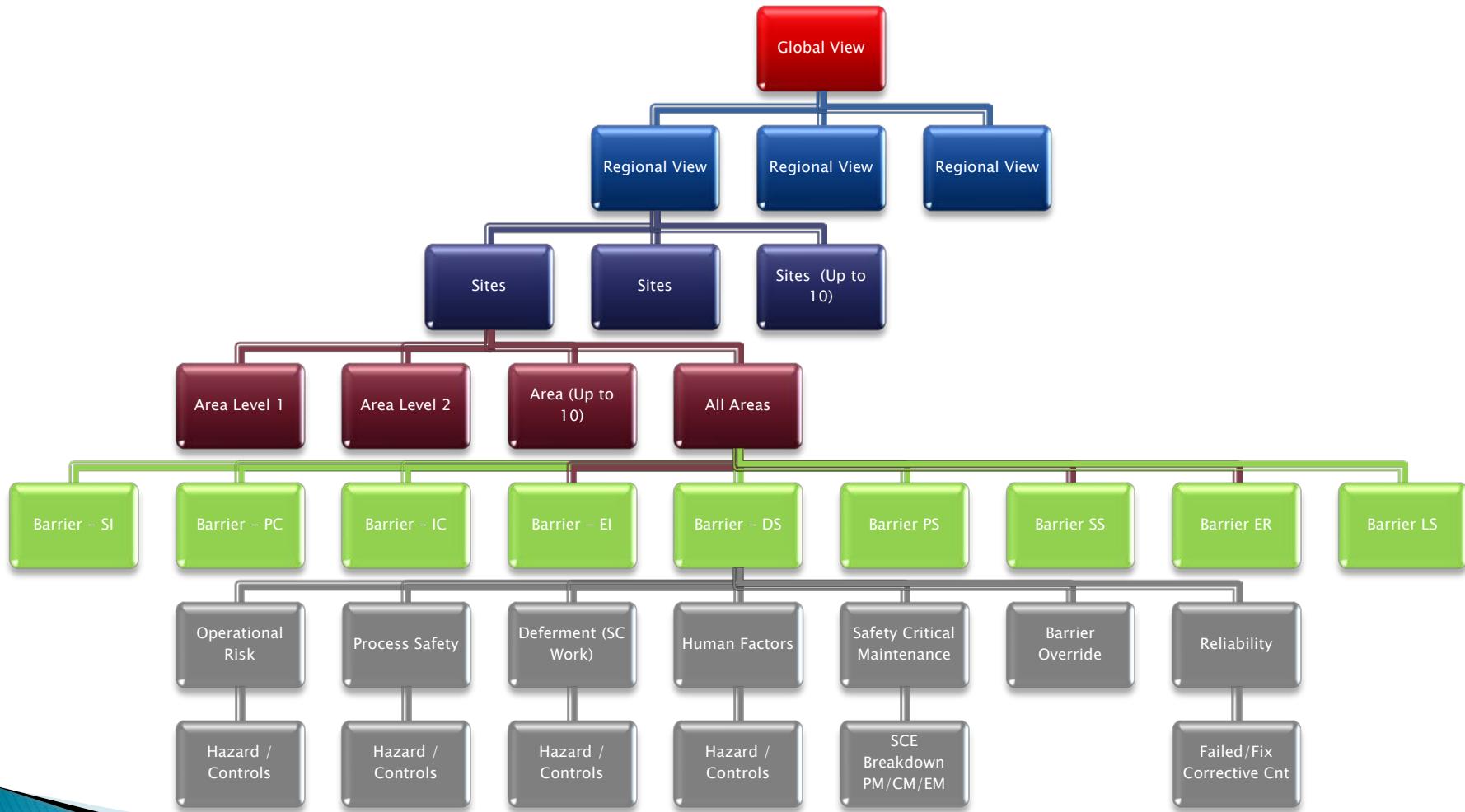


Barrier Model – Information

- Reports
- Mitigation Controls
- Colors (RAG) Definitions

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 | Init | Res |
|----------------------|------|-----|
| Process Containment | Init | Res |
| Ignition Control | Init | Res |
| Environment Impact | Init | Res |
| Detection Systems | Init | Res |
| Protection Systems | Init | Res |
| Shutdown Systems | Init | Res |
| Emergency Response | Init | Res |
| Life Saving Systems | Init | Res |

Press to DrillDown to the Regional View

PFS-3

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

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

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   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 | | |

ALL COGEN CONTROL BUILDING ALL SITES

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

Regional Level Display Containing All Sites.

COGEN LOCATION1 LOCATION2 TERMINAL

Initial Resid Initial Resid Initial Resid Initial Resid

| | Initial | Resid | Initial | Resid | Initial | Resid | Initial | Resid |
|----------------------|---------|-------|---------|-------|---------|-------|---------|-------|
| Structural | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Process Containment | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Ignition Control | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Environmental Impact | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Detection Systems | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Protection Systems | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Shutdown Systems | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Emergency Response | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |
| Lifessaving Systems | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ | ■■ |

Version 8.05 ALSHIV:barriermode1.tpsco.com/barriermode1/

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 - Reliability Data

Turnpoint Solutions Barrier Model

Unallocated PS Codes

July 2013

ALL COGEN CONTROL BUILDING SITE - COGEN

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

Protection Systems

Initial Reading Residual Reading

HF OP DF SCM PS

HF OP DF SCM PS

Correctives PMs 0

OP Count DF Count PS Count HF Count

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

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

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 | 0 |
| PS007 - NITROGEN BLANKET | 3.65 |
| PS008 - SPRINKLER SYSTEM | 0 |
| PS009 - DRY POWDER SYSTEM | 100 |
| 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

Version 8.05 ALSHN:barriermodele.tpsco.com/barriermodeldb/

Barrier Model - Work Management

Turnpoint Solutions Barrier Model

Unallocated PS Codes

| Month | July | 2015 |
|-------|------|------|
| Mon | 1 | 2 |
| Tue | 3 | 4 |
| Wed | 5 | 6 |
| Thu | 7 | 8 |
| Fri | 9 | 10 |
| Sat | 11 | 12 |
| Sun | 13 | 14 |
| Mon | 15 | 16 |
| Tue | 17 | 18 |
| Wed | 19 | 20 |
| Thu | 21 | 22 |
| Fri | 23 | 24 |
| Sat | 25 | 26 |
| Sun | 27 | 28 |
| Mon | 29 | 30 |
| Tue | 31 | |

ALL COGEN CONTROL BUILDING SITE - COGEN

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

Return to Barrier

Process Containment

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.
ALAR 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.
ALAR 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

Performance Standard

| TA Owner | Emergency | CM | PM | Total |
|----------------------|-----------|----|----|-------|
| Pressure Systems | 0 | 3 | 9 | 10 |
| Rotating Equipment | 0 | 0 | 0 | 0 |
| Pressure Systems | 0 | 8 | 0 | 8 |
| Pipelines | 0 | 0 | 0 | 0 |
| Production Chemistry | 0 | 0 | 24 | 24 |
| Pressure Systems | 3 | 2 | 0 | 5 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Criteria

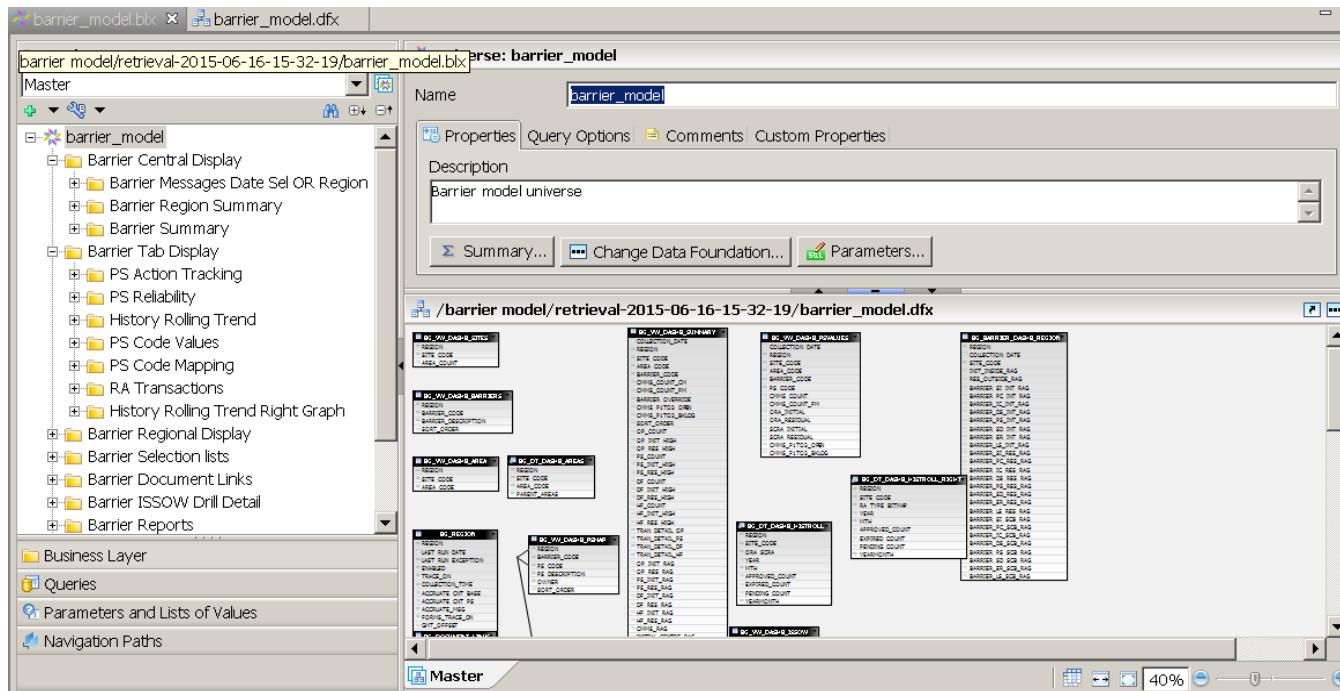
- Emergency Open
 - Green 0
 - Amber >1
 - Red Overdue
- CM > P3
 - Green <5
 - Amber >= 5 - 10
 - Red >10
- PM
 - Green <5
 - Amber >= 5 - 10
 - Red >10
- Total
 - Green <5
 - Amber >= 5 - 10
 - Red Any red

SAFETY CRITICAL BACKLOG

Version 8.05 ALSHN:barriermodeLtpsco.com/barriermodeLdb/

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

Return to Barrier

Process Containment

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

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 (black dots), Process Safety (blue circles), Deferment (purple circles)

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 (red), Deferment (yellow), Process Safety (green)

Approved (green), Pending (yellow), Expired (red)

Version 8.05 ALSHN:barriermode.tpsco.com/barriermode/db/

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 | aduhMUSOkQqjdGJG_0nqg7PKC | test 1 test risk 1 | 01/01/1900 | imported |
| | Risk summary entered | ARM-13-00218 | wohpeaf | whohwifit klyguk a taz | 01/01/1900 | |
| | Risk summary this is a further update | ARM-13-00219 | Mitigation Context Summary entered | Recovery Summary | 01/01/1900 | |
| | test risk 1 test risk summary | ARM-13-00212 | Mitigate context | recovery | 01/01/1900 | imported |
| | | 111427 | test risk 2 test mit sum 1 | test rec plan risk 3 | 14/11/2014 | |
| | | ARM-13-00210 | | | 31/08/2013 | |
| | | 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 | BERRYMAN |
| | | 105699 | | | 30/10/2014 | |

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

BM_PS_DRILLDOWN.PDF - Adobe Reader

File Edit View Window Help

1 / 394 48.4% Comment

Reliability Breakdown 12 months consolidation.

Friday, 24 July

Selected Region ▾

Summary

- Details**
 - DS001
 - ER001
 - ER002
 - ER003
 - ER004
 - ER005
 - ER006
 - ER007
 - ER008
 - IC002
 - IC003
 - LS001
 - LS003
 - LS004
 - PC001

| Platform | Barrier | P&I Code | Owner | Green Pass | Amber Failed | Red Fail | FF_percent | On Failed |
|---------------------------|--|---|-------|------------|--------------|----------|------------|-----------|
| 1 SI Structural Integrity | S001 - SUBSEA STRUCTURE | Structural | 10 | 0 | 0 | 0.00% | 0 | |
| | S002 - TOPSIDE STRUCTURE | Structural | 5 | 0 | 0 | 0.00% | 0 | |
| | S003 - CRANES AND LIFTING EQUIPMENT | Cranes & Lifting Equipment | 204 | 0 | 0 | 0.00% | 0 | |
| | Sum: | | 219 | 0 | 0 | 0.00% | 0 | |
| 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 50M 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 | 4.28% | 0 | |
| | PC008 - PIPING INC SMALL-BORE TUBING AND F | Pressure Systems | 0 | 0 | 0 | 0.00% | 3 | |
| | Sum: | | 899 | 0 | 4 | 0.67% | 19 | |
| 3 IC Ignition Control | IC002 - NON HAZARDOUS AREA VENTILATION | HVAC | 188 | 0 | 0 | 0.00% | 0 | |
| | IC003 - IGNITION PREVENTION (EX EQUIPMENT) | Electrical | 240 | 0 | 0 | 0.00% | 0 | |
| | TE001 - TEMPORARY EQUIPMENT | Process & Production Chemistry | 318 | 0 | 0 | 0.00% | 0 | |
| | Sum: | | 746 | 0 | 0 | 0.00% | 0 | |
| 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 | |
| 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 - GASEOUS 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 | 91 | 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 1-2 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

The screenshot displays a complex dashboard from the 'Annual Barrier Model Report.pdf' document. The top left features a sidebar with 'Bookmarks' containing links to 'Regional Summary', 'RA Trend', 'Operational Barrier Status', 'Action Tracker', 'Reliability Summary', and 'Reliability Detail'. The main area has two primary sections: 'SG TRB Risk Assessment Trend - From 25 September 2013 to 1 October 2014' and 'Regions: TRB - Operational Barrier Status based on initial flow profile'. The first section contains a line graph with five data series: SGTRB (blue), CTRB (orange), CTRB (light blue), CTRB (green), and CTRB (yellow). The second section is a large grid showing operational status across various regions and categories. To the right, there's a detailed 'HBMOUT Barrier Current Risk Summary' table with columns for Region, ID, Name, Type, Mitigation Status, Recovery Plan, Lead Risk, and Impact Risk. A large green bar at the bottom indicates a current risk level of 100%.

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

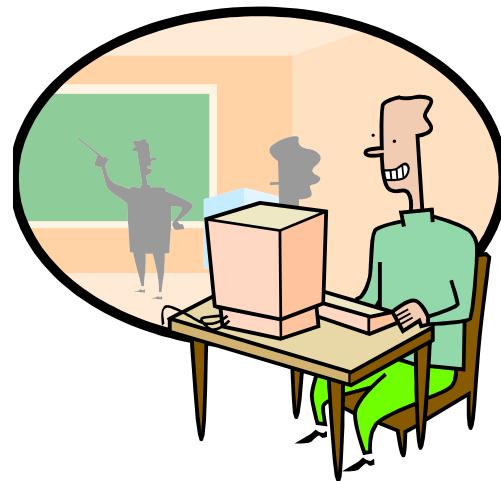
Close Window

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, there is a footer bar with the text 'Months - Current Year Records'. The background of the main area is light gray, and the window has a dark gray border. On the left side of the main area, there is a vertical list of navigation items: 'RA History', 'SC Backlog Drill down', 'Reliability Drill Down', 'Action Tracker Report', 'TA Report', 'Associated Standards', 'PS Code Allocation', and 'Yearly Barrier Report'. On the right side, there are two vertical bars: one labeled 'Counts' with values from 1 to 6, and another labeled 'Safety' with values from 1 to 6. At the very bottom of the screen, there is a footer bar with the text 'Version 9.01 ALSHN:54.186.42.122/barriermodeldb/'.

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 =

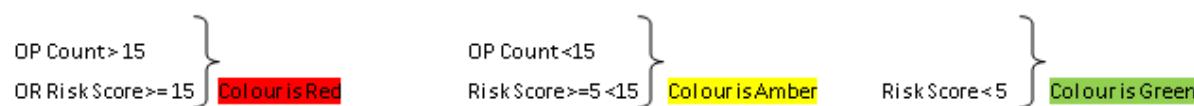
Number of open PTVW control certificates with a state equal to either: Live, Pending, Requested, Approved, Exceeded Validity or overdue and with a category of "ORA" or any risk record created from the Barrier Model Risk application with this record type and in a status of Review, Pending Approval, Approved,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

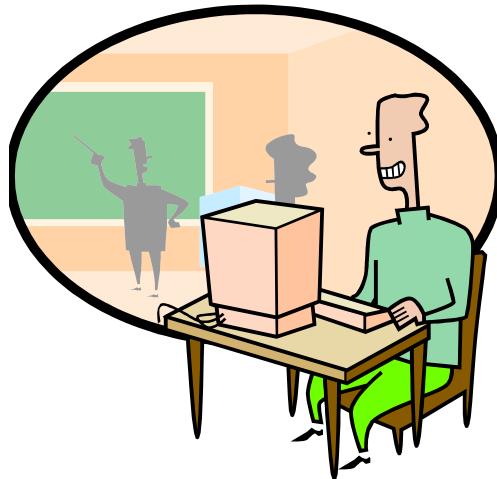
Residual Score: If a site has up to 2 Amber barriers the colour is GREEN.

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 – Mitigation



Mitigation Measures

Risk Assessment Create

Initial Residual

| Hazard | Initial | Residual |
|--|--|---|
| HAZARD 1 Barrier – Process Containment – Treat to rupture of intermediate stage compressor stage which could lead to rupture or leak of this stage | P4 SV D LH 16 Risk P4 SV B LH 8 Risk | 10-5 ALARP |
| Control | Control Type: Supp, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 6, Element: <input type="text"/> | <input type="checkbox"/> Select <input type="button" value="Delete"/> |
| Control | Control Type: Pre, Action: <input type="checkbox"/> | <input type="checkbox"/> Select <input type="button" value="Delete"/> |
| Control | Control Type: Supp, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 8, Element: <input type="text"/> | <input type="checkbox"/> Select <input type="button" value="Delete"/> |
| Control | Control Type: Pre, Action: <input checked="" type="checkbox"/> Frequency: Day, Schedule: 2, Element: <input type="text"/> | <input type="checkbox"/> Select <input type="button" value="Delete"/> |

Initial

Residual

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

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

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 | <input checked="" type="button"/> Edit |
| 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 |
| 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 |
| 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 |
| 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 |
| COG-15-00006-006 | | | | | | |
| COG-15-00006-007 | | | | | | |
| COG-15-00006-017 | | | | | | |
| COG-15-00006-010 | | | | | | |
| COG-15-00006-016 | | | | | | |

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Turnpoint Solutions Barrier Model

Unallocated PS Codes

Ignition Control

Initial Reading Residual Reading

Correctives OP Count DF Count IP Count

PPs PP Count

Messages Reports Risk Records SC Backlog Reliability Control Actions

Log Report

| Ps Code | Item | Details | Hazard | Control | Completed | Frequency | Schedule |
|---------|------------------|---|---------------------------------------|-------------------|------------------|-----------|----------|
| PC003 | COG-15-00006-013 | Failure of Process process control and shut down on the 1st stage separator | HAZARD 1 (Barrier - Detection system) | Control Measure 2 | 28/08/2015 00:00 | Hour | 7 |
| | | Impaired process and shut down control through loss of low level alarm and | | | | | |

Shift Change Report

| Ps Code | Item | Details | Hazard | Control | | | |
|---------|------------------|--|--|---|--|--|--|
| PC001 | COG-15-00003-024 | Failure of Process containment barrier on the 1st stage separator (Tag V-4 | HAZARD 2 (Barrier - Protection System) | 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. | | | |
| PC002 | COG-15-00007-018 | Test Separator -Excessive pump vibration from "Oil leg" pump in test separator | Barrier - Process Containment - Excessive Vibration during Low flow well app | Walk Down section and inspect | | | |
| PC002 | COG-15-00007-019 | Test Separator -Excessive pump vibration from "Oil leg" pump in test separator | Barrier - Process Containment - Excessive Vibration during Low flow well app | 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". | | | |
| PC003 | COG-15-00006-013 | Failure of Process process control and shut down on the 1st stage separator | HAZARD 1 (Barrier - Detection system) | Control Measure 1 | | | |
| | | Impaired process and shut down control through loss of low level alarm and | | | | | |

Action Tracker

Title: Test Separator -Excessive pump vibration from "Oil leg" pump in test separator when testing low producing wells.

Issue: Barrier - Process Containment - Excessive Vibration during Low flow well appraisal.

Control: 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".

Comments: None

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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

SCD: SCD001 - EMERGENCY SHUTDOWN

Work Order:

Schedule Date: 7/3/2015

Associated Risk Assessment:

Related Bow-tie:

Area Display Zone: 119

Installation: COGEN
RA No: COG-15-00002
Status: Review
Date Raised: 7/3/2015
Extensions: 1
Date Valid To: 1/7/2016
Overall Risk Ranking:
Initial: ● Residual: ●
ALARPs: 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

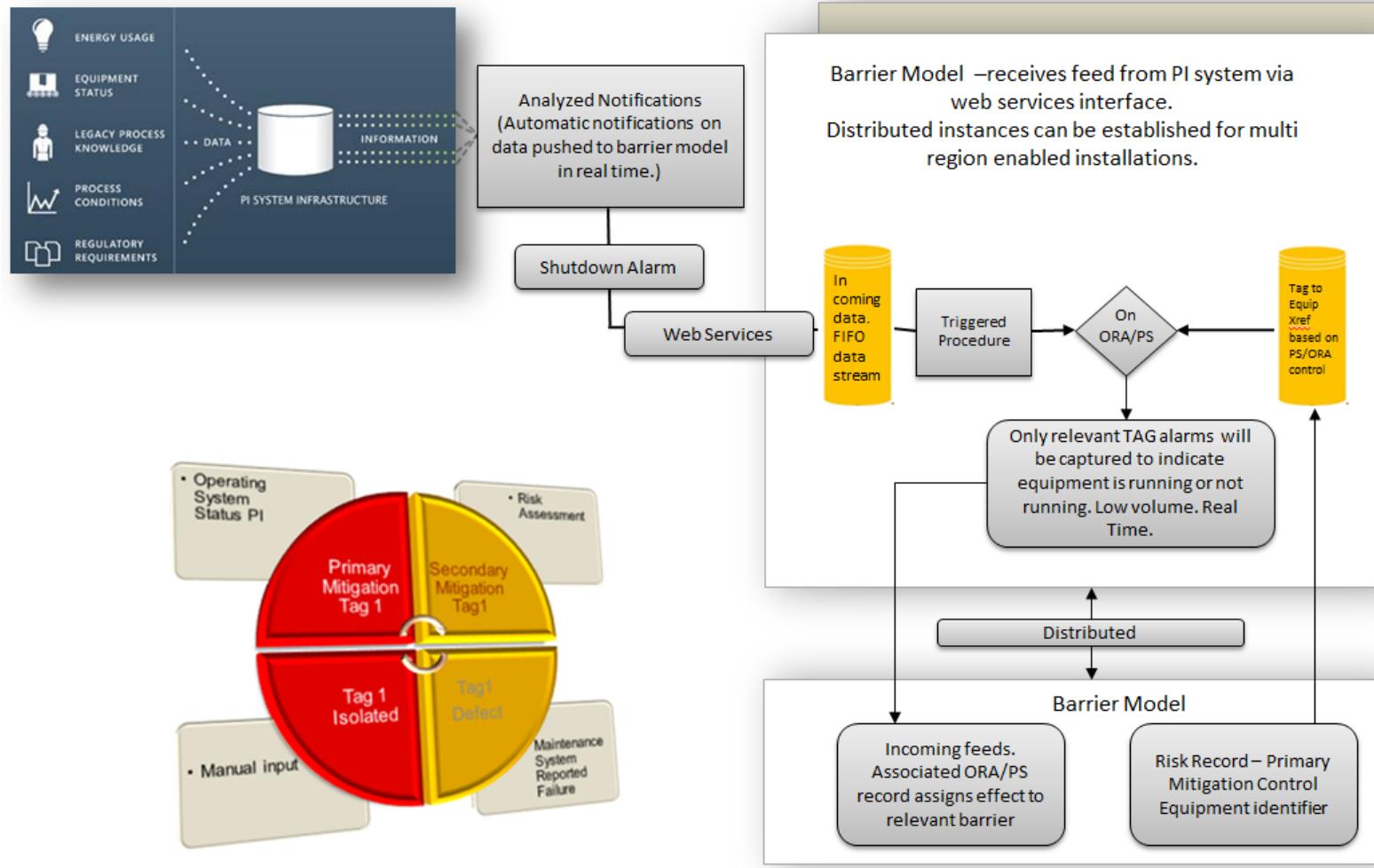
Area Barrier PS Code Item Details Initial Score Residual Score ALARP

PROCESS AREA SD SD001 COG-15-00002 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

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PI/DCS system interface



Questions

