

13th Chemical Process Safety Sharing (CPSS)

Topic: LOPC Prevention Program (Inspection Campaign) Presenter Name: Mr. Pranpath Narupantawart E-mail: Pranpath@Thaioilgroup.com **Company : THAIOIL Public Company**



13th Chemical Process Safety Sharing (CPSS) June 20th-21st, 2024, Dusit Thani Pattaya Thailand









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LOPC BACKGROUND



Loss of Primary Containment (LOPC)

An unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials(e.g. steam, hot condensate, nitrogen, compressed CO2 or compressed air).

Source: OGP Report No. 456, Process Safety – Recommended Practice on Key Performance Indicators, International Association of Oil & Gas Producers, November 2011. Global Standards





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LOPC BACKGROUND

THAIOIL LOPC Corrosion degradation

Process Safety Sharing

LOPC Analysis showed:

THAIOIL LOPC by hardware

- Approx. 50% of Leaks occurred in a piping system.
- Approx. 45-50% of Leaks occurred due to corrosion and degradation.
- Approx. 20-25% of leaks occurred due to incorrect operation.
- Approx. 5-10% of leaks occurred at flange.



THAIOIL LOPC Threat list



LOPC BACKGROUND



All campaigns are issued to control LOPC





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Corrosion Under Insulation (CUI)

Corrosion Under Insulation (CUI) is a major failure mode of aging plants. That often leads to LOPC and unit SD. Most of severe corrosion in THAIOIL is found at units that have a service life of more than 15 years. due to cladding and painting damage.





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Corrosion Under Insulation (CUI)

Inspection and Maintenance Program

Overall CUI inspection result



Proactive Program : Your information is the most importance for Plant Integrity!



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Challenging the need for insulation

- Personal Protection
- Normally No Flow ,Start up line and No service line
- Stagnant area for example inlet RV, By passed control valve

Reliability work about

Create guideline for operator to support during plant patrol.

Your information is the most importance for Plant Integrity! Tharoul



Vertical vessel !!







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Dead legs Inspection(Corrosion Under Deposit)

areas where little no flow occurs in piping or equipment and have process conditions (composition, temperature) that are different from the main line. Example of dead legs **Dead legs** (end) Low point drains, High Point Vents Header cap, Exchanger By-Passes Non-normal Flow Lines, Level Indicator Piping









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Dead legs Inspection(Corrosion Under Deposit)





U8950: Corrosion under deposit at 1" x ¾" V8956 LRCR nozzle



U1100: Corrosion under deposit / severe corrosion at 2" drain E-1123A Shell

Table 2 : Flushing plan for susceptible deadlegs

Deadlegs	Flushing
Criticality	Frequency
Extremely high (E)	3 Months
High (H)	6 Months
Medium High (MH)	Yearly or PM schedule, whichever is less
Medium (M)	Yearly
Low (L)	MTA
Negligible (N)	No flushing required



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Small Bore Connection (SBC) inspection (Mechanical fatigue)

Small bore connection (SBC):

- A branched connection on mainline piping that is NPS 2" (DN 50) and smaller
- Including connections that have a branch pipe to mainline pipe ratio ("branch ratio") of less than 10%.
- Excluding connections that have a branch ratio greater than 25%



Integrity Evaluation of Small Bore Connections (Branch Connections) by: Chris B. Harper, P.Eng. Principal Engineer Beta Machinery Analysis





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Small Bore Connection (SBC) inspection (Mechanical Fatigue)





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LOPC from corrosion and degradation Reduced 66% Corrosion and degradation leaked record (2017-2023)





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