



Shell Global Solutions

Pipeline Integrity Management

3rd Party Interference

UKOPA, 14 January 2004

by

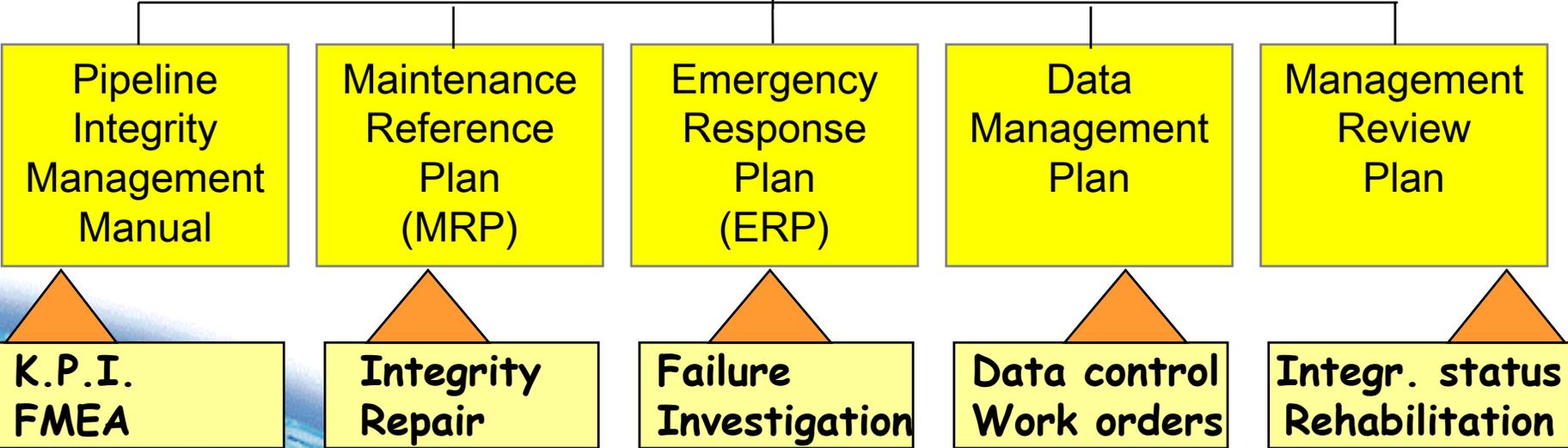
Cees Voermans



Elements of PIMS

**ASSET INTEGRITY
MANAGEMENT**

**PIPELINES
(PIMS)**



FMEA (ref API 1160, B31.8S)

Liquid systems

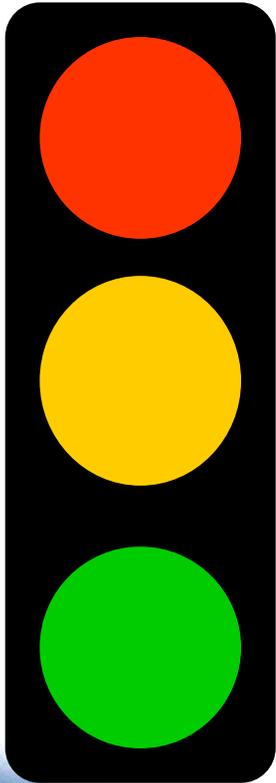
- External corrosion
- Internal corrosion
- 3rd Party Interference
- Design & Materials
- Operations

Gas systems

- External corrosion
- Internal corrosion
- SCC
- Manufacturing defects
- Equipment related
- Welding/Fabrication rel.
- 3rd Party Interference
- Weather/Earth forces
- Operations



Traffic Light System for Integrity Status (time related degradation)



End of Remaining life $<$ X years

**Immediate
action !**

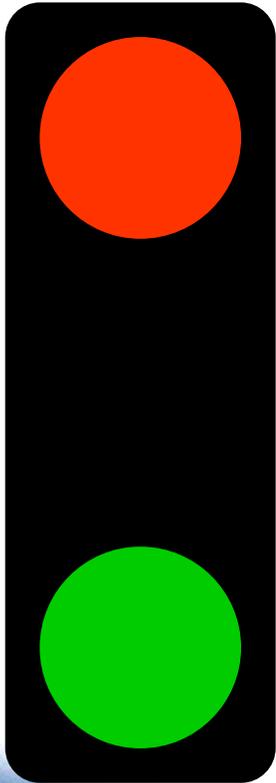
X yrs $<$ End of Remaining life $<$ Required Life
or
Verification Overdue

**Corrective
action !**

End of Remaining life $>$ Required Life
and
Inspection in Time

**No
action**

Traffic Light System for Integrity Status (Stable - Unstable)



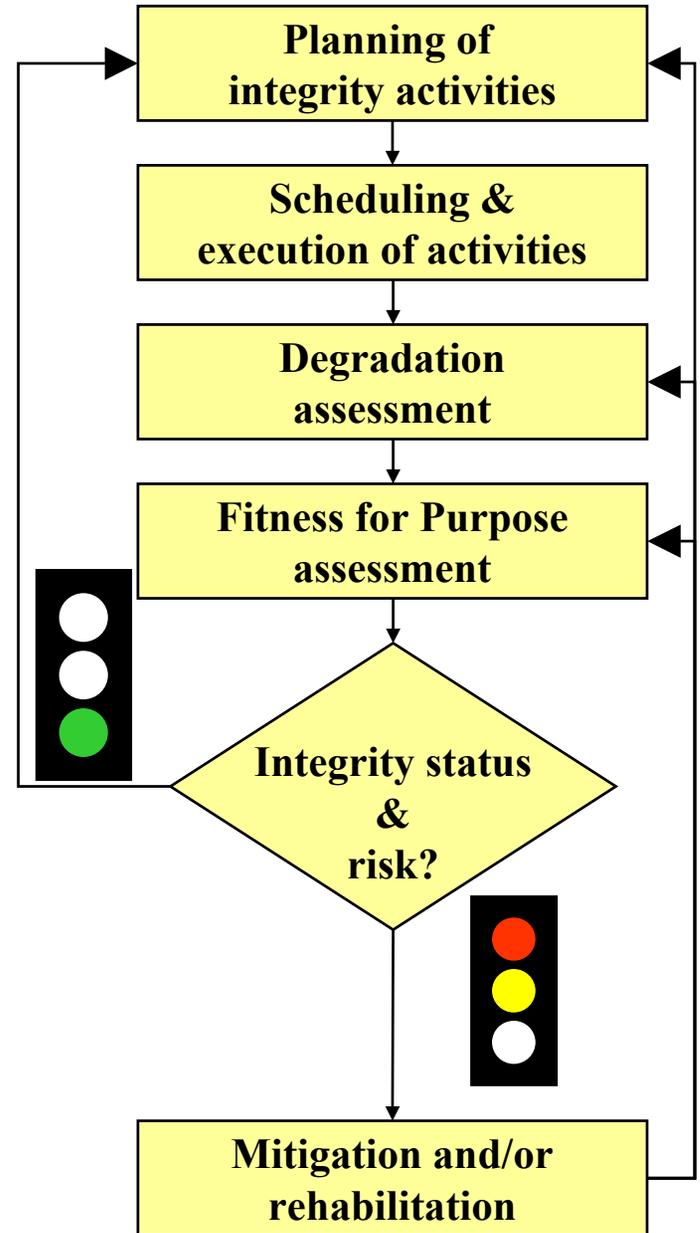
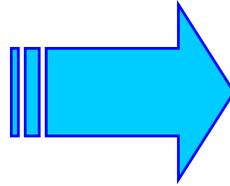
Drivers of the threat outside accepted operational window or not monitored

**Immediate
action !**

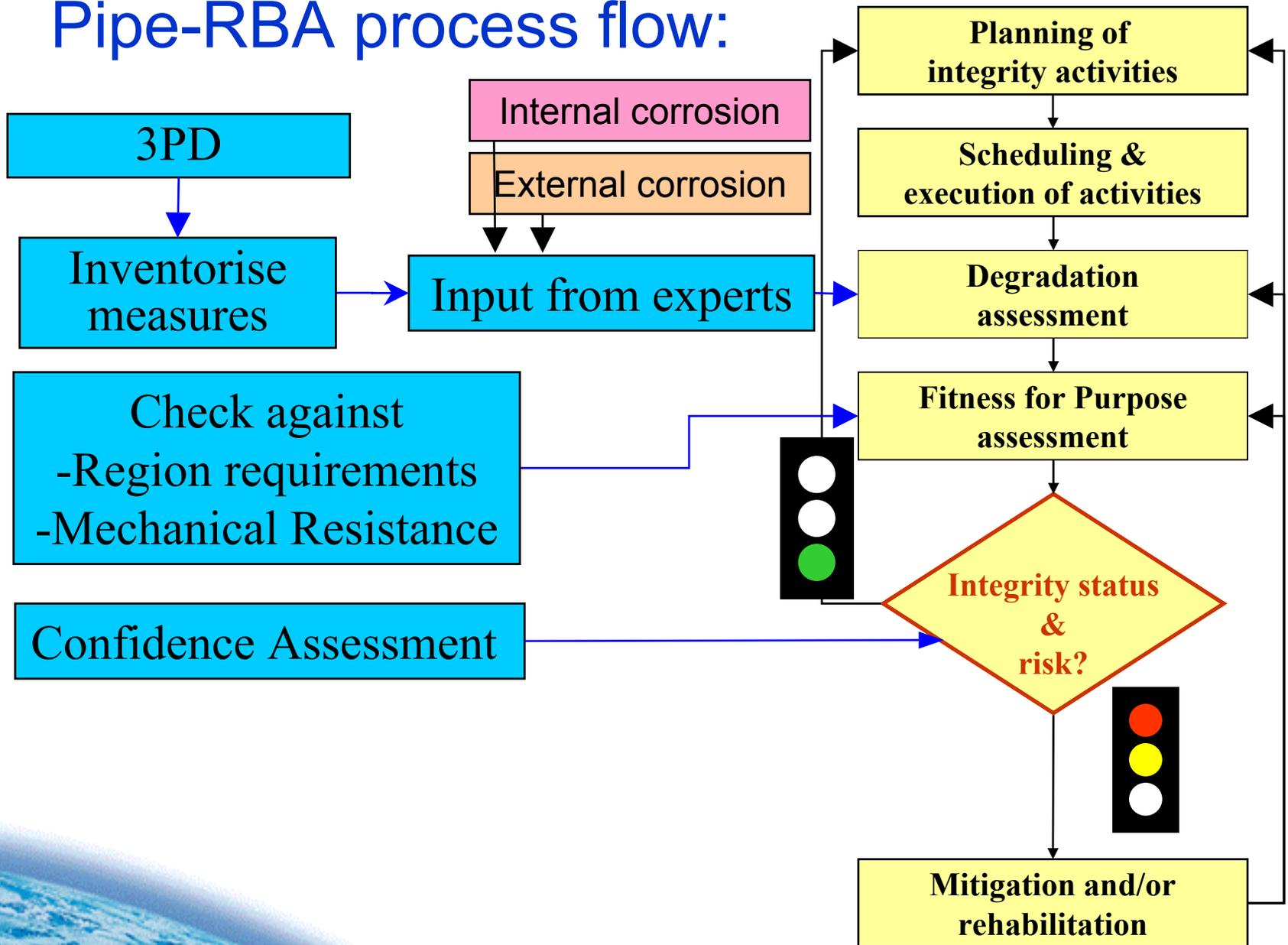
Drivers of the threat are inside accepted operational window and are reliably monitored

**No
action**

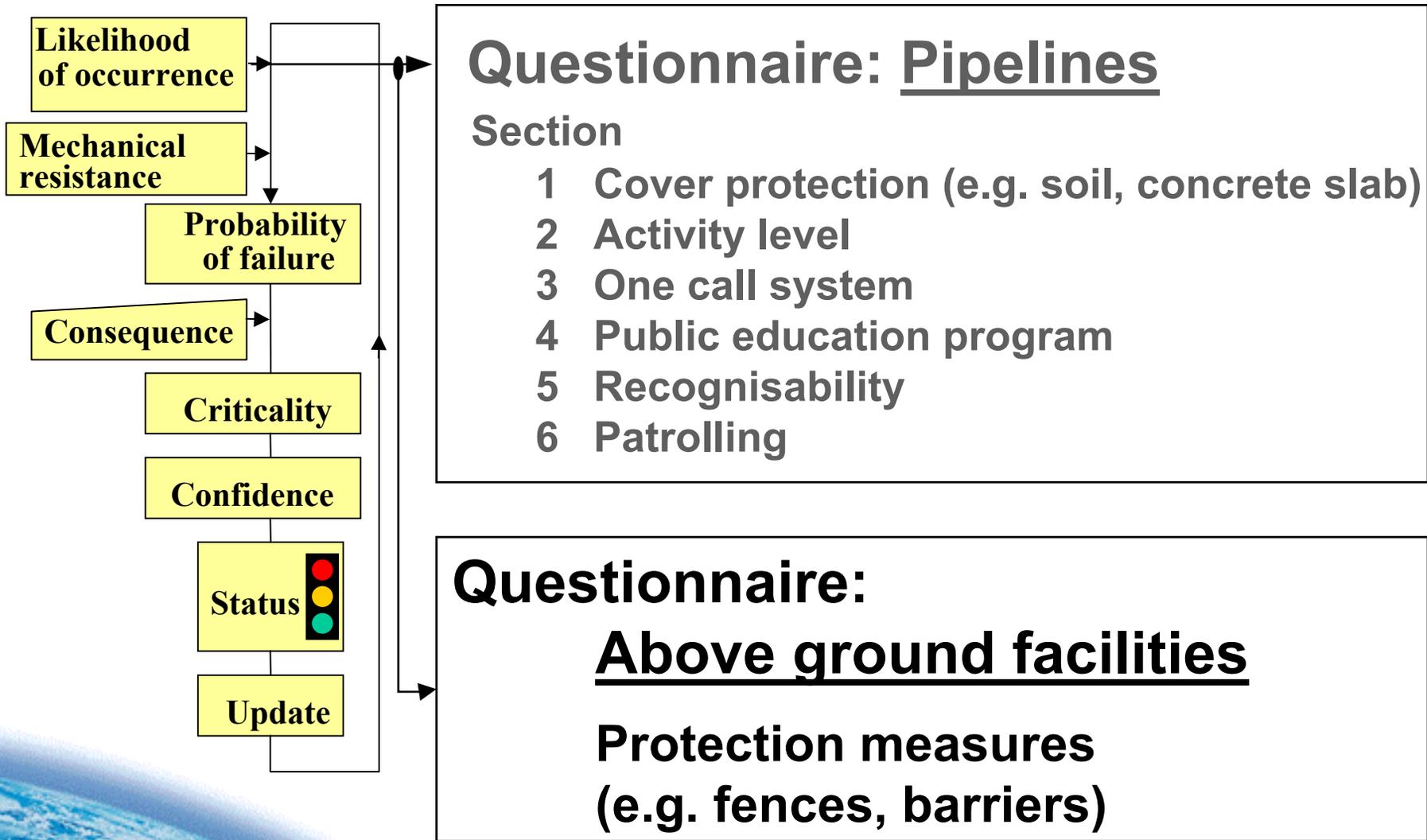
Pipe-RBA process flow:



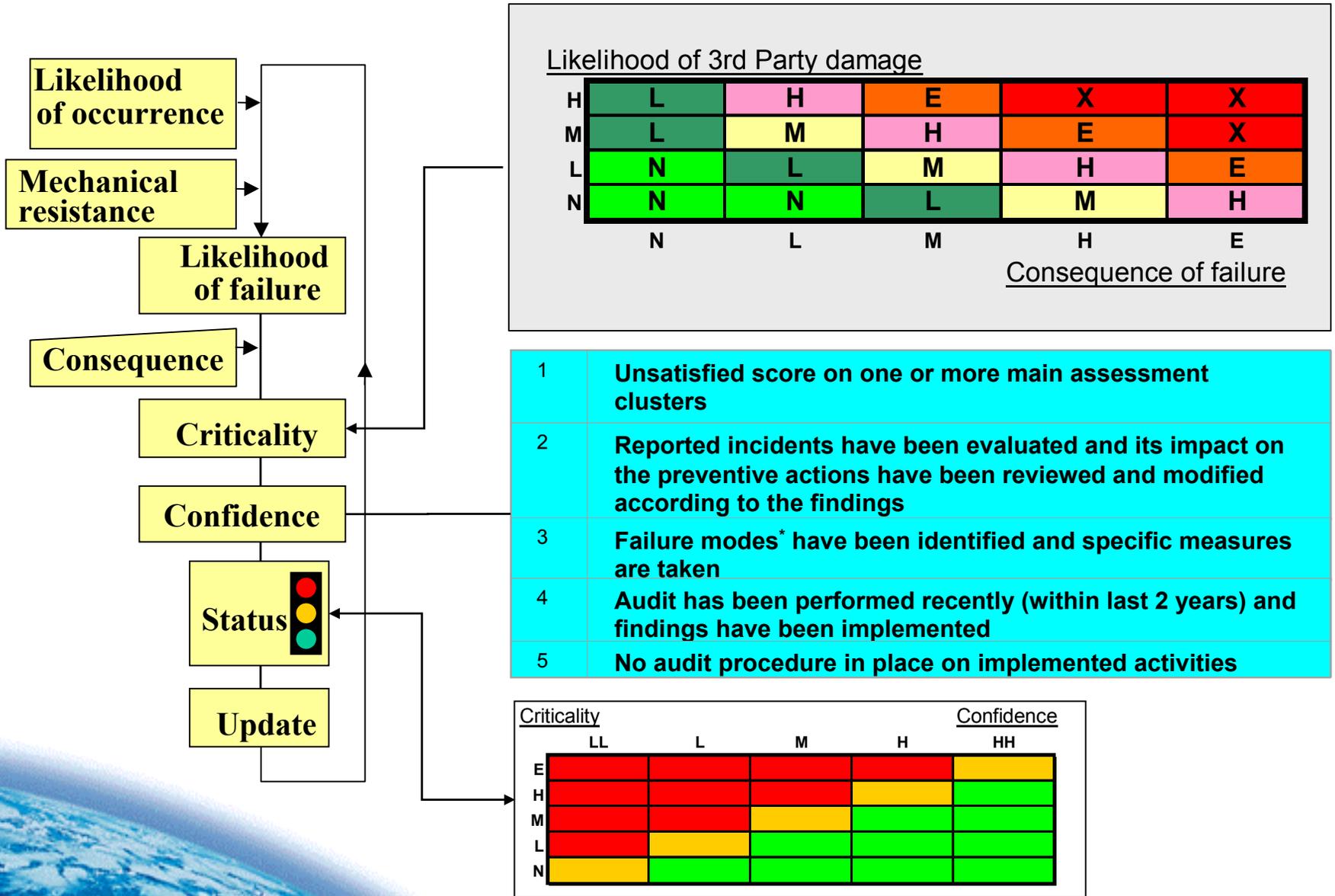
Pipe-RBA process flow:



3PD evaluation process related to S-RBA



3PD evaluation process related to S-RBA



Report results

2003 Pipeline Annual Report				WX002	
18" Alto to Term-A		Asset Owner		West	
		Area		SO02	
Overall Integrity Status		RED			
Length:	24 km	Service type:	Wet separated crude oil		
Wall Thickness:	7.11 mm	Replacement Costs:	\$ 4,050,000		
Material:	X60		Internal	External	3 rd Party Interf.
Diameter	18 inch	Corrosion rate:	0.270 mm/yr	0.100 mm/yr	N/A
MAOP:	82.0 bar	Status:	RED	Amber	Green
Operating pressure:	65.0 bar	Inspection Due Date:	N/A	N/A	N/A
Last Intelligent Pig:	2003	Remaining life:	2003	2005	N/A
		Confidence:	Very high	Very high	High
Consequence	Medium	Criticality:	High	High	Medium

Summary Reports					
Degradation Status					
Currently the internal degradation (CO2) is not properly controlled.					
Integrity Status					
Immediate action required to ensure future technical integrity. See action list					
Maintenance and Inspection Planning					
The contract with the chemicals supplier requires a review immediately. The inhibition skid has to be repaired and the maintenance team has to schedule the inhibition activities.					
Remedial Action					
Three repairs are required end 2003 (2m sleeves) and five pipe sections required coating replacements.					
3 rd Party Interference					
After the adoption of the additional measures in 2001, no additional activities are required.					
Inspection/Maintenance Summary					
Item	2003		2004		
	Plan	Achieved	Plan	Action Party	
Repair 1	2m Sleeve at km 2.035				
Repair 2	2m Sleeve at km 3.434				
Coating R1			Full joint section Joint	1020	
Coating R2			Full joint section Joint	1230	
Coating R3			Full joint section Joint	1560	
Other Details		RBA Results			
Date in service:	1990	Remnant Life:	2003	2005	3 rd Party Interference
Wall Thickness:	7.11 mm	Corrosion rate:	0.270 mm/yr	0.100 mm/yr	N/A
MAOP:	8200.0 kPa	Corrosion status:	RED	Amber	Green
Design Factor:	0.72	Prob. of Failure:	High	Medium	Low
Material:	X60	Inspection Due Date:	N/A	N/A	N/A
Last intelligent Pig:	2003				
Required Life:	2008				