

*PMT Joint Venture*

(Operated by ONGC, RIL and BGEPII)

# Risk Management in Late Life Asset



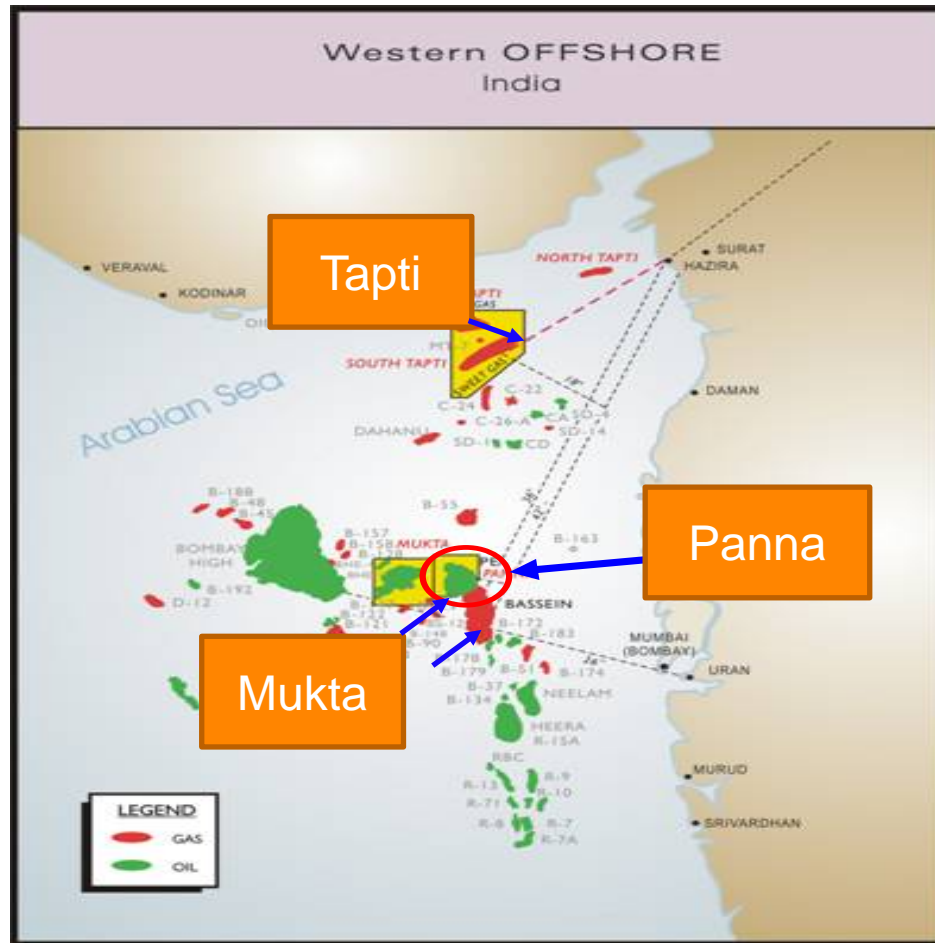
Panna platform  
India

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# Panna-Mukta & Tapti at a Glance

- Joint venture- **ONGC, RIL & BGEPIIL**
- **600+** million BOE gross sales
- **20** offshore platforms
- **180** development wells drilled (60 currently flowing)
- **>130** well service jobs per year
- **6-7** vessels supporting operations and well interventions
- PSC expires in **2019**
- Tapti in Decommissioning stage

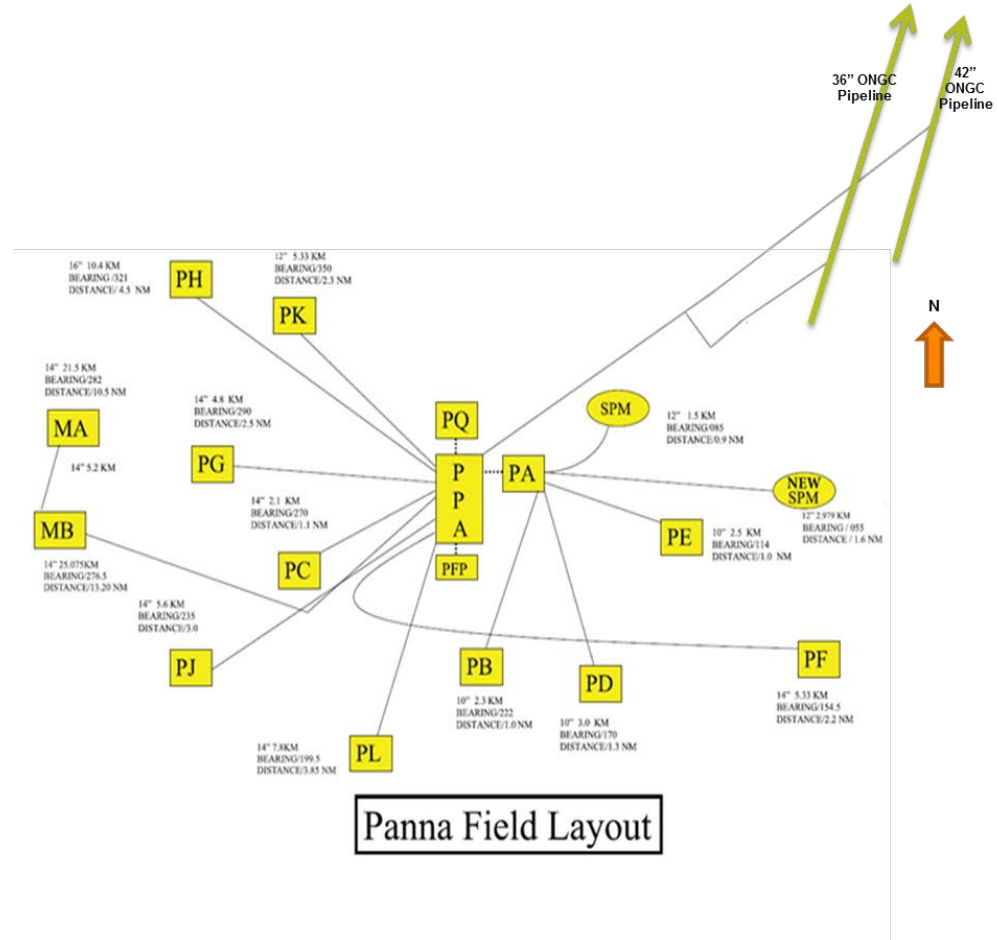


# Panna-Mukta Fields

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- Panna reservoir – 450 km<sup>2</sup>
- Mukta reservoir – 777 km<sup>2</sup>
- Process platform (PPA)
- 13 Wellhead platforms
- Avg. water depth: 154 Feet
- Commissioned July 1997
- Capacities (per day):
  - Oil: 60,000 bbls
  - Gas: 240 mmscf
- Average daily production
  - Oil: 18,000 bbls
  - Gas: 200 mmscf



# Key Challenges

- ❖ Producing since 1987, ageing legacy facilities posing typical late life asset integrity issues- design life, obsolete equipment etc.
- ❖ Increasing HSSE risks that has the potential to affect integrity of barriers; significant effort and resources spent in actively managing the risks
- ❖ More than 90% of offshore workforce efforts on liquidating preventive maintenance work
- ❖ Complex logistical challenges involving helicopter, tanker, SPM and supporting vessel operations
  - 600+ landings every month across Panna installations ferrying 4500+ passengers
- ❖ Presence of H2S creating a complex HSSE risk in every operation
- ❖ Emerging risks constantly disrupting priorities
- ❖ Long lead times for designing and executing the mitigation measures



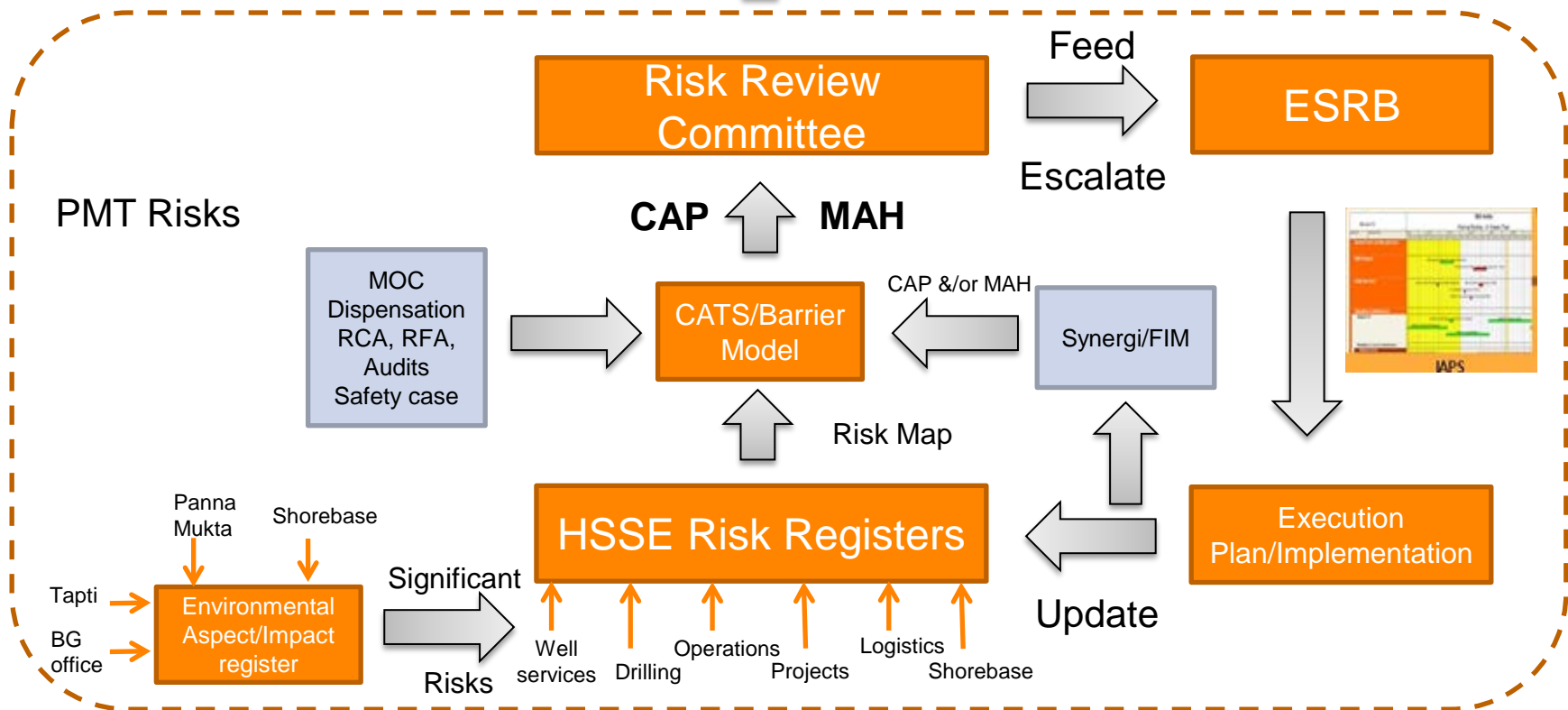
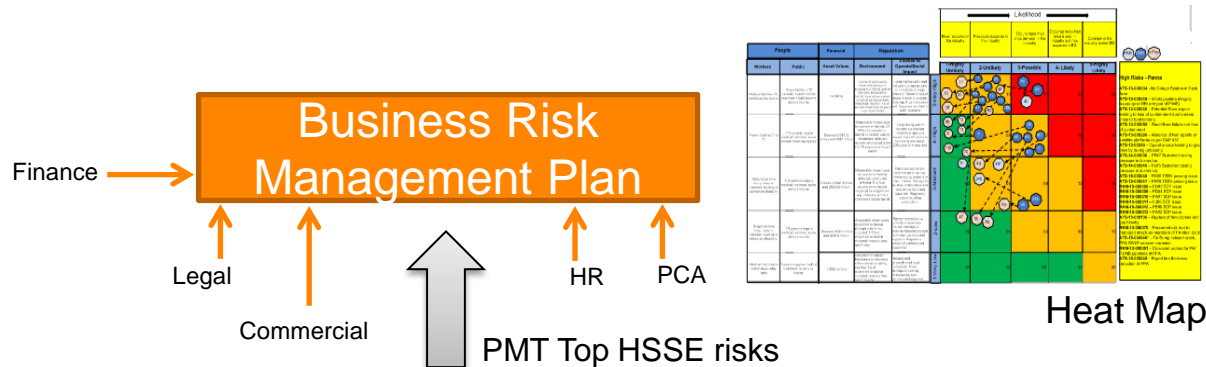
A holistic process to dynamically:

- Collect, assess and review risks
- Assign actions to mitigate the impact of risks and reduce the likelihood
- Set priorities, focusing management efforts on the issues where management can make the biggest difference (i.e. largest potential effect on impact and / or probability)
- Make appropriate resource allocation decisions
- Widen perspectives on risks, such that a broader range of issues can be considered
- Communicate risks appropriately so as to inform decisions on strategy, investment, functional actions, etc.
- Enhance corporate risk memory with better retention of knowledge about HSSE risks faced, actions taken and lessons learnt from the success or failure of those actions
- Strengthen and optimize Asset Integrity assurance

# Risk Management Process

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# Risk Matrix

					Likelihood					
					Never occurred in the industry	Previously occurred in industry	Occurs more than once per year in the industry	Occurred more than once a year in industry and has occurred in BG	Common in the industry and/or BG	
People		Financial	Reputation							
Workers	Public	Asset Values	Environment	Licence to Operate/Social Impact	1 - Highly Unlikely	2 - Unlikely	3 - Possible	4 - Likely	5 - Highly Likely	
Impact (on & off site)	Multiple fatalities >5, numerous site injuries	>US\$1bn	Long term and possibly irreversible damage to ecosystem or habitat; greater than 90% ecosystem or habitat impacted; ecosystem or habitat viability severely threatened, recovery, if at all, will take longer than 10 years once impact halted	Long lasting public and industry outrage globally or in multiple strategic markets. Threat of loss of global licence to operate. Existing JV partners seek exit. Suppliers reluctant to enter contracts	5 - Very High	05	10	15	20	25
	Fewer fatalities (1 to 5)	Between US\$100 million and US\$1 billion	Measurable impact upon ecosystem or habitat; 30-90% of ecosystem or habitat impacted; viability threatened, although recovery anticipated within 3 to 10 years once impact halted	Long lasting public/investor outrage but limited to single core market. Loss of licence to operate in core asset. Difficult to form new JVs	4 - High	04	08	12	16	20
	Multiple lost time injury, injury or illnesses resulting in permanent disability	Between US\$10million and US\$100 million	Measurable impact upon ecosystem or habitat although viability not affected; 5-30% of ecosystem or habitat impacted in a significant way; recovery in 1 to 2 years once impact halted	Public outrage in non-core market or narrow-interest group protects in major market. Damage to existing relationships with core JV partners and suppliers. Regulatory action including prosecution.	3 - Moderate	03	06	09	12	15
	Single lost time injury, injury or illnesses resulting in temporary disability	Between US\$1 million and US\$10 million	Measurable impact upon ecosystem or habitat although viability not impacted; 1-5% of ecosystem or habitat impacted; recovery less than 1 year	Narrow-interest group protests in non-major market. Damage to existing relationships with non-major partners and suppliers. Regulatory action not partners and suppliers	2 - Low	02	04	06	08	10
	Medical treatment or restricted workday case	<US\$1 million	Ecosystem or habitat disturbance or alteration within natural variability; less than 1% of ecosystem or habitat impacted; recovery less than 6 months	Isolated and uncoordinated local complaints. Minor damage to existing relationships with partners and suppliers	1 - Very Low	01	02	03	04	05



# Barrier Model

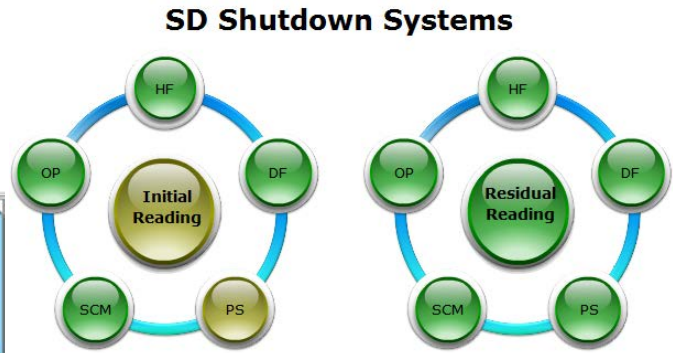


Consolidated live view of asset risks.

Pulls the information from ORAs and SCRA's.

Weekly Risk assessment meeting with TAs.

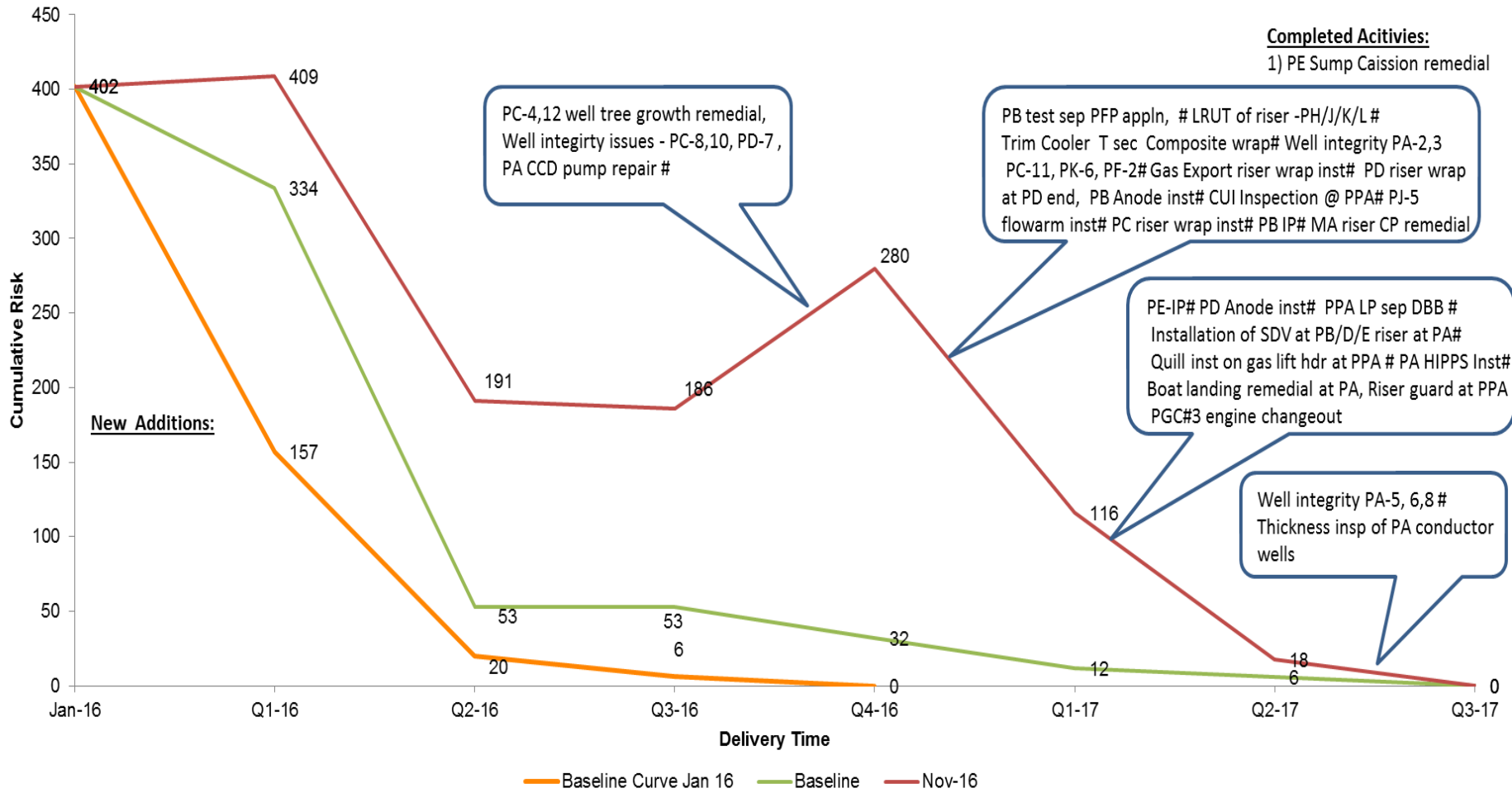
Assess/ demonstrate the cumulative effect of the risks to TAs/ OIMs.



Area	Barrier	PS Code	Item	Details	Initial Score	Residual Score	ALARP	Status	Approved	Valid To	Extensions	Duration	Type
Barrier Selection - ALL BARRIERS													
CELLAR DECK	SD	SD003	PA1-16-00272	PA HPPS valve 7010A, is not fully closing (only 30%)	0	0		Review		31/10/2016	0		Process Safet
MEZZANINE DECK	PC	PC007	PA1-16-00275	PA Wells - Well Integrity risk of loss of containment due to Wellhead Seal leaks I.e. Failed Perf 9	6	10-6		Approved	16/08/2016	31/03/2017	0		Operation
SPIDER DECK	SI	SI002	PA1-15-00141	Potential riser impact leading to loss of containment due to risers installed close the boat landin	12	4		Pending Ap	22/02/2016	31/12/2016	0		Process Safet
	ER	ER007	PA1-16-00214	PA CCD Pump not available	6	4		Approved	22/02/2016	31/10/2016	0		Operation
	PC	PC007	PA1-15-00177	PA wells conductor casing integrity issues due to corrosion in splash zone affecting the integri	6	3		Overdue	22/02/2016	01/05/2016	0		Operation
	PC	PC007	PA1-15-00188	PA-22H Well Integrity risk of loss of containment due sustained casing pressure in B-annulus	12	4		Overdue	19/02/2016	30/06/2016	0		Operation
	PC	PC007	PA1-16-00253	PA-5 Well Integrity risk of loss of containment due sustained casing pressure in A-annulus & B	8	4		Approved	21/06/2016	31/12/2016	0		Operation
	PC	PC007	PA1-16-00206	PA-6 Well Integrity risk of loss of containment due to Non-compliant integrity of DHSV	8	4		Overdue	25/01/2016	31/03/2016	0		Operation
	PC	PC008	PA1-16-00236	Thickness reduction in elbow for tapping in production/test header as mentioned in UT report P1 9	0	10-6		Overdue		31/05/2016	0		Operation
	PC	PC008	PA1-15-00167	Loss of containment from well flow arms due to depletion in the wall thickness	9	6		Overdue	22/02/2016	01/07/2016	0		Operation
	PC	PC008	PA1-15-00112	Loss of containment from small bore piping and tubing connections in filed	9	6		Overdue	22/02/2016	30/07/2016	0		Process Safet

# Risk Reduction Plot

## Risk Reduction Chart for December 2016



# Q&A