

# The quest for a fundamental upgrade in chemical operator qualification methods.

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# Relevance of Chemical Operator Competencies.



Onboarding



Knowledge  
Capture / Transfer



Scarce SMEs



Procedure  
Clarity



Unplanned Equipment  
Downtime



Quality  
Issues



Environmental  
Events



Safety  
Incidents

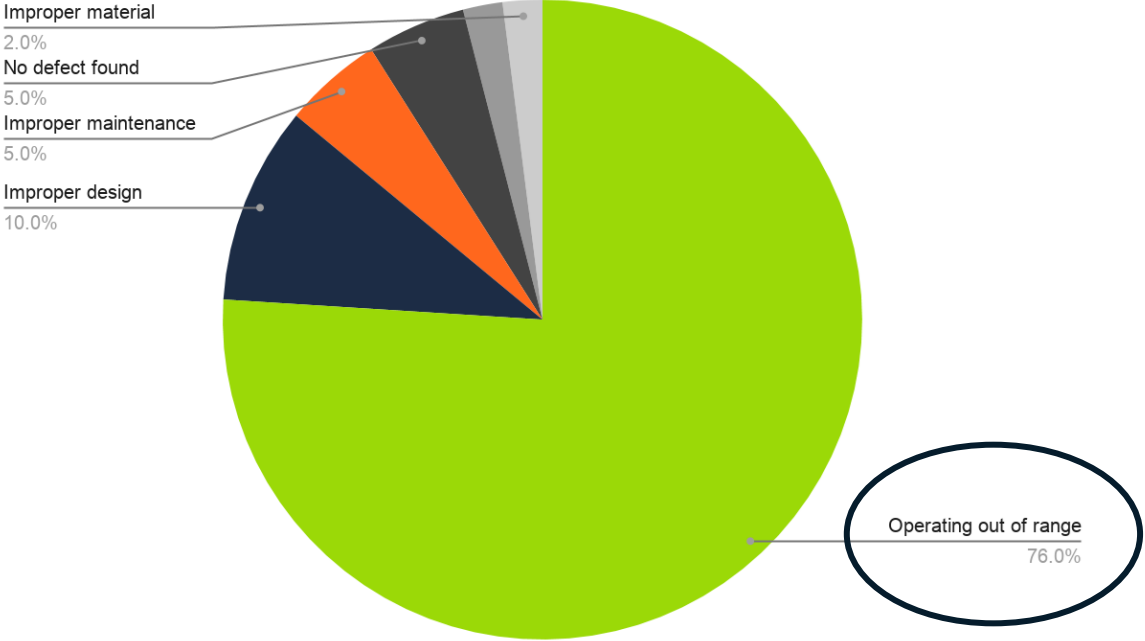
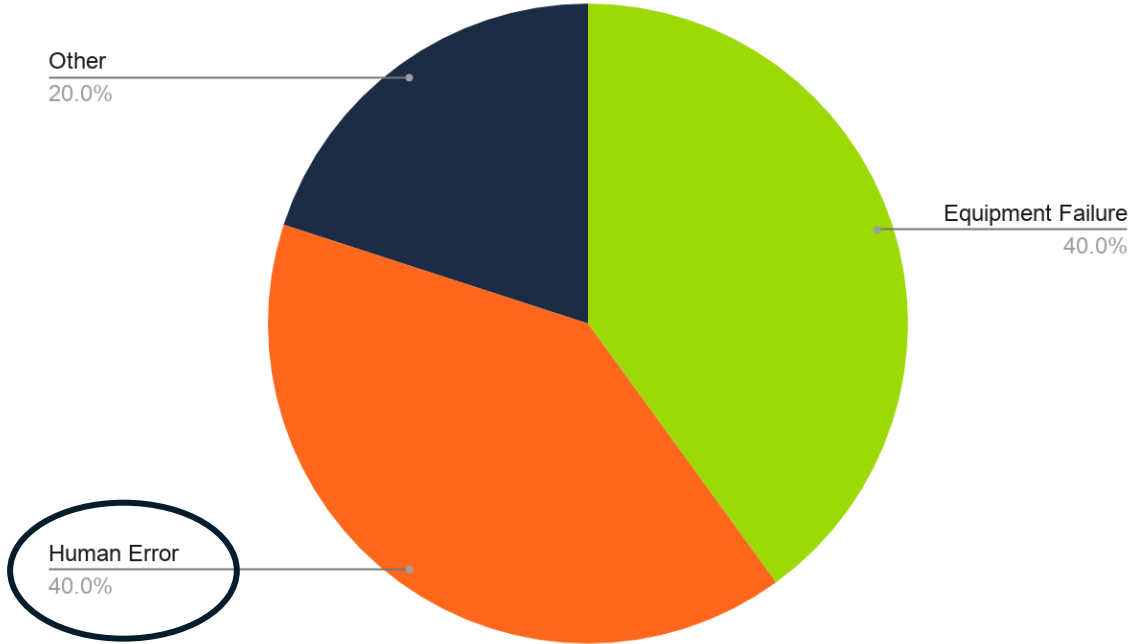
# Human Reliability & Procedure Quality are major contributors to process upsets & equipment failure.



### Causes of Process Upsets

### Unplanned Equipment Downtime

### Causes of Equipment Failure



**Honeywell**

A background image of an industrial facility, possibly an oil or gas processing plant, with a complex network of pipes, valves, and machinery. A person in a red uniform is visible in the center, working on the equipment. The image is dimmed to allow text to be overlaid.

**Technology & automation will  
not solve human reliability issues.**

**“40 - 60% of field operator tasks are not automatable.”**

McKinsey  
& Company



It's not just about money...

## Quotes from CSB's final report on the fatal acid release at LYB La Porte (2021)

*"[...] The recurrence of these types of incidents points to the need to **further re-design** plug valves so that it is more difficult to remove pressure-retaining components while attempting to remove actuating equipment.*

*"The recommendations seek to address gaps in equipment design and labeling, procedures, communication of past incidents, and worker training."*

*"The CSB found that both the company and the contractor considered the removal of the actuator a simple task and did not provide the work crew with any sort of **procedure or training.**"*

**Don't over-rely on inherent safety, people still matter!**

[https://www.csb.gov/csb-releases-final-report-into-2021-fatal-acid-release-at-lyondellbasell-la-porte-complex-in-la-porte-texas-/](https://www.csb.gov/csb-releases-final-report-into-2021-fatal-acid-release-at-lyondellbasell-la-porte-complex-in-la-porte-texas/)

## Also common and very open-ended...

1 step



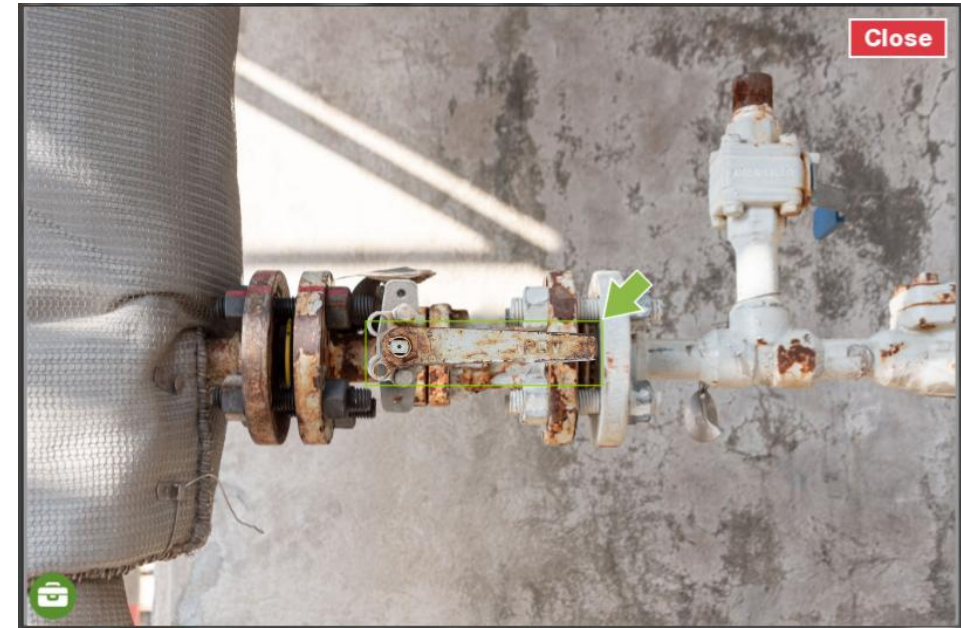
53 actions

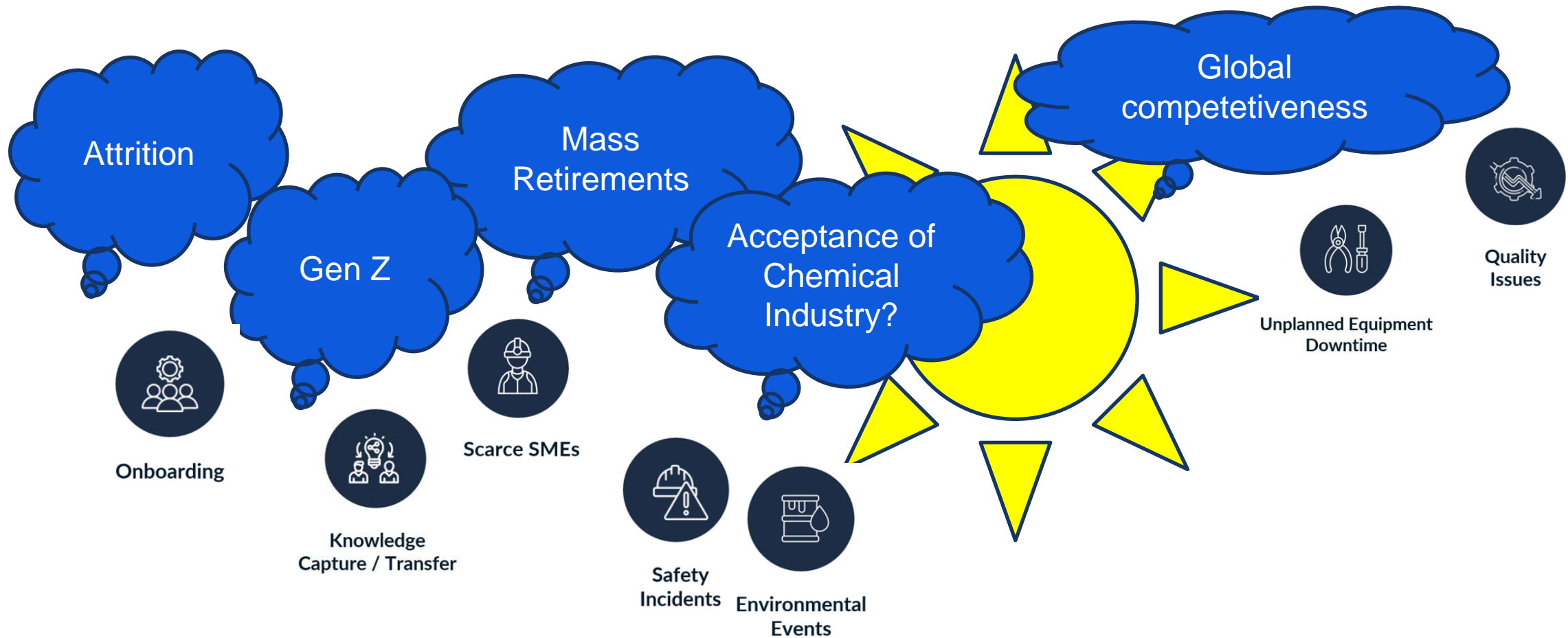
Actuating 15 different valves

**MANUALLY FLUSH** all CTO's, top/bottom flushes, bypasses around flush flow meters, and any other isolation flush valves

### CAUTION

Failure to properly flush all CTOs may result in a reactor poisoning event

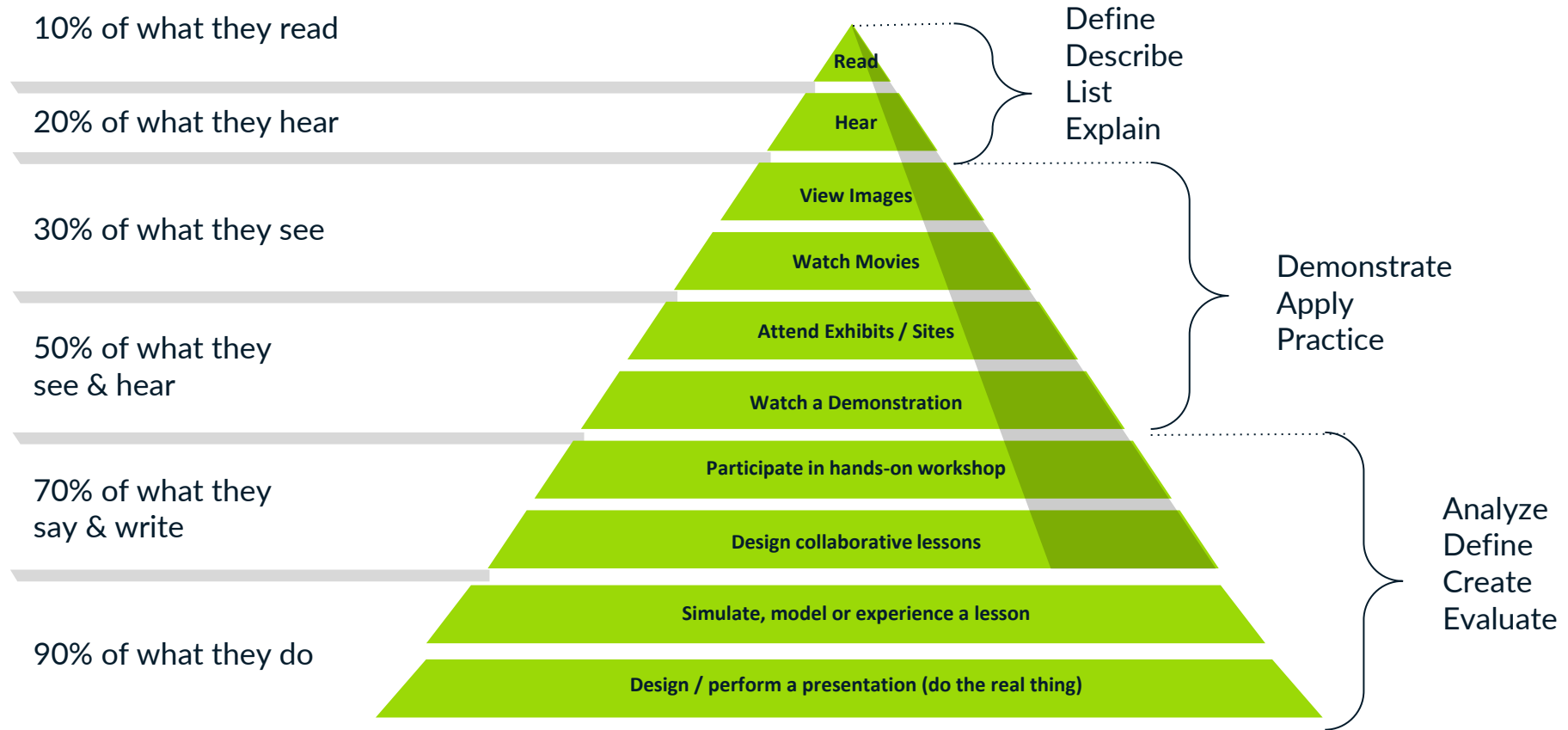




**A fundamental upgrade in chemical operator qualification is needed!**

# The Power of Simulation.

People generally remember...



The Learning Pyramid



Let's see a demo.



YouTube video links:

[Voovio | Solving Manufacturing's Biggest Challenges](#)

[What Voovio customers say about the Skills Gap](#)

# Onboarding faster & ease pressure on SMEs

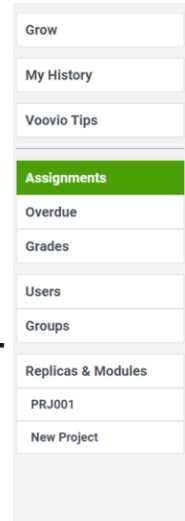
Impact on	Benefit	Time Required	
		Voovio	Traditional
Procedure Competency	65% faster	3.30 hours	9.75 hours
SME / Trainer Time	>73% reduction	2.25 hours	8.25 hours

- Controlled experiment at major Texas Petrochem facility with input from Rice university, Houston TX – June 2021.
- 24 operators, split into 2 groups, learned 2 SOPs in 2 days. No experience in that production unit prior to exercise.
- Traditional method: classroom, review P&IDs/SOP, field walkthrough
- Voovio method: Voovio Guided/ Learn, field walkthrough



# Refinery's Self-Loading Racks Transformed.

- ~150 trucking companies
- ~900 drivers
- Email notification of assignments.
- Practice, learn and take Test via web browser
- Content available 24/7
- Email notifications
- Documented driver records
- Gate access on successful completion of Test



## Assignments

New Assignment

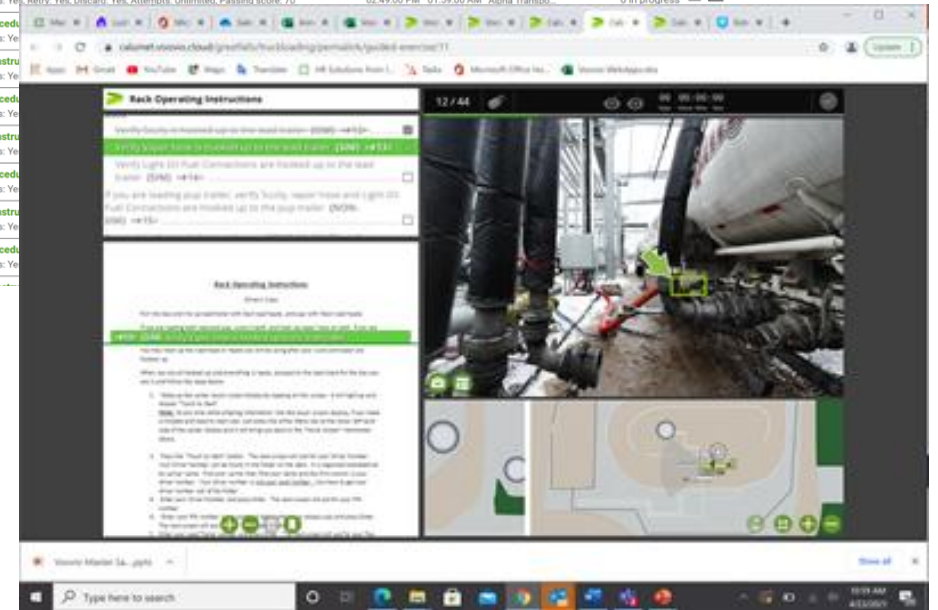
Filter Apply Reset

Simulation Module: All

(68 results)

Pages: 1 2 3 4

Assignment Information	Start Date	Due Date	Assignees	Status	Progress
<b>Asphalt Rack Procedure and Driver Training Record</b> Tags: No, Shortcuts: Yes, Retry: Yes, Discard: Yes, Attempts: Unlimited, Passing score: 70	04/22/2021, 02:49:00 PM	06/23/2021, 01:59:00 AM	2 Alpha Transpo...	Open	1 completed 0 in progress
<b>Rack Operating Instructions</b> Tags: No, Shortcuts: Yes, Retry: Yes, Discard: Yes, Attempts: Unlimited, Passing score: 70	04/22/2021, 02:49:00 PM	06/23/2021, 01:59:00 AM	2 Alpha Transpo...	Open	1 completed 0 in progress
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# Refinery – fewer environmental releases.

## Site:

- Refinery

## Challenge:

- Eliminate loss of containment of process materials resulting in reportable incidents and regulatory fines
- Procedure generalizations
- Lack of exposure to entire startup procedure and lack of competency

## Use of Enhanced Reality/improved clarity:

- Line Walk process to create action checklist clearly defining all release sources
- Practice procedure simulators prior to procedure execution
- Field execution tool

## Main ROI contributor:

- Elimination of environmental releases



# Questions? See us at our booth!

Logos associated with the North American map include: SUNCOR ENERGY, CALUMET SPECIALTY PRODUCTS MATERIALS LP, Formosa Plastics, TESLA, Linde, lyondellbasell, covestro, DOW, PHILLIPS 66, HALLIBURTON, kuraray, LBC BANK TERMINALS, Westlake, SHINTECH, BASF, Celanese, CRODA, EASTMAN, FIBER INDUSTRIES, OWENS CORNING, ERGON, سابك (SABIC), Chevron, Renewable Energy Group, and LION ELASTOMERS.

Logos associated with the European and Middle Eastern maps include: ALBEMARLE, Climax Molybdenum, BASF, Westlake Vinnolit, Borouge, and HALLIBURTON.