV-28544 last received 06/08/13, next due 06/08/19							Supp
PSV-28548 last received 05/09/13, next due 05/09/16							Supp
PSV-28504A last received 13/09/13, next due 13/09/16							Supp
PSV-28513 last received 12/02/12, next due 12/02/17							Supp
PALL-28539 to be calibrated and ESD input function tested and reflected every 6 months							Pre
Instrumentation certified electrical equipment is inspected under risk based programme, residual ignition risk level is within the tolerable threshold							Supp
EVI carried out in March 2014 CVI & UT carried out in Aug 2014							Supp
Vessel UT and EVI carried out in 2013 SD in line with TA requirements for sock filter v-2806							Supp
Vessel UT and EVI carried out in 2013 SD in line with TA requirements for Charcoal filter v-2807							Supp
ESD system to be fully operational with no active overrides or blocks on valves or inputs for devices in this PA							Supp
Failure of any pre-requisite inspections to be reported to TA immediately							Supp
LOLD audit of vessel relief routes to be completed in line with Maximo PMs and LOLD register							Supp
Fixed P&G system to be in normal operating mode and testing up to date in Maximo							Supp
Instrument TA to countersign SCRA							Pre
Process TA to countersign SCRA							Pre
Mechanical TA to countersign SCRA							Pre
Electrical TA to countersign SCRA							Pre
North Everest asset manager to countersign							Pre
PTL to countersign SCRA							Pre

Selected ID = for site 24 Jul 2015 2/186

Barrier Model - Annual Report

Barrier Model – Associated documents

PMs DF Count PS C

Messages Reports Risk Records SC Backlog Reliability Control Actions

RA History SC Backlog Drill down Reliability Drill Down Action Tracker Report TA Report Associated Standards PS Code Allocation Yearly Barrier Report

Counts

Associated Document Standards

Document Title

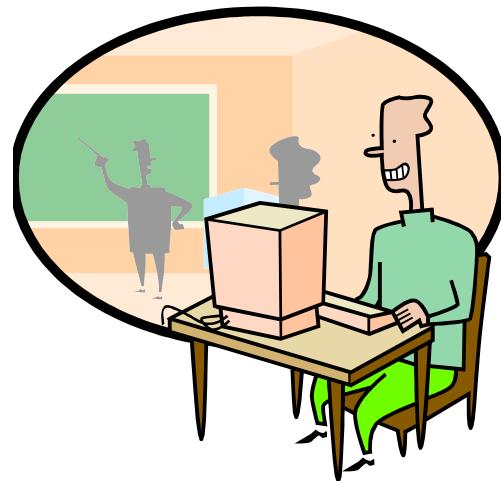
Close Window

Months - Current Year Records

Version 9.01 ALSHN:54.186.42.122/barriermodeldb/

The screenshot shows a software application window titled 'Associated Document Standards'. A large text input field labeled 'Document Title' is centered. Below it is a 'Close Window' button. At the bottom of the window, the text 'Months - Current Year Records' is displayed. The background features a sidebar with various navigation links and a main area with a blue gradient bar at the bottom. The top of the screen has a header with tabs and performance metrics.

Barrier Model Colour Definition



Barrier Model – Colour Definition



SCM Node calculation

SCM Count =

Number of CM Work orders (Corrective Open Work orders that are safety critical)

+

Number of PM Work orders (Preventative Open Work orders that are safety critical)

+

Number of CM SC work orders that are Priority 1 to 3 (The CM count separates out the P1-3 work orders so they are not counted twice)

P1-3 Backlog =

Number of Open work orders that are CM or PM and safety critical with a priority of 1-3 and in backlog

(Current date is past the latest finish date)

CM P1-3 Backlog > 1 CM P1-3 Failure ==> 1 < 5 CM P1-3 Failure = 0
CM P1-3 Failure ==> 5 PM/CM Count ==> 5 < 10 OR CM/PM Count < 5
OR PM/CM Count > 10 Colour is Red Colour is Amber Colour is Green

Barrier Model – Colour Definition



OP Count =

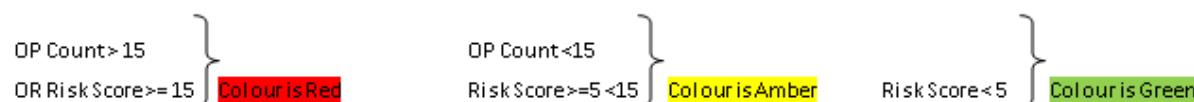
Number of open PTVW control certificates with a state equal to either: Live, Pending, Requested, Approved, Exceeded Validity or overdue and with a category of "ORA" or any risk record created from the Barrier Model Risk application with this record type and in a status of Review, Pending Approval, Approved, Overdue.

Max (High) Initial Risk Score =

Based on the same control certificate select the maximum initial risk score from the hazard control listing

Max (High) Residual Risk Score =

Based on the same control certificate select the maximum residual risk score from the hazard control listing



Barrier Model – Colour Definition



Barrier Override

A barrier can be overridden at any time which means that the user can choose a colour and ignore the underlying system measures. When a barrier is overridden, there is a notice in the details that indicate this. The override is also recorded in the history so there is an audit trail.

Notes for Central Barrier Color: If any nodes are red - centre is red. If 3 nodes are amber - centre is red. If any node is amber and no nodes are red - centre is amber. Otherwise centre is green. Overrides are possible by user.

Colour Key as Per Risk Matrix
(Volume contributes to status)

1-4	5-14	15-25
-----	------	-------

Centre Override = NO OVERRIDE

OP Details 110162
Pipeline Pump A & B Lube oil temp switches
ALARP 10-6

PS Details 115301
PS PC007 - Operational Well Containment T9
ALARP 10-6

DF Details 109481
PS - PC001 IVI deferral of TEG Contactor 1.

▲ ▼

[Close Window](#)

Barrier Model – Colour Definition

Total Barrier Reading

The barrier colour is then translated as follows



If the number of red Nodes is >1 then the centre node is red. This excludes SCM red nodes. If 4 nodes or over are amber then the centre node is also red.



If the number of amber nodes is >1 then the centre node is Amber. A SCM node which is red is weighted as amber to the central node.



The default result is a green indicator.

Barrier Model – Colour Definition

Site level RAG cumulative modelling



Initial Score: If a site has up to 1 Amber barrier the colour is GREEN.

If a site has between 2 and 4 Amber barriers the colour is AMBER.

If a site has 5 or over Amber or any Red barriers the colour is RED.

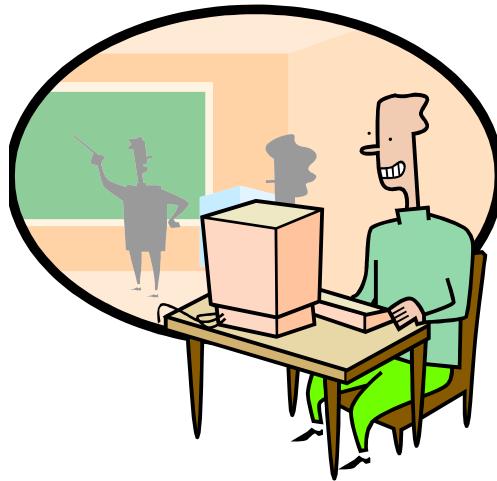
Residual Score: If a site has up to 2 Amber barriers the colour is GREEN.

If a site has between 3 and 4 Amber barriers the colour is AMBER.

If a site has 5 or over Amber or any Red barriers the colour is RED.

There is no higher level of RAG indicators than a Site Level. The global view simply displays each site for each region displayed.

Barrier Model – Application



Barrier Model - apply ps codes to work

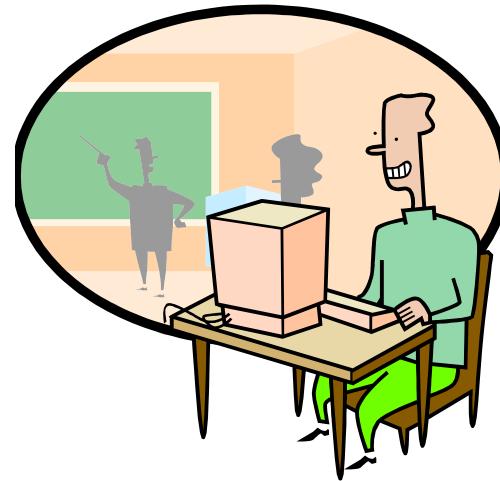
PS/SCE Code Assignment

Reset PS/SCE Code Assignment Type: Reset PS/SCE Code Assignment Reference No: Reset Save

Barrier Code	PS/SCE Code	Assign Type	Site Code	RA Type	Reference No	Reference Description	Discounted																																																																																
			PANNA PA	CMMS_CM	40114037	IN-PM-PA-ODS Work Desc Z13_PA sump line replacement Priority 3 Safety Critical SAFETY CRITICAL	<input type="checkbox"/>																																																																																
<table border="1"> <thead> <tr> <th>Performance Standard</th> <th>TA Owner</th> <th>Emergency</th> <th>CM</th> <th>PM</th> <th>Total</th> <th>Barrier Level</th> <th>Criteria</th> </tr> </thead> <tbody> <tr> <td>PC001 - PRESSURE VESSEL, HEAT EXCHANGERS</td> <td>Pressure Systems</td> <td>11</td> <td>50</td> <td>0</td> <td>61</td> <td>Emergency</td> <td>Emergency Open Green 0 Amber >1 Red Overdue</td> </tr> <tr> <td>PC002 - ROTATING EQUIPMENT</td> <td>Rotating Equipment</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>CM</td> <td>CM > P3 Green <5 Amber >= 5 - 10 Red >10</td> </tr> <tr> <td>PC003 - TANKS</td> <td>Pressure Systems</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>PM</td> <td>PM Green <5 Amber >= 5 - 10 Red >10</td> </tr> <tr> <td>PC004 - PIPELINES WITHIN THE 500M ZONE</td> <td>Pipelines</td> <td>2</td> <td>3</td> <td>0</td> <td>5</td> <td>Total</td> <td>Total Green <5 Amber >= 5 - 10 Red Any red</td> </tr> <tr> <td>PC005 - RELIEF VALVES</td> <td>Process & Production Chemistry</td> <td>0</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> </tr> <tr> <td>PC006 - HELICOPTER REFUELING</td> <td>Pressure Systems</td> <td>1</td> <td>0</td> <td>6</td> <td>7</td> <td></td> <td></td> </tr> <tr> <td>PC007 - OPERATIONAL WELL CONTAINMENT</td> <td>Well Integrity - Completions, Testi</td> <td>2</td> <td>4</td> <td>1</td> <td>7</td> <td></td> <td></td> </tr> <tr> <td>PC008 - PIPING INC SMALL-BORE TUBING AND FLE</td> <td>Pressure Systems</td> <td>10</td> <td>123</td> <td>0</td> <td>133</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Drill Down</td> <td></td> </tr> </tbody> </table>								Performance Standard	TA Owner	Emergency	CM	PM	Total	Barrier Level	Criteria	PC001 - PRESSURE VESSEL, HEAT EXCHANGERS	Pressure Systems	11	50	0	61	Emergency	Emergency Open Green 0 Amber >1 Red Overdue	PC002 - ROTATING EQUIPMENT	Rotating Equipment	0	0	0	0	CM	CM > P3 Green <5 Amber >= 5 - 10 Red >10	PC003 - TANKS	Pressure Systems	1	0	0	1	PM	PM Green <5 Amber >= 5 - 10 Red >10	PC004 - PIPELINES WITHIN THE 500M ZONE	Pipelines	2	3	0	5	Total	Total Green <5 Amber >= 5 - 10 Red Any red	PC005 - RELIEF VALVES	Process & Production Chemistry	0	1	1	2			PC006 - HELICOPTER REFUELING	Pressure Systems	1	0	6	7			PC007 - OPERATIONAL WELL CONTAINMENT	Well Integrity - Completions, Testi	2	4	1	7			PC008 - PIPING INC SMALL-BORE TUBING AND FLE	Pressure Systems	10	123	0	133									Drill Down	
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			PANNA PA	CMMS_CM	40152886	IN-PM-PA Work Desc SZ11_PA MD diesel line corroded nr delug Priority 3 Safety Critical SAFETY CRITICAL	<input type="checkbox"/>																																																																																
			PANNA PA	CMMS_CM	40156863	IN-PM-PA-STY-0000P610-3 Work Desc Z12_PA FWP twin torque deficiencies Priority 3 Safety Critical SAFETY CRITICAL	<input type="checkbox"/>																																																																																
			PANNA PA	CMMS_CM	40159137	IN-PM-PA Work Desc Z11_PAID NW corner handrail corroded Priority 3 Safety Critical SAFETY CRITICAL	<input type="checkbox"/>																																																																																
			PANNA PA	CMMS_CM	40163011	IN-PM-PA-WHS-WELL0001 Work Desc PA-1 SUSTAINED CASING PT PRESSURE DIAGNOSIS Priority 3 Safety Critical SAFETY CRITICAL	<input type="checkbox"/>																																																																																

SAFETY CRITICAL BACKLOG

Barrier Model – Features



Mitigation Measures

Risk Assessment Create

Initial Residual

Hazard: HAZARD 1 Barrier – Process Containment – Treat to rupture of intermediate stage compressor stage which could lead to rupture or leak of this stage

	Initial	Residual
Hazard	P4 SV LH Risk 16	P4 SV LH Risk 8 ALARP 10-5
Control	Walk Down	Control Type: Supp, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 6, Element: <input type="text"/>
Control	Better checking	Control Type: Pre, Action: <input type="checkbox"/>
Control	Inspection	Control Type: Supp, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 8, Element: <input type="text"/>
Control	Oil Levels	Control Type: Pre, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 2, Element: <input type="text"/>

[+Add Control](#)

Initial **Residual**

LH	Risk	SV	LH	Risk	ALARP
D	16	P4	B	8	10-5

[+Delete](#)

Control Type : Supp	Action : <input checked="" type="checkbox"/>	Frequency : Day	Schedule : 6	Element : <input type="text"/>	<input type="checkbox"/> Select Delete
Control Type : Pre	Action : <input type="checkbox"/>			Element : <input type="text"/>	<input type="checkbox"/> Select Delete
Control Type : Supp	Action : <input checked="" type="checkbox"/>	Frequency : Day	Schedule : 8	Element : <input type="text"/>	<input type="checkbox"/> Select Delete
Control Type : Pre	Action : <input checked="" type="checkbox"/>	Frequency : Day	Schedule : 2	Element : <input type="text"/>	<input type="checkbox"/> Select Delete

[+Add Control](#)

[+Add Hazard](#)

Mitigation Measures

Secondary measures are displays in a list in both the barrier model and application. Shift records can be closed from the barrier model.

Control Measure							
Item	Title	Hazard	Control	Frequency	Schedule		
COG-15-00006-013	Failure of Process process control and shut down on the 1st stage separator (Tag VZ X02) causing overpressure of downstream separator.	HAZARD 1 (Barrier - Detection system) Impaired process and shut down control through loss of low level alarm and trip in 1st Stage Separator due to common mode failure of LSSL and LUC on the same bridge.	Control Measure 1	8/24/2015 7:30:56 PM	Adhoc	0	<input checked="" type="checkbox"/> Edit
COG-15-00003-024	Failure of Process containment barrier on the 1st stage separator (Tag V-49001) causing over pressure of downstream separator.	2 (Barrier - Protection System) Impaired deluge protection as a consequence or scaffolding on separator affecting the ability of LoS heat and flame detectors to identify fires and provide adequate coverage to 2nd stage separator.	Remove all unnecessary scaffolding from the area retaining only as necessary for ongoing C-u-I inspection. Area to be barrier off and access by permit only.	8/26/2015 11:05:35 AM	Day	1	<input checked="" type="checkbox"/> Edit
COG-15-00007-018	Test Separator -Excessive pump vibration from "Oil leg" pump in test separator when testing low producing wells.	Barrier – Process Containment - Excessive Vibration during Low flow well appraisal.	Walk Down section and inspect	8/26/2015 12:20:57 PM	Day	1	<input checked="" type="checkbox"/> Edit
COG-15-00007-019	Test Separator -Excessive pump vibration from "Oil leg" pump in test separator when testing low producing wells.	Barrier – Process Containment - Excessive Vibration during Low flow well appraisal.	Monitor pump during start up of well test procedure. In the event of alarm from B/V system or observed excessive noise and vibration abort test and establish alternative "Test by difference".	8/26/2015 12:20:57 PM	Day	1	<input checked="" type="checkbox"/> Edit
COG-15-00006-006						2	<input checked="" type="checkbox"/> Edit
COG-15-00006-007						3	<input checked="" type="checkbox"/> Edit
COG-15-00006-017						7	<input checked="" type="checkbox"/> Edit
COG-15-00006-010						5	<input checked="" type="checkbox"/> Edit
COG-15-00006-016						16	<input checked="" type="checkbox"/> Edit

Area Code - Image overlay

Risk Assessment Create

Type: PS - Process Safety Title: Compressor backflow risk on gas compression train

Status: Review Raised By: QUSR Date Valid To: 1/7/2016

Equipment: AA-040-RVF-900 Description: OTHER_BP-012-ARM FLARE TOWER AT EL System: EMERGENCY SHUTDOWN

Area: BOG COMPRESSORS AND LET-DOWN Safety Critical: Yes Barrier Code: SD SCE: SD001 - EMERGENCY SHUTDOWN

Work Order: Schedule Date: 7/3/2015 Associated Risk Assessment: Related Bow-tie: Area Display Zone: 119

Overall Risk Ranking: Initial: 16 Residual: 8 ALARP: 10-5

Turnpoint Solutions Barrier Model

Manage Data Barrier Report All Barriers Refresh Print What This? Deck Images

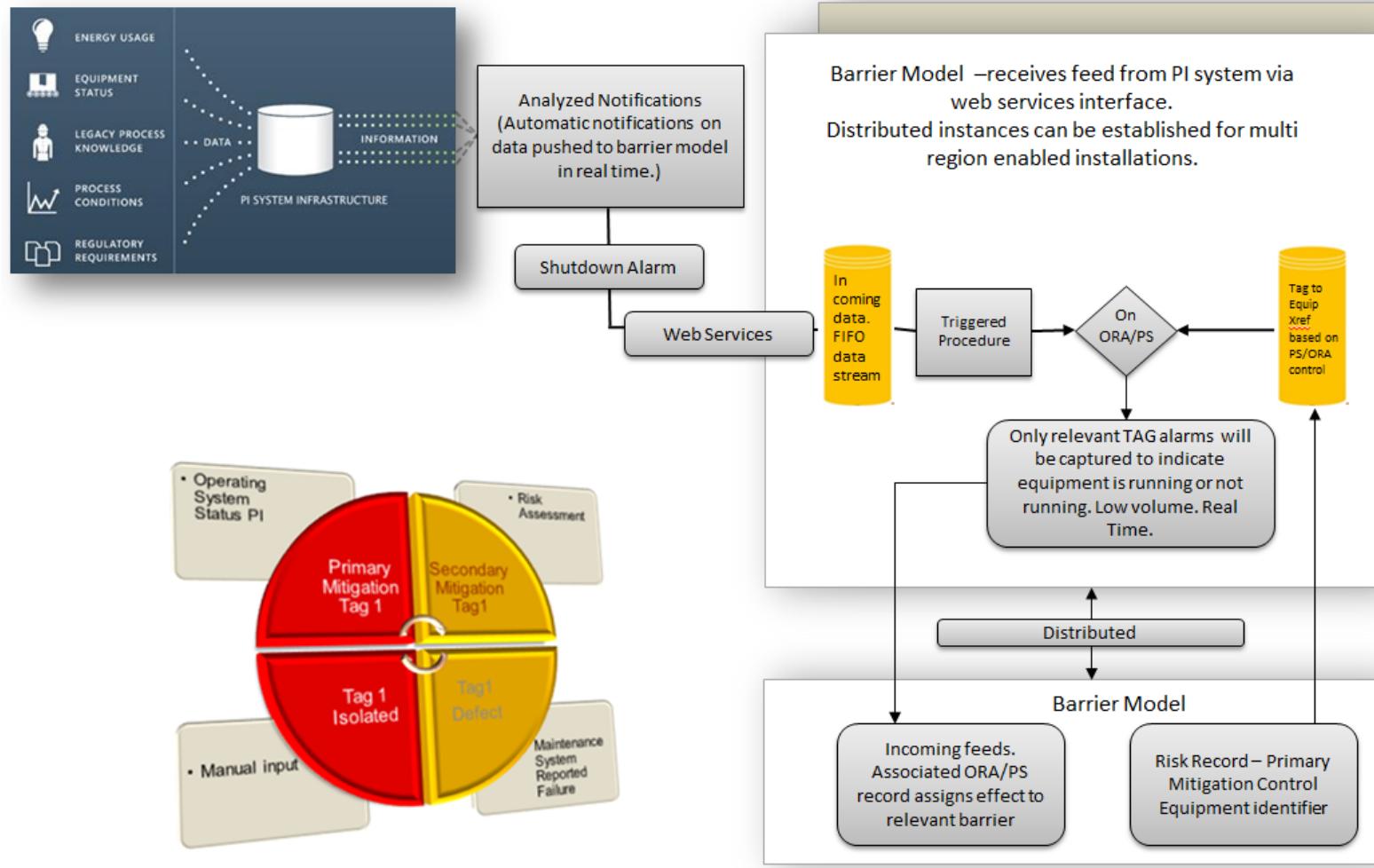
Unallocated PS Codes COGEN CONTROL BUILDING PROCESS AREA SITE - COGEN

Area Barrier PS Code Item Details Initial Score Residual Score ALARP

PROCESS AREA SD SD001 COG-1B-00002 Compressor backflow risk on gas compression train. 16 8 10-5

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 2.10 2.11 2.12 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10 4.11 4.12 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 5.10 5.11 5.12 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 6.10 6.11 6.12 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9 7.10 7.11 7.12 8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.9 8.10 8.11 8.12 9.1 9.2 9.3 9.4 9.5 9.6 9.7 9.8 9.9 9.10 9.11 9.12 10.1 10.2 10.3 10.4 10.5 10.6 10.7 10.8 10.9 10.10 10.11 10.12 11.1 11.2 11.3 11.4 11.5 11.6 11.7 11.8 11.9 11.10 11.11 11.12 12.1 12.2 12.3 12.4 12.5 12.6 12.7 12.8 12.9 12.10 12.11 12.12 13.1 13.2 13.3 13.4 13.5 13.6 13.7 13.8 13.9 13.10 13.11 13.12 14.1 14.2 14.3 14.4 14.5 14.6 14.7 14.8 14.9 14.10 14.11 14.12

PI/DCS system interface



Barrier Model – In Summary

Frequency of Review

- ★ In the event of significant change – (TA's and onshore support).
- ★ Daily by platform
- ★ Weekly as part of the ORA/SCRA review conducted by the platform.
- ★ Monthly Platform TA's and Onshore support.

Barrier Model – In Summary

Information to be taken into consideration

- ★ CMMS recorded Safety Critical failures (Performance Standard)
- ★ PM with 2 or more deferments
- ★ Safety Critical Risk Assessment i.e., Deferment & Deviations
- ★ Operational Risk Assessment's
- ★ PSIC/Long Term Isolations
- ★ Control Loops in Manual
- ★ Piping anomalies etc.
- ★ Well Integrity Status

Barrier Model – In Summary

Asset Integrity Model

- ★ communicates a consistent, uniform visual summary of the assurance process across business operations
- ★ demonstrates corporate and operational governance, in measuring and maintaining compliance and controls through awareness of relevant risks on a daily basis
- ★ offers integration with application data sources and manual risk assessment through the Barrier Model *Risk Application* module

Questions

