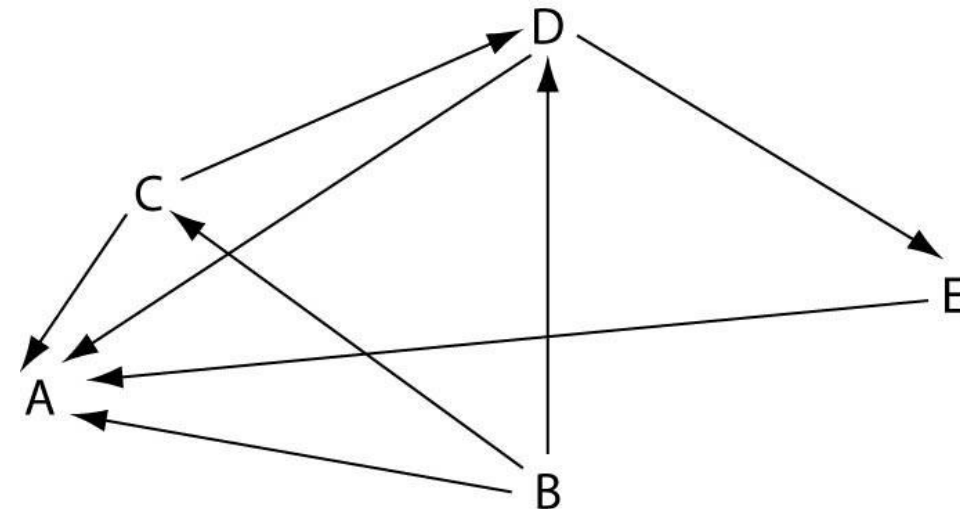


ECOLAB PROCESS SAFETY QUALIFICATION PROCESS

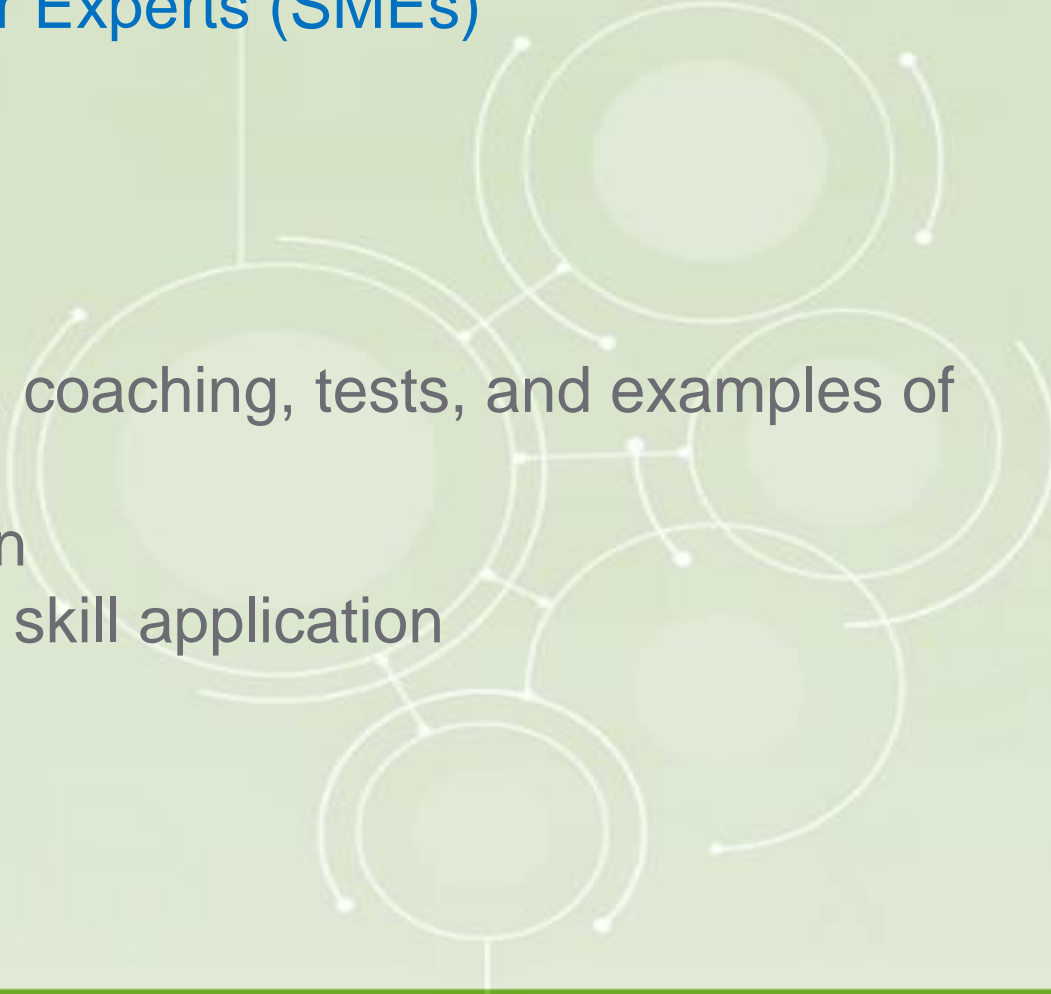
Nathan Thompson
Global Training Program Manager

PROCESS SAFETY QUALIFICATION PROCESS: BACKGROUND

- Ecolab's Process Safety performance had started to plateau
 - Process Safety tasks were getting missed at global plant sites
- Development of Engineering Career Ladder
 - Consistent Job Roles at a global level



PROCESS SAFETY QUALIFICATION PROCESS: PROJECT

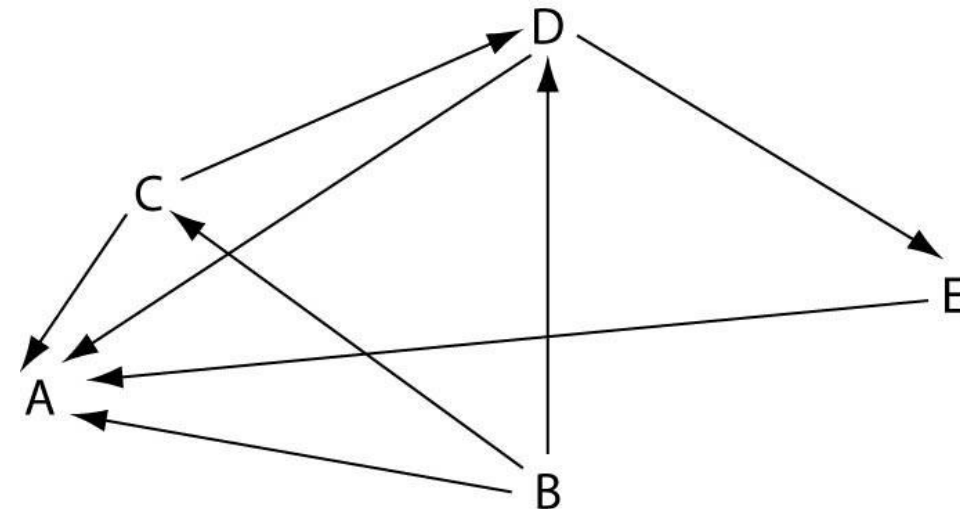
- Core Elements identified by Subject Matter Experts (SMEs)
 - PSE/Incident data
 - Engineering Career Paths
 - Academic and business resources
 - Combination of Self-assessment, training, coaching, tests, and examples of skill application
 - 30% based on training/testing/evaluation
 - 70% based on examples of experience, skill application
- 

PROCESS SAFETY QUALIFICATION PROCESS: PROJECT

- Competencies developed for a Benchmark level **Engineer II**
 - 3-5 years experience**



- Self assessment tool and test questions
- Training adjusted to meet competencies
- Evaluation criteria to calibrate final steps
 - Examples show skill applications



PROCESS SAFETY QUALIFICATION PROCESS: PROJECT

- **Benchmark Discoveries**

- Process Safety is limited focus area for global degree programs
 - Is emerging as a stronger focus area
- Other companies have similar issues with PS knowledge/application
 - Mainstream Petro/chem may have PS requirements, but not other industries (EX: F&B)
 - **Many qualifications tend to be for Personal Safety only**
- Consensus from internal SMEs is challenging
 - **Calibrating what qualified looks like -**



PROCESS SAFETY QUALIFICATION PROCESS STEPS

1. Employee completes self-assessment

2. Employee completes training and testing

3. Employee shows skill application with examples of their work and coaching

4. Global review panel approves qualification

30%

Training
Testing
Evaluation

70%

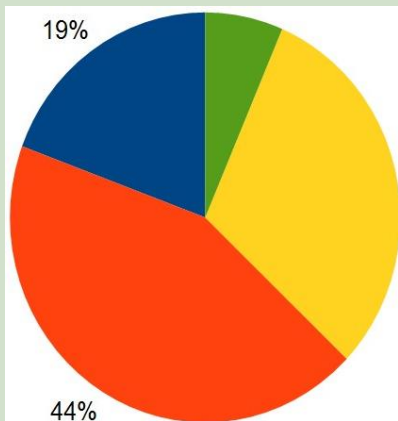
Examples of experience
and skill application



PROCESS SAFETY QUALIFICATION IN ACTION

Plant engineer completes Self-Assessment

Finds competency gaps in chemical compatibility and plant design



Completes WebEx sessions and Open Ends training

Passes tests for Plant Design and Red List/Chemical Compatibility

Attends training workshop
Reviews PS policies, standards, best practices

Completes tests for all 12 core elements

Works with regional engineering for **Open Ends Score Card** project

- Analyzes hazards and risks in specific production area
- Implements recommendations to eliminate open ends and chemical compatibility hazards at the site

Submits project to Review Panel to show skill application

Review Panel confirms qualification through consensus



PROCESS SAFETY QUALIFICATION EXAMPLE

1. Completes Self-Assessment – sees gaps in chemical compatibility and plant design
2. Completes WebEx session and Open Ends training
3. Works with regional engineering for Open Ends Score Card project
 - a) Analyzes hazards and risks in specific production area
 - b) Implements recommendations to eliminate open ends and chemical compatibility hazards at the site
4. Passes tests in all 12 core elements
5. Submits project to Review Panel to show skill application
6. Review Panel confirms qualification through consensus



CORE PROCESS SAFETY QUALIFICATION ELEMENTS

■ HIRA/ PHA Tools	■ Management of Change
■ RBPS/PSM Program Knowledge/ SHE Management System	■ Managing/Using Process Safety Information
■ Measurement and Metrics	■ Regulatory Compliance/ RAGAGEP
■ Compliance with Global Standards	■ Critical Equipment
■ Plant Design	■ Root Cause Analysis
■ Chemical Compatibility/ Red List	■ Process Safety Culture

ROLE MAPPING FOR QUALIFICATION

Core Elements	HIRA/ PHA Tools	RBPS/PSM Program Knowledge SHE Management System	Managing/Using Process Safety Information	Plant Design	Chemical Compatibility/ Red List	Management of Change	Compliance with Global Standards	Regulatory Compliance/ RAGAGEP	Measurement and Metrics	Root Cause Analysis	Critical Equipment	Process Safety Culture
Plant Level Roles												
ENGINEER I	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA
ENGINEER II	BA	WK	WK	BA	WK	WK	WK	WK	WK	WK	WK	WK
PRINCIPAL ENGINEER I	WK	FO	FO	WK	FO	FO	FO	FO	FO	FO	WK	FO
PRINCIPAL ENGINEER II	FO	FO	FO	WK	FO	FO	FO	FO	FO	FO	FO	FO
ENGINEERING MANAGER I	FO	FO	FO	FO	FO	FO	FO	FO	FO	FO	FO	LE
ENGINEERING MANAGER II	FO	LE	FO	FO	FO	FO	FO	FO	FO	FO	FO	LE

0. NK - No Knowledge

1. BA - basic awareness

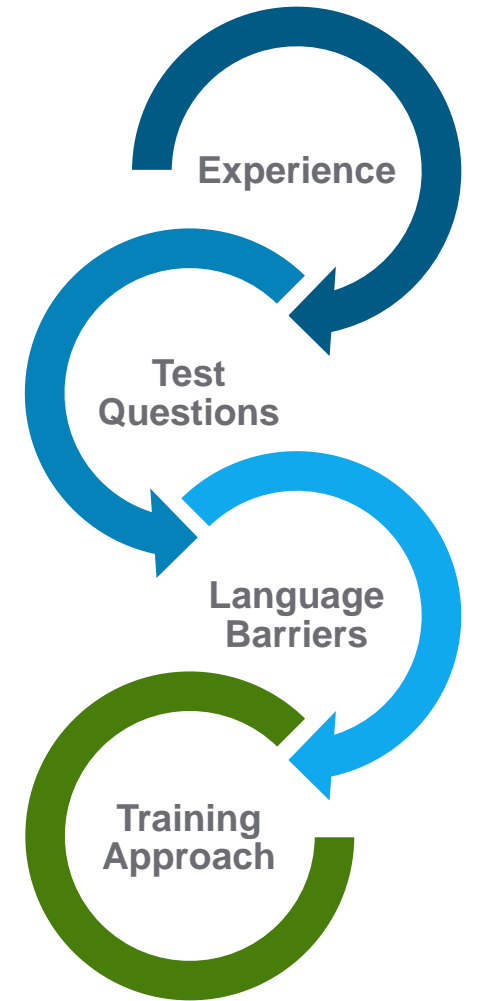
2. WK - working knowledge

3. FO - fully operational

4. LE - leading edge

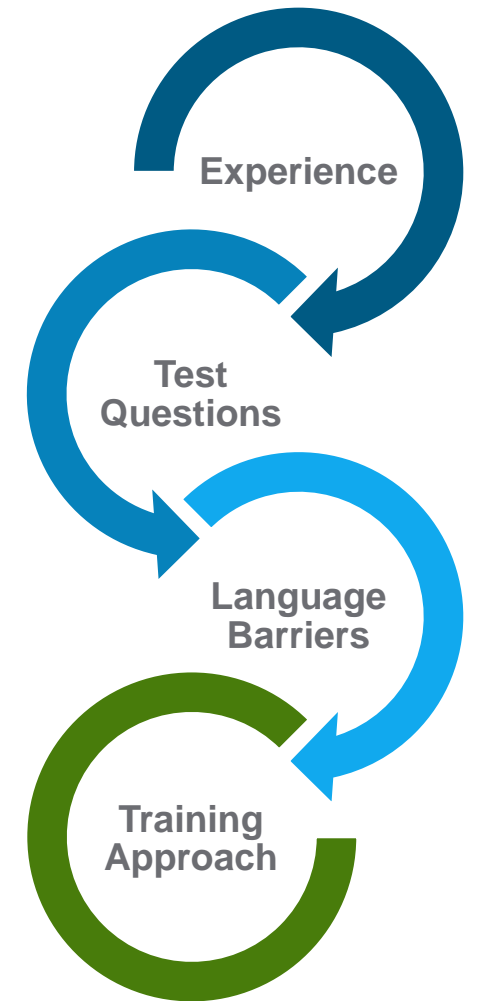
ROLE MAPPING CHALLENGES

- **Different plant sizes** and production volumes
 - Different priorities and reception of the process
- **Job Roles** within each plant site
 - Not all plant sites have an engineering team, so the work falls on the **maintenance teams**



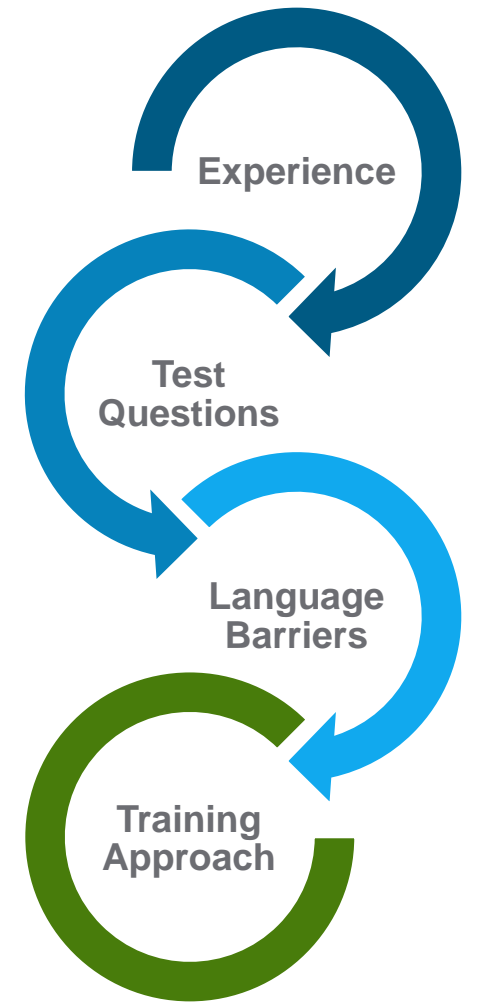
PROCESS SAFETY QUALIFICATION PROCESS: LEARNINGS

- Experienced adults don't like tests
 - *"Why do I have to take a test?"*
 - Test Anxiety
- Test questions are key to success
 - Appropriate to benchmark level
 - Language can be easily translated : Goggles vs Glasses
- Set the competencies, adjust the approach
 - Mapped to standards and training, PSE data



PROCESS SAFETY QUALIFICATION PROCESS: PILOT

- **Pilot Goal:** Participants complete the PS Qualification Process by the end of 2019
- Focus is for review/support and provide examples of skill application
 - Additional training and coaching/mentoring
- **Stronger PS Skills and risk reduction**
 - Champion at the sites to drive improvement



PROCESS SAFETY QUALIFICATION PROCESS: FUTURE STATE

- **Leverage Learnings into other Disciplines**
 - SHE Career Ladder: Environmental, Sustainability, Security, Health, Industrial Hygiene
 - Internal/External Auditing Practices
 - Technical Disciplines: Controls and Automation; Packaging; Environmental Controls
- **External Global Influence Through CCPS Project teams**
 - Ecolab driving *Early Career Professionals* project, sponsored by CCPS
 - Anyone interested in joining the team?
- **Improved PS Performance; Reduced Risks**
- **Succession Planning**

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