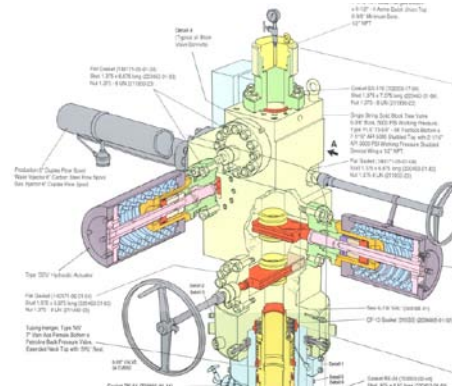




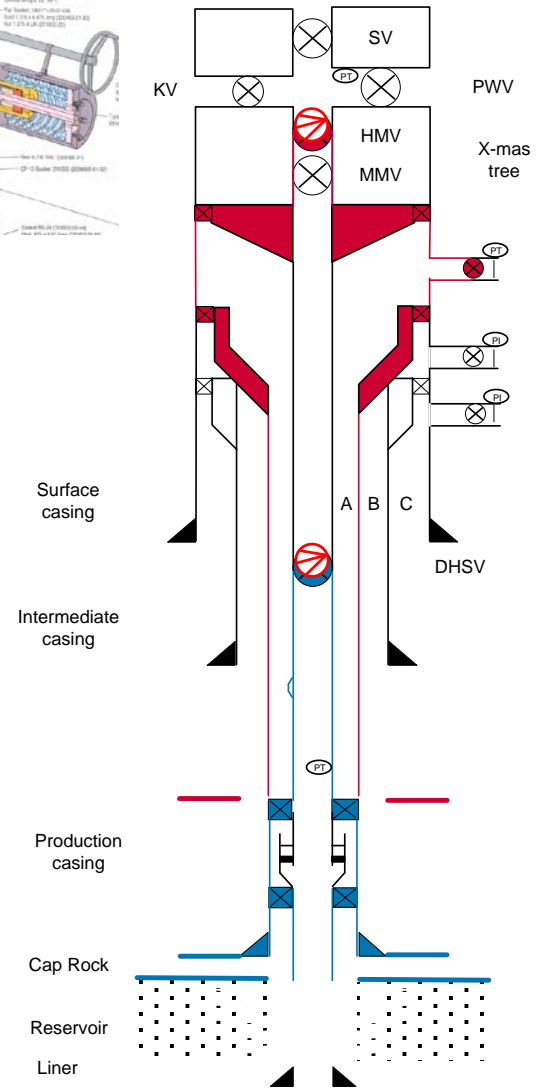
# Introduction to Well Integrity Incident Classification guideline

WIF Workshop 06.06.2012

# Objective



- What do we have:
  - **RNNP reporting.** Selected barrier data related to processing, wells and structural integrity are provided in the PSA's annual trends in risk level in the petroleum activity (RNNP) survey.
  - As the bi-annual **RNNP reporting** only reports a «snap shop», this guideline will better describe the trends of Well Integrity Incidents. Also a common industry routine of reporting well integrity incidents to the PSA.



## WELL INCIDENT

Incident during D&W operation or in a well in operation,  
with a barrier issue

## WELL CONTROL INCIDENT

is in D&W operations defined as

Failure of barrier(s) or failure to activate barrier(s),  
resulting in an **unintentional**<sup>1</sup> flow of formation fluid –  
i) into the well,  
ii) into another formation or  
iii) to the external environment

<sup>1</sup>: A **planned** flow is not a well control incident

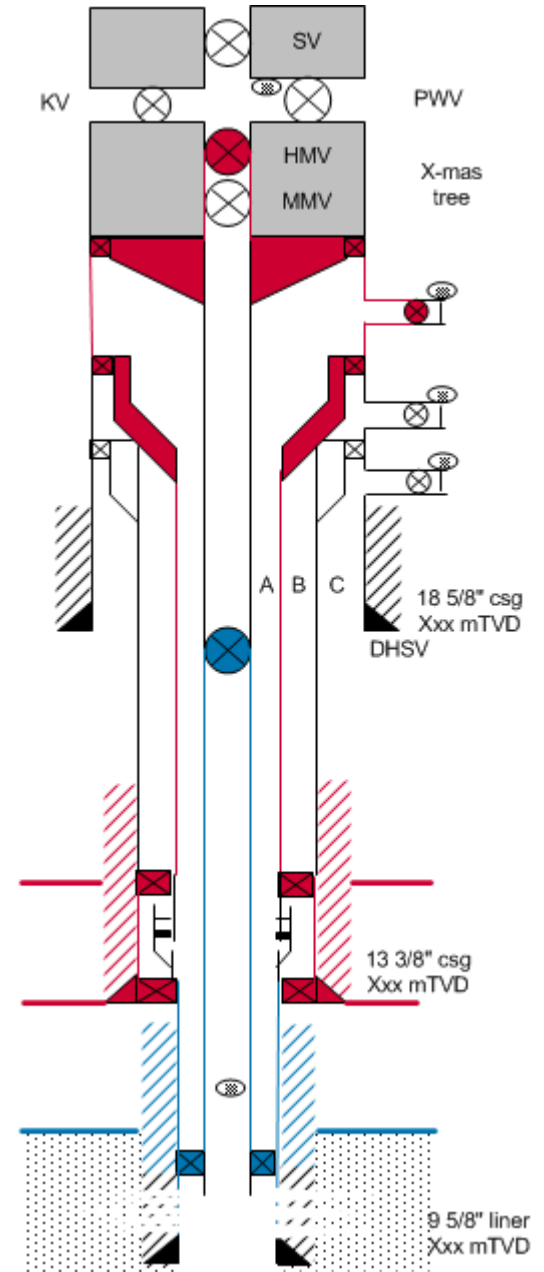
## WELL INTEGRITY INCIDENT

is for Wells in operation defined as

Well Integrity incident is defined as  
a well incident in the  
operational/production phase

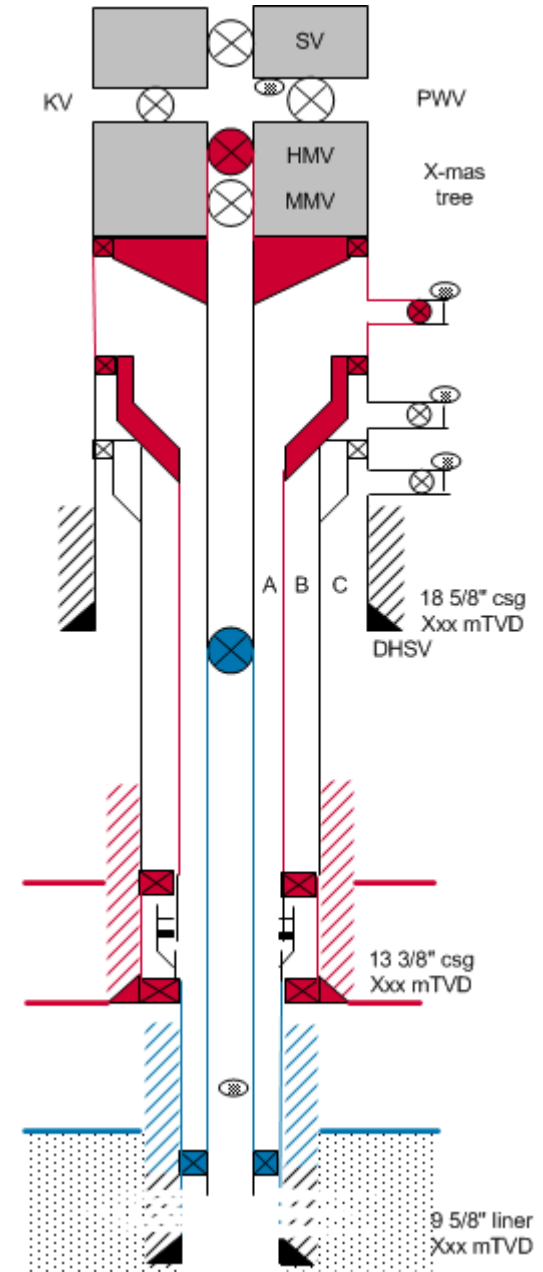
# Objective

- This guideline has been developed to assist with consequence classification of well incidents in the operational/production phase. It provides guidance on alert and notification reporting to the authorities.
- Please note that any incident or leakage after the wellhead or XT valves is not covered by this guideline and not defined as a well integrity incident, even if the incident may lead to a temporarily leak from the well to the environment (e.g. leakage from flowline)



# Target group

- The following personnel are the target group to this guideline:
  - All personnel involved in categorisation and classification of well integrity incidents
  - All personnel involved in alerting, notifying, reporting and following up well integrity incidents towards the authorities.



# Guideline

- For well integrity incidents the matrix presented in [Appendix A](#) has been made for classifying a well integrity incident into a system relative to the degree of seriousness of the incident.
- The matrix is made on the basis of **how critical the degree of degradation/loss of barrier(s) is**. The evaluation shall include both actual and potential **consequences** of the well integrity incident.

# Guideline

- The requirement of PSA reporting shall be based on the most serious classification level of the incident.
- The matrix itself indicates principles of incident classification. In Appendix B there is a list of examples of classified incidents. These are examples only therefore the list is not comprehensive.
- The document has not been finally approved

GUIDELINE FOR CLASSIFICATION AND CATEGORISATION  
OF WELL INTEGRITY INCIDENTS

DRAFT  
24.05.2012

# Description of matrix

## 3.1.1 Colour codes for Level and Consequence classification

- The matrix is, in the left column, divided into four different colours based on degree of seriousness;
  - Red – Critical well integrity incidents with high risk for personnel, environment and facility. This classification is divided into two different levels based on the difference in consequence.
  - Orange – Serious well integrity incidents
  - Yellow – Medium well integrity incidents
  - Grey – Minor well integrity incidents not reportable to PSA.
- The right hand column of the matrix describes the principles of which well integrity incident that fall into the different classification levels.

## 3.1.2 Alert and Notification to authorities

- Incidents with tan background colour require an Alert to PSA
- Incidents with blue background colour require a Notification to PSA
- Incidents with grey background colour only require company internal reporting
- Form: [Confirmation of alert/notification to Petroleum Safety Authority](#)

## 3.1.3 Internal reporting

- Each company to follow their requirements for internal reporting, investigation and experience transfer based on the consequence classification

Well Integrity Incident Classification matrix	
Well incident is defined as: Well integrity incident is defined as a well incident in the operational/production phase	
GUIDELINE FOR CLASSIFICATION OF INCIDENTS	
ACTUAL/POTENTIAL DEGREE OF SERIOUSNESS	WELL IN OPERATION
LEVEL 1 – red: Most critical well integrity incidents with high risk for personnel, environment and facility	<b>1. BLOWOUT</b> All barriers failed. Blowout to sea or platform. Necessary to drill relief well or perform capping operation to regain the barriers.
	<b>2. HC RELEASE</b> threatening whole facility/plant or environment Actual: <span style="background-color: #e6f2ff;"> </span> Potential: <span style="background-color: #e6f2ff;"> </span>
LEVEL 2 – red: Critical well integrity incidents with high risk for personnel, environment and facility	<b>1. BLOWOUT - HANDLED ON INSTALLATION</b> All barriers failed. Flow to sea or platforming, flow through barriers. Possible to regain the barriers on location. Threaten large part of facility/plant (i.e. several modules)
	<b>2. HC RELEASE threatening</b> large part of facility/plant or environment Actual: <span style="background-color: #e6f2ff;"> </span> Potential: <span style="background-color: #e6f2ff;"> </span>
LEVEL 3 – orange: Serious well integrity incidents	<b>1. FAILURE OF ONE BARRIER WITH RELEASE TO ENVIRONMENT</b> Actual: <span style="background-color: #e6f2ff;"> </span> Potential: <span style="background-color: #e6f2ff;"> </span>
	<b>2. HC RELEASE threatening parts of facility/plant or environment</b> Actual: <span style="background-color: #e6f2ff;"> </span> Potential: <span style="background-color: #e6f2ff;"> </span>
LEVEL 4 – yellow: Medium well integrity incidents	<b>1. FAILURE OF ONE BARRIER WITH FLOW TO ANOTHER FORMATION.</b> Failure of one barrier resulting in uncontrolled cross flow between formations. No potential for breaching to surface or pollution Actual: <span style="background-color: #e6f2ff;"> </span> Potential: <span style="background-color: #e6f2ff;"> </span>
	<b>1. MINOR WELL INTEGRITY INCIDENTS.</b> Degradation or failure of well barrier. No potential for release to environment. Negligible risk for plant/facility. Small well release to environment not due to failure of well barrier: < 0.1 kg/sec.

Tan = Alert to PSA according to management regulation §29  
 Blue = Notification to PSA according to management regulation §29  
 Grey = Alert or Notification to PSA not required



# Exercise 1, 2 and 3

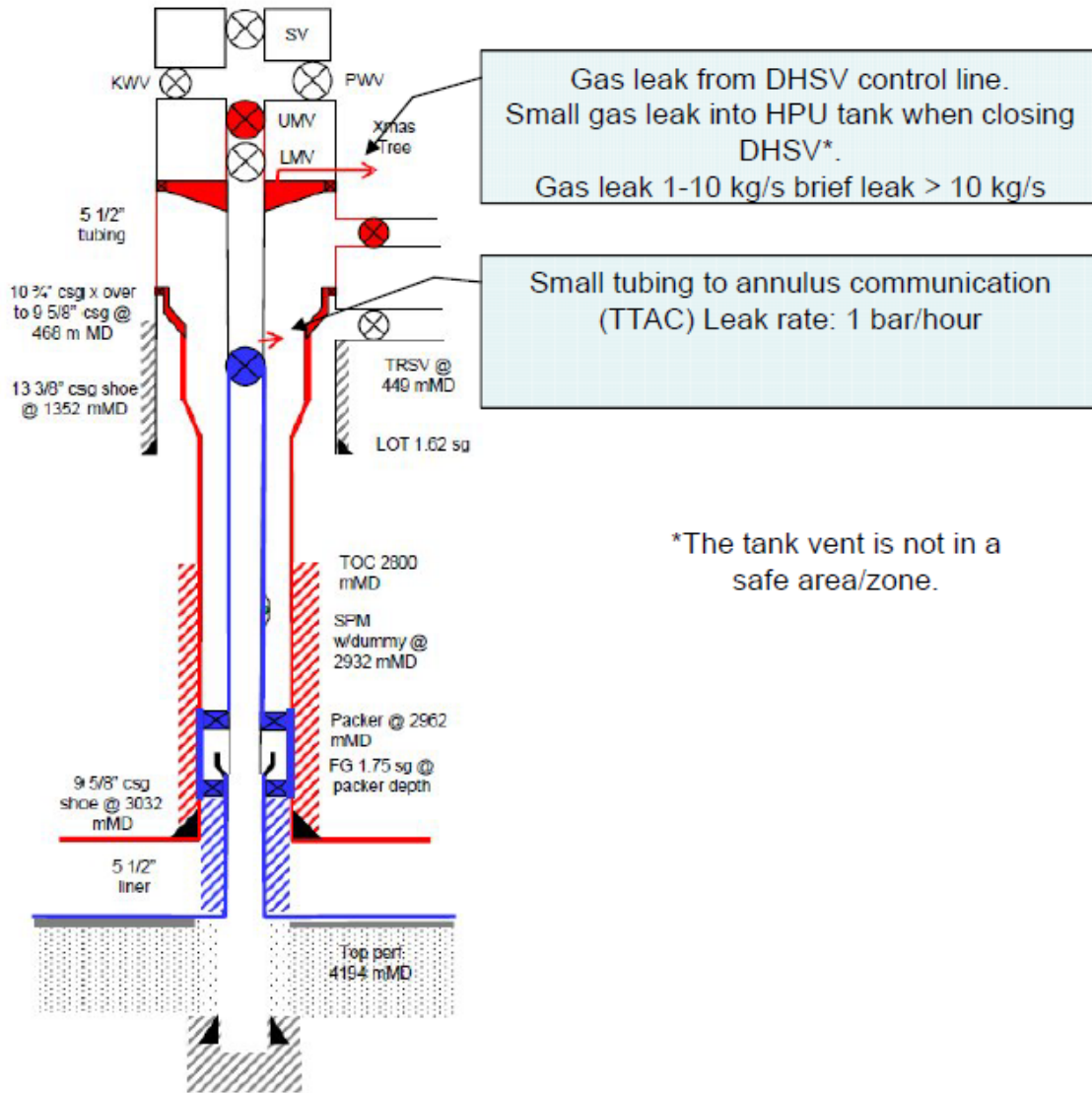
- Discuss around the table and answer the following questions:
  - A) Actual consequence: \_\_\_\_\_
  - B) Potential consequence: \_\_\_\_\_
  - C) Reporting: \_\_\_\_\_

# Exercise 1

- WAG injector
- Failure of control line (or DHSV) resulting in a small gas leak to surface\*.
- Failure of tubing above DHSV (TTAC)

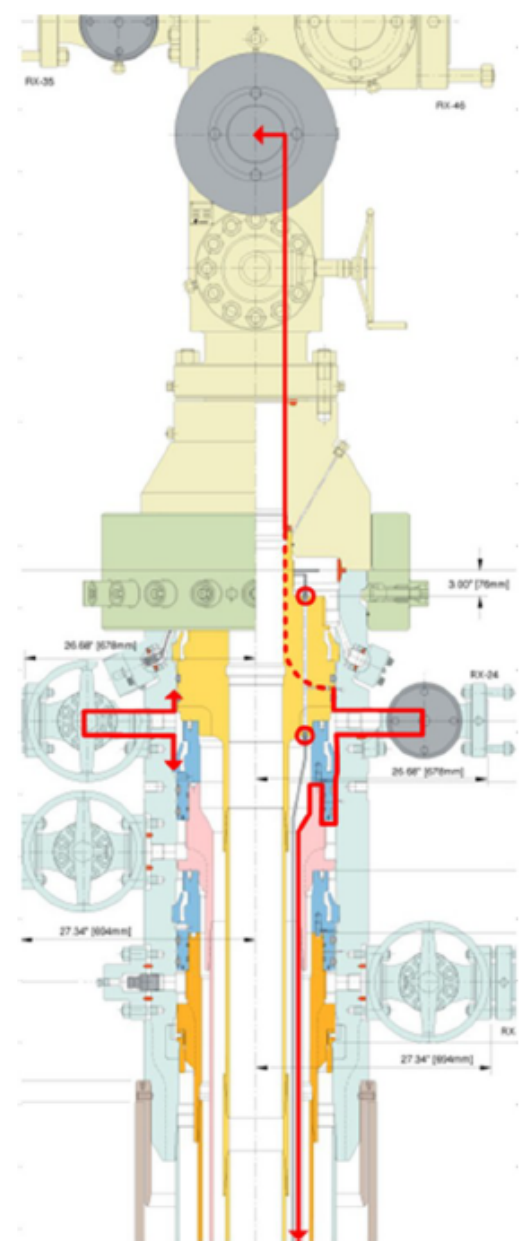
• Actual consequence: ?

• Potential consequence: ?



## Exercise 2

- Leak in TH neck seal  
and
- Leak in XT/WH connector
- Limited leak to platform of HC because of very small leakage, but potential for larger leak that may threaten parts of facility.
- Secondary barrier has failed. Primary barrier intact.
- Actual consequence:
- Potential consequence:



# Exercise 3

- Make as many examples as you can that's fit into the matrix Appendix B in the Guideline (Incident Categorisation)

Appendix B Incident Categorisation Examples	
	<b>1.BLOWOUT</b>
1.1	1 Loss of all well barriers, uncontrolled outflow
	2 Failure of DHSV And LMV stem packing resulting in HC release to environment.(high potential for blowout)
	3 Casing leak below production packer into formation above reservoir. Packer set in uncemented casing. Breaching to surface.
	4 Tubing and production casing leak resulting in leakage to a annulus not qualified as a barrier. Breaching to surface.
	<b>2. HC RELEASE</b>
1.2	1 Loss of casing barrier elements against gaslift gas.Resulting in high amount of HC gas treathning the whole facility.
	2
	<b>1. BLOWOUT - HANDLED ON INSTALLATION</b>
2.1	1 Failure of DHSV and HMV stem packing resulting in HC release to environment.(Handled by closing HMV going automatic to back-seat). Potential leak above 1 kg/sec.
	2 Casing leak below production packer into formation above reservoir. Packer set in uncemented casing. Potential for breaching to surface.
	3 Tubing and production casing leak resulting in leakage to a annulus not qualified as a barrier. Potential for breaching to surface.
	4
	<b>2. HC RELEASE</b>
2.2	1 Break in wellhead resulting of release of gas lift volume from A-annulus greater than 1 kg/sec
	2
	3
	<b>1. FAILURE OF ONE BARRIER WITH RELEASE TO ENVIRONMENT</b>
3.1	1 Failure of HMV stem packing resulting in HC release to environment.(Handled by closing HMV going automatic to back-seat and DHSV)
	2 Leak in TH neck seal and XMT/WH connector. Handled by closing DHSV and installing plug (s).
	3 Leak in DHSV control line from below DHSV (Insert valve) with release to platform. Handled by closing needle valve (WH exit block) No potential of leakage above 1 kg/sec.
	4 Failure of DHSV and HMV stem packing resulting in HC release to environment.(Handled by closing HMV going automatic to back-seat). Potential leak < 1 kg/sec.
	<b>2. HC RELEASE threatening parts of facility/plant or environment</b>
3.2	1 HC release from WH void
	2
	3
	<b>FAILURE OF ONE BARRIER WITH FLOW TO ANOTHER FORMATION</b>
4.1	1 Casing leak below production packer into formation above caprock. Packer set in uncemented casing. No potential for breaching to surface.
	2 Leak through cement into formation above cap rock. No potential for breaching to surface.
	3
	<b>MINOR WELL INTEGRITY INCIDENTS</b>
5.1	1 Failure of DHSV other barrier elements intact.
	2 Failure of HMV other barrier elements intact.
	3 Tubing to annulus communication (TTAC)
	4 Too high oxygen content in injection water resulting in unacceptable corrosion of barrier elements.
	5 Leak in TH neck seal.

Incident Categorisation Examples

No.		
		<b>1.BLOWOUT</b>
1.1	1	
	2	
	3	
		<b>2. HC RELEASE</b>
1.2	1	
	2	
		<b>1. BLOWOUT - HANDLED ON INSTALLATION</b>
2.1	1	
	2	
	3	
		<b>2. HC RELEASE</b>
2.2	1	
	2	
	3	
		<b>1. FAILURE OF ONE BARRIER WITH RELEASE TO ENVIRONMENT</b>
3.1	1	
	2	
		<b>2. HC RELEASE threatening parts of facility/plant or environment</b>
3.2	1	
	2	
		<b>FAILURE OF ONE BARRIER WITH FLOW TO ANOTHER FORMATION</b>
4.1	1	
	2	
		<b>MINOR WELL INTEGRITY INCIDENTS</b>
5.1	1	
	2	
	3	
	4	