Functional Safety
A Reality Check in the World of Projects!
Presenters

• Nagappan Muthiah “Muthu”, PE, CFSE
  – 12 Years in Process Automation
  – WGM - Functional Safety Discipline Technical Authority
  – ISA 84 Committee – Voting Member
  – CFSE Process Safety Advisory Board Member

• Aracely Acevedo, ISA 84 SIS Expert
  – 12 Years in Process Automation / Instrumentation
  – WGM – Functional Safety Engineer
ISA84 - Functional Safety Standards

- ISA 84 / IEC-61511: Safety Instrumented Systems for the Process Industry Sector
- Performance based Specification
- Allows Operating Companies a measure of freedom to determine their own methodology in meeting the targets set by the standard.

Freedom comes with its own Challenges!
Challenges – Paper to Reality

1. Funding - ISA-84 SLC: Show me where it says we have to do all this?
2. Safety Lifecycle is Continuous – Projects are Not!
3. S84 Compliance – Breaking the Silos
4. S84 Compliance – Functional Safety Planning
5. Don’t let “Best” be the enemy of “Good”

Challenges discovered based on Lessons Learned From executing Functional Safety Projects
Challenge - 01) Show me where it says so?

S84 Compliance

- Functional Safety Plan
- PHA, LOPA
- IPL – Independence
- IPL - Auditable
- SIFs - SIL Rating
- Define Operator Response
- Proof Testing
- Failure rates

Follow Safety Lifecycle Approach

ISA-84

RAGAGEP

OSHA

United States Operations
Challenge - 01) Show me where it says so?

1910.119(d)(3)(ii) – The employer shall document that equipment complies with recognized and generally accepted good engineering practices.

1910.119(j)(4)(ii) – Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.

OSHA General Duty Clause: SEC. 5. Duties
(a) Each employer –
(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

OSHA has sent letter to ISA conveyed that it considers ISA-84 as R.A.G.A.G.E.P

RAGAGEP: Recognized and Generally Accepted Good Engineering Practice
Challenge - 02) Safety Lifecycle vs. Projects

Results: Projects go Over-Budget with most of the money spent on Paperwork!

Scott Adams (Dilbert)
Challenge - 02) Safety Lifecycle vs. Projects

Safety Lifecycle is Continuous – Projects are Not!

Lifecyle Approach

- PHA
- LOPA
- MOC 5 Years
- Update SIL Calcs
- Test
- IPLs
- SRS/ SIL Calcs
- Maintain
- Install

Start
- • Estimate
- • Approve
- • Project Kickoff

Stop
- • Purchase
- • Design
- • FAT/SAT => IFD

T/A
- • Unit Shutdown
- • Field Commissioning
- • Start-up

Project Approach
Challenge - 03) Breaking the Silos

Silo Approach

Shared Accountability and Ownership
Challenge - 03) Breaking the Silos

Management, PSM Consultants, PHA Team

Establish Goals of PHA facilitation:

1) PSM Consultants to **facilitate inputs from PHA Teams**

2) All members of PHA team should contribute – Process, Operations, Safety Team

**Successful Results:**

- PHA had better coverage
- Consequence categories better aligned with reality
- Invalid consequences eliminated

**Shared Accountability and Ownership**
Challenge - 03) Breaking the Silos

PHA Teams and Projects Team

1) PHA / LOPA Documentation not just for passing OSHA Audits.

2) Documentation should be captured keeping Safety Lifecycle usability in mind.

3) Reports to provide useful information to Projects Team

Successful Results:

- Project teams understood requirements faster
- HAZOP scenarios validity was not challenged
- Project scope was defined more effectively
Challenge - 03) Breaking the Silos

LOPA Validation Team, Projects, Configuration Team and Operations.

Always involve Process and Operations during SRS Definition.

- SIFs are not just about tripping
- It’s important to keep the plant running!
- Consider Operability Factors
  - Reducing Spurious trips
  - Startup bypass requirements
  - Reset and Restart requirements

Successful Results:
- Better SIF Design with reduced Spurious trip rate
Summary

• S84 is considered RAGAGEP by OSHA
• Functional Safety Planning => Project Specific Actions
• Breaking the Silos => Start with the End in mind
• Safety Lifecycle is Continuous – Projects are Not!
• Don’t let “Best” be the enemy of “Good” => Don’t Stall Projects
Where To Get More Information


- Process safety: Blind spots and red flags – Tom Shephard – WGM

- Presenter Contact:
  
  Nagappan.muthiah@woodgroup.com
  Aracely.acevedo@woodgroup.com