Integrated Revalidation
HAZOP/SIL Study:
Lessons Learned

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Outline

- Background
- Life Cycle Model
- Study Scope & Scheme
- Lessons Learned
- Summary
• Process Hazard Analysis:
  – Hazard evaluation that identifies and analyzes the significances of hazardous situation associated with a process or activity.

• What is Revalidation?
  – Updating the results of initial PHA and identify, evaluate and attempt to control any newly introduced hazards.

• Industry Practices:
  – Initial PHA is typically performed during design stages.
  – Recent trends mandates frequent updates.

• Why Revalidation?
  – Changes on Field, Equipment & Personnel
Life Cycle Model

- Design
- Construction
- Operate & Maintain
- Decommissioning
“A Process Hazard Analysis shall be performed on individual process node within a unit and on the entire unit at least every 5 years”
Ju’aymah NGL Fractionation

- Scope & Scheme:
JNGLF Study

- Analyzes process deviations on continuous nodes of operations.

HAZOP
HAZARD & OPERABILITY

SIL
SAFETY INTEGRITY LEVEL

- Evaluates the reliability of ESD system loops and other Safety Instrumented Functions (SIFs) during operational demand.
JNGLF Study

- Consultant: ERSG, Australia
- Scope: HAZOP & SIL for 3 Fractionation modules, Rerun units and Auxiliary systems.
- Total Process Nodes: 35 Nodes
- Start: October 3rd, 2009
- Finish: November 5th, 2009
- Venue: JNGLGF Training building
- Team: 10 full-time & 3 part time
- Daily hours: 6-8 hrs
Lessons Learned

- Revalidation shall be business-driven.
- Process nodes estimation defines the roadmap.

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45 PFDs
200 P&IDs
Lessons Learned

- Revalidation shall be business-driven.
- Process nodes estimation defines the roadmap.
- Success is determined by teamwork.
Lessons Learned

• Revalidation shall be business-driven.
• Process nodes estimation defines the roadmap.
• Success is determined by teamwork.
• Key engineering documents shall be available.
Lessons Learned

- Clear study schedule helps to streamline activities.
- Daily plan & objectives supports team to focus.
- Spotting concerns engages management support.
Lessons Learned

- Unit breakdown avoids potential duplicates.
- Opportunities for optimization shall be invested.
- Visible P&ID for all team sets review unity.
- SIL integration minimized 50% of time and efforts.
Lessons Learned

- Advantage for participants when trained on basics.
- Discussion participation shall be fostered.
- Opportunity for new engineer’s learning.
Lessons Learned

- Report value is how helpful for Implementation team.
- Attention is to be given for procedural systems.

- NDT Inspection
- Turnaround & Inspection (T&I)
- LEL Detection layout
- Fixed fire protection layout
- Operation Instruction Manual (OIM)
- Operator's training
- ESD Procedures
- Instrumentation & Rotating equip. PM

*Risk Mitigation Plan

Exception of specific failure
Rational behind optimization
Common industrial trends
Lessons Learned

- Report value is how helpful for Implementation team.
- Attention is to be given for procedural systems.
- Categorizing action plans addresses RMP priority.

*Risk Mitigation Plan*
Lessons Learned

- Report value is how helpful for Implementation team.
- Attention is to be given for procedural systems.
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SIL Validation
- Refrig. compressor (DeC2)
- Critical & non-critical SD
- Total of “5” SIL 1 rating
- Acceptable risk level

*Risk Mitigation Plan
Summary

• PHA revalidation would lose value if not driven by business-objectives and management support.

• Ju’yamah NGL’s scheme of integrated PHAs was successful to optimize time, efforts and assigning RMP.

• PHA is an opportunity for risk reducing and process learning specially for new engineers.

• Findings of retroactive SIL on existing facilities are likely to be minimum unless major upgrade occurs.

• Risk Mitigation Plan should be prioritized either qualitatively or quantitatively for implementation.
Thank you

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