

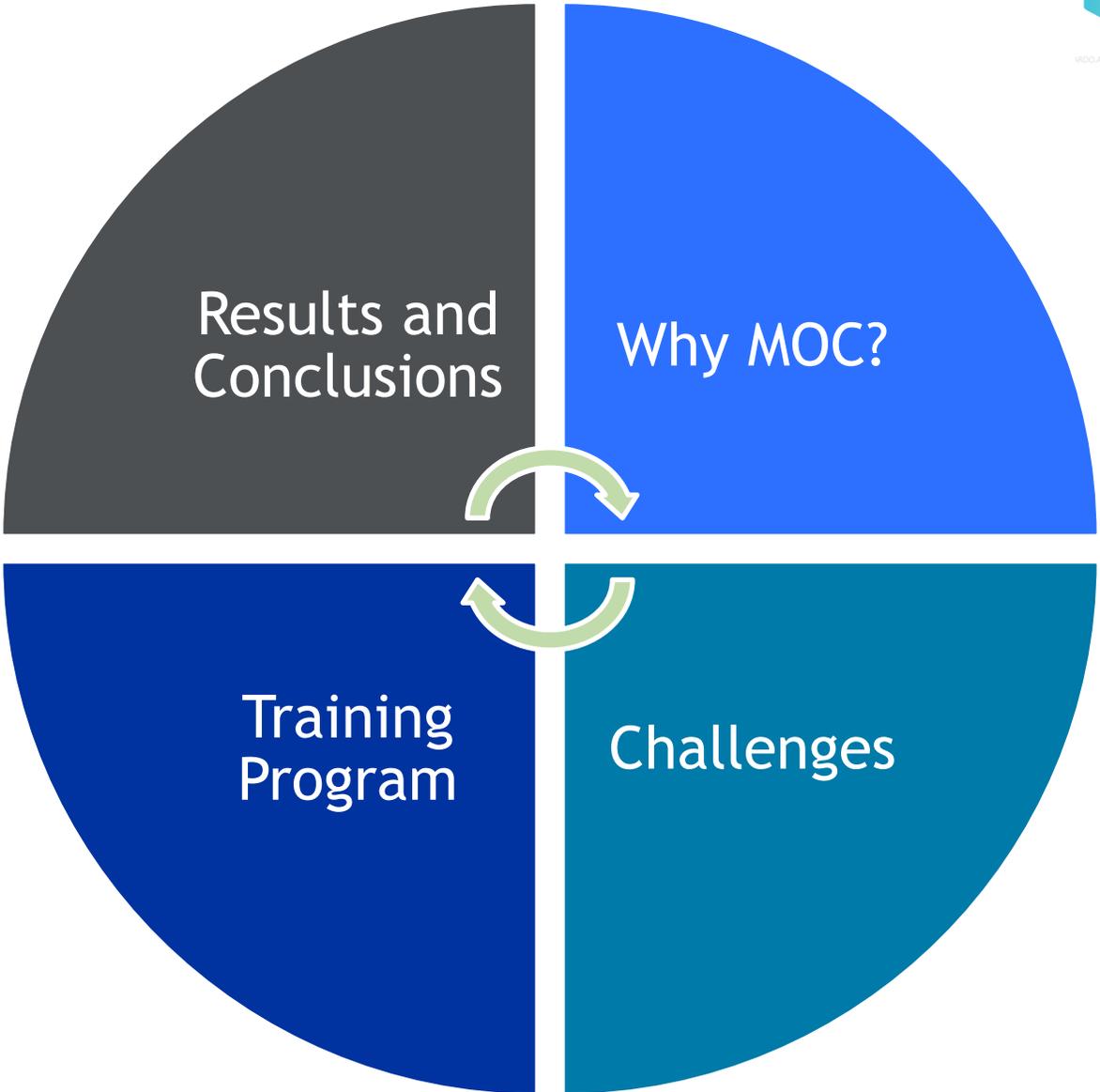


The experience of training on Management of Change with a Process Safety Perspective

MENA HSE Forum 2022
Gerardo Abalde,
Dubai, September 6-7, 2022



CONTENTS





U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

INVESTIGATION REPORT

REFINERY INCIDENT

(1 Killed, 8 Injured, Offsite Environmental Impact)



- Engineering Management
- Management of Change

MOTIVA ENTERPRISES LLC
DELAWARE CITY REFINERY
DELAWARE CITY, DELAWARE
JULY 17, 2001

KEY ISSUES:

- MECHANICAL INTEGRITY
- ENGINEERING MANAGEMENT
- MANAGEMENT OF CHANGE
- HOT WORK SYSTEMS

REPORT No. 2001-05-1-DE
OCTOBER 2002

CASE STUDY

Ink Dust Explosion and Flash Fires
in East Rutherford, New Jersey
(Seven Employee Injuries)



US Ink/Sun Chemical Corporation
East Rutherford, NJ
October 9, 2012

Key Issues

- Combustible Dust
- Engineering Design
- Management of Change
- Process Hazard Analysis
- Hazard Communication
- Management Oversight
- Regulatory Oversight

2013-01-I-NJ

SUMMARY

This case study examines the explosion and flash fires that occurred at the US Ink manufacturing facility in East Rutherford, New Jersey, on Tuesday, October 9, 2012. Seven workers suffered burn injuries when they congregated at the entrance to the ink mixing room after hearing a loud thump from the newly installed dust collection system on the top of the facility and seeing signs of an initial flash fire from a bag dumping station. A second flash fire then occurred that led to the employee injuries.

...Inside

- Introduction
- Incident Description
- Incident Analysis
- Test Results and Implications
- Engineering Design Analysis
- Safety Management Analysis
- Regulatory Analysis
- Key Findings
- Recommendations

Engineering Design
Management of Change
Process Hazard Analysis
Hazard Communication



U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

INVESTIGATION REPORT

CATASTROPHIC VESSEL OVERPRESSURIZATION
(4 DEATHS)



Sonat Exploration Company
Temple 22-1 Common Point Separation Facility
Pitkin, Louisiana
March 4, 1998

KEY ISSUES:

- DESIGN & HAZARD REVIEWS
- PRESSURE-RELIEF DEVICES
- OPERATING PROCEDURES



Why MOC?



BP Texas City Explosion
15 Killed, 180 Injured
March 23, 2005



HEALTH SAFETY & ENVIRONMENT
Why MOC?

Organizational Changes

Changes in Procedures

Change in Tank Service



Pryor Trust
Gas Well Blowout and Fire
The fire killed five workers
January 22, 2018

BP Amoco Thermal Decomposition Incident; 3 killed; March 13, 2001



HAZARD IDENTIFICATION

Caribbean Petroleum Refining Tank Explosion & Fire; Community and Emergency Declaration (US) Oct 23, 2009



RISK ASSESSMENT AND CONTROL



INHERENT SAFETY DESIGN IN PROJECTS AND MODIFICATIONS

Chevron Refinery Fire; August 06, 2012

Dupont La Porte; Toxic Release; 4 fatalities and 15 injured; November 15, 2014

EMERGENCY PREPAREDNESS





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Photos from the June 13, 2013,
Williams Olefins Incident
Geismar, LA

©SB



©SB

©SB

US Ink/Sun Chemical Corporation;
Dust Explosion and flash fires;
7 injuries; October 9th 2012

SMALL CHANGES IN DIFFERENT
PHASES OF PROJECTS

Williams Olefins Plant
Explosion and Fire;
2 fatalities;
Junio 13, 2013

MANAGEMENT OF
CHANGE EFFECTIVENESS

Tesoro Refinery; Catastrophic
Rupture Fire and Explosion;
Seven Fatalities;
April 02, 2010

ASSET INTEGRITY AND SAFE
PROCEDURES

GERARDO ABALDE, September 2022



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1. MINDSET CHALLENGE: Why Process Safety is different?

BEHAVIOR BASED & COMPLIANCE

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L
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D

OCCUPATIONAL
SAFETY

No operate

COST?

PROCESS
SAFETY

RISK-BASED
&
SENSE OF
VULNERABILITY

Likelihood / Frequency	5	5	8	9	10	10
	4	4	7	8	9	10
	3	3	6	7	8	9
	2	2	3	6	7	8
	1	1	2	3	4	5
	Risk Matrix	1	2	3	4	5
	Severity / Consequence					

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U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

INVESTIGATION REPORT

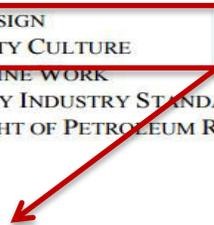
CATASTROPHIC RUPTURE OF HEAT EXCHANGER (SEVEN FATALITIES)



TESORO ANACORTES REFINERY
ANACORTES, WASHINGTON
APRIL 2, 2010

KEY ISSUES

- INHERENTLY SAFER DESIGN
- TESORO PROCESS SAFETY CULTURE
- CONTROL OF NONROUTINE WORK
- MECHANICAL INTEGRITY INDUSTRY STANDARD DEFICIENCIES
- REGULATORY OVERSIGHT OF PETROLEUM REFINERIES

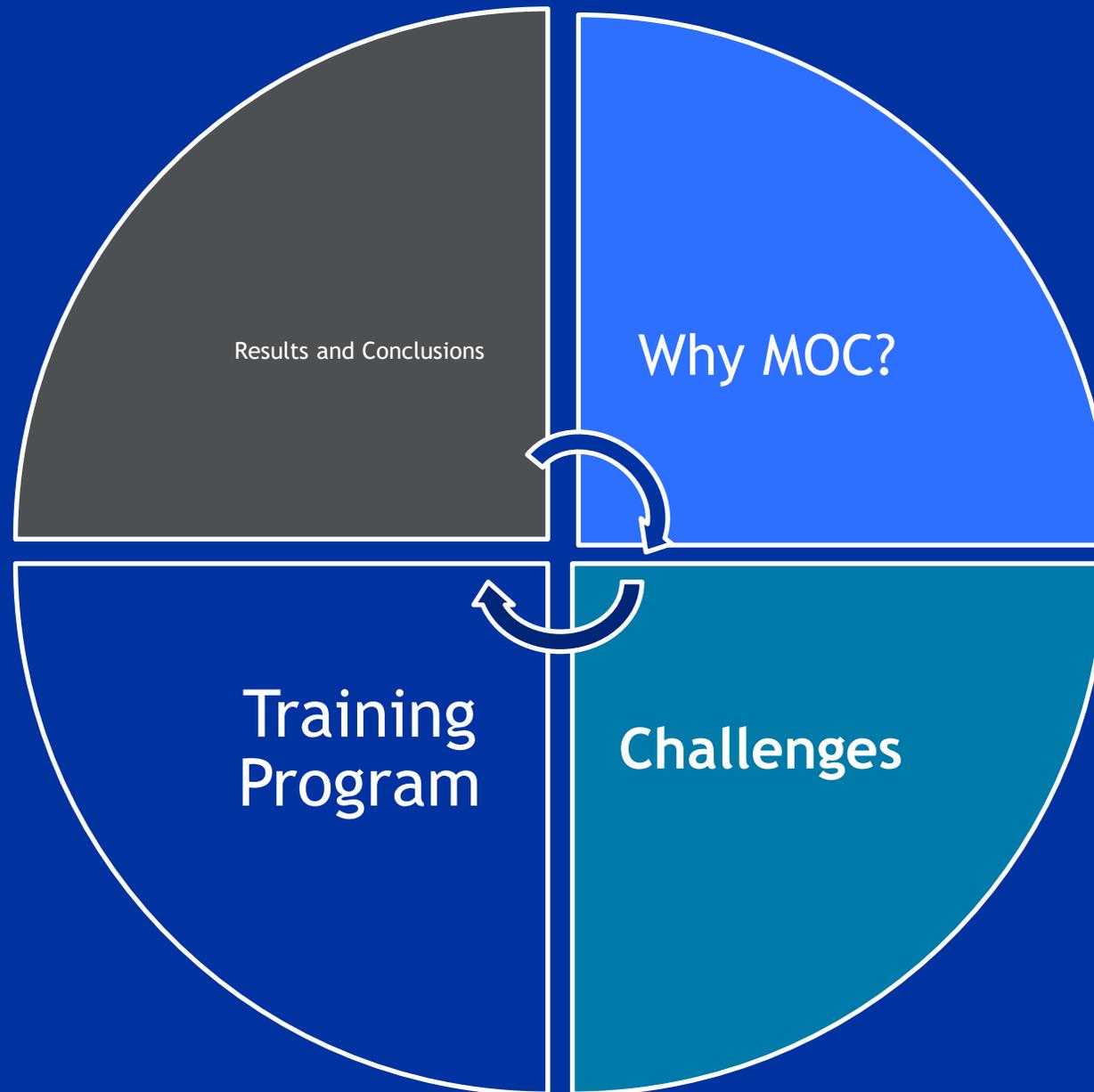


INHERENTLY SAFER DESIGN and PROCESS
SAFETY CULTURE

Failures in Identifying changes (or minimizing them) could be the result of a wrong organizational approach

CSB Investigation Findings

“Because the project was classified as low-risk routine maintenance, no special precautions were in place. The fractionator continued to operate, with large volumes of flammable vapor and liquid flowing inside the tower and its attached piping...”



MAIN GOALS AND TARGETS

ENHANCE EFFECTIVENESS OF MANAGEMENT OF CHANGE

FORMALLY TRAIN MANAGEMENT OF CHANGE COORDINATORS

POPULATE THE RISK BASED APPROACH THROUGH THE KEY STAKEHOLDERS

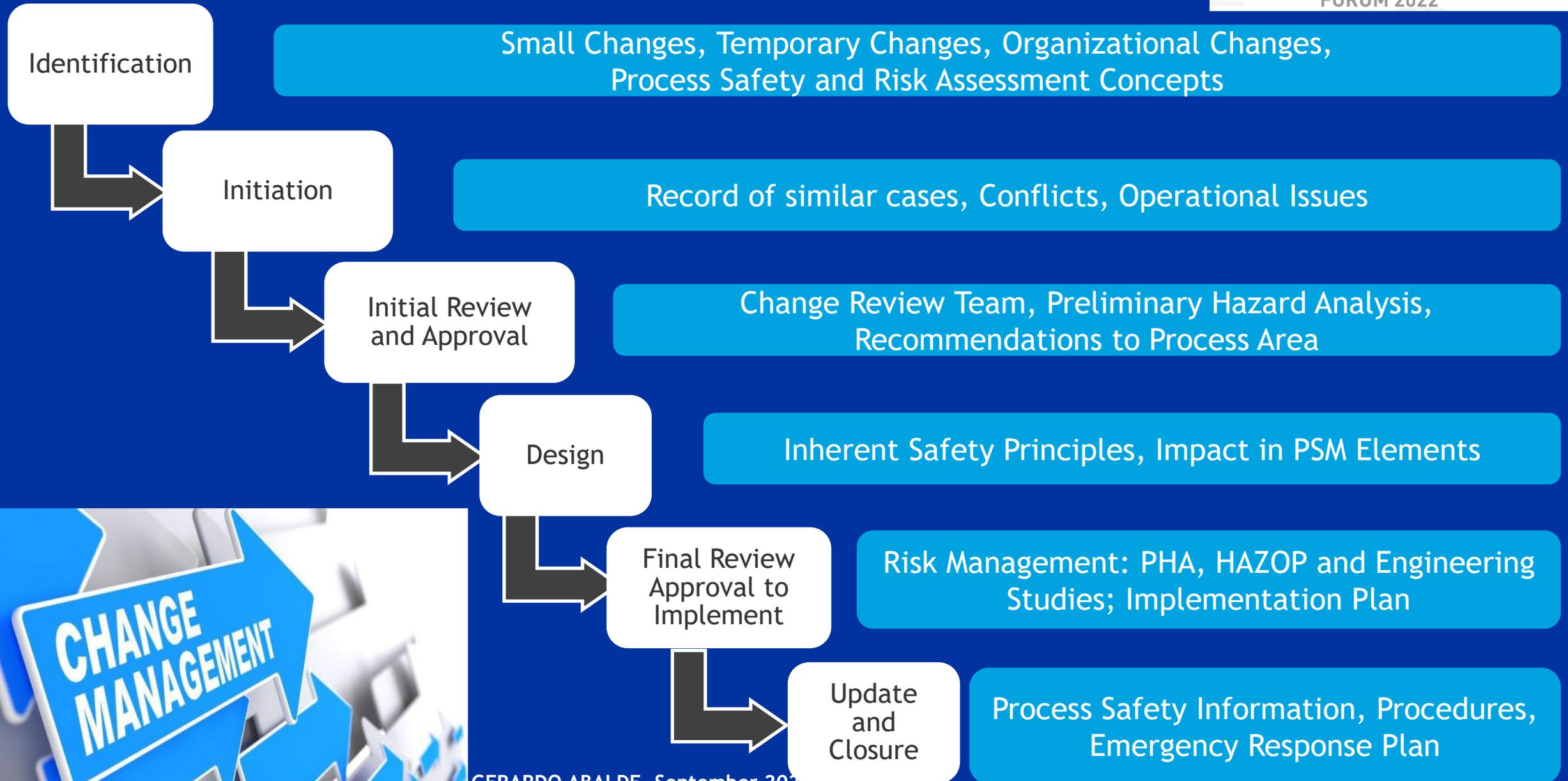
PROVIDE SPECIFIC MATERIAL FOR PROCESS SAFETY SCENARIOS

REINFORCE QUALITY ASSESSMENT OF THE PROCESS

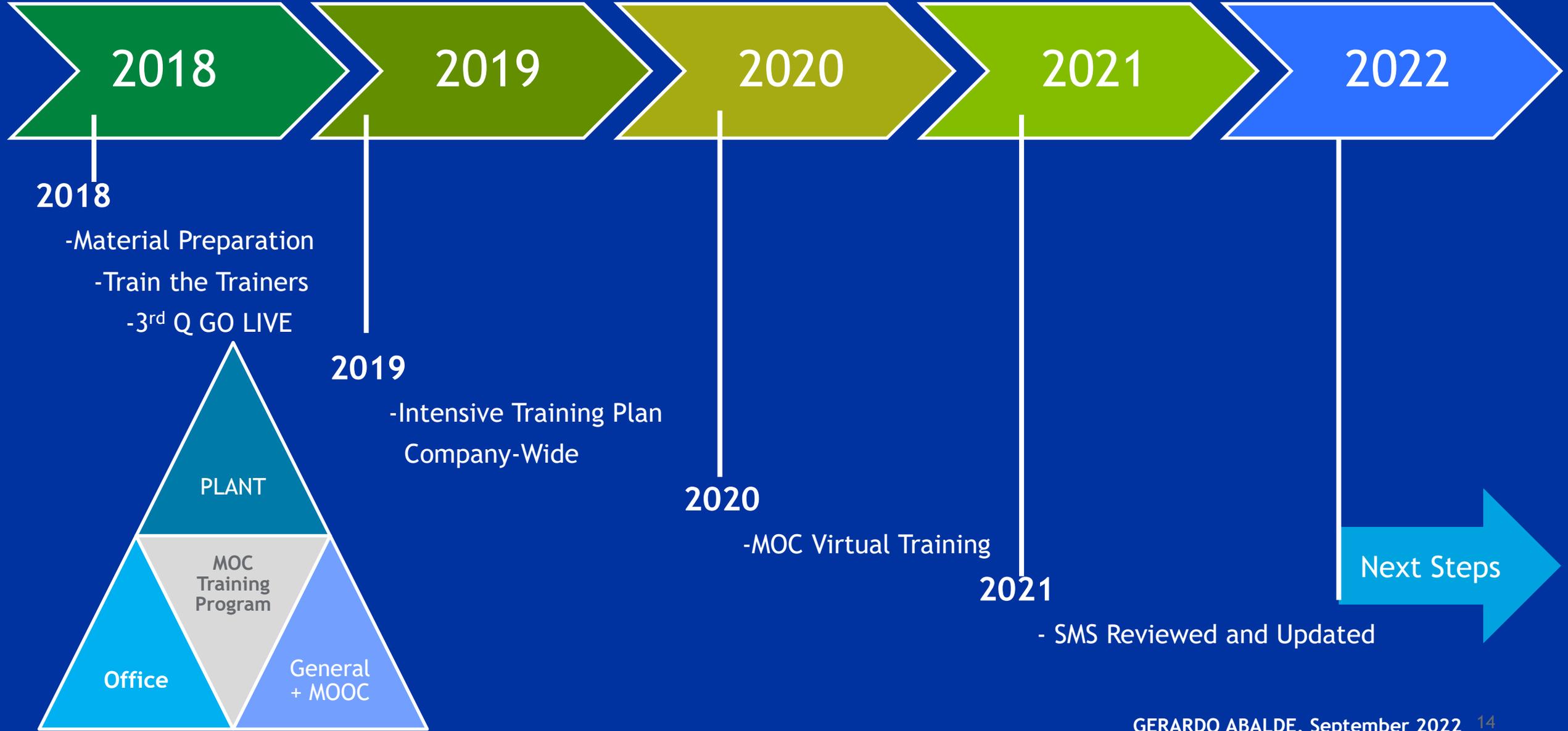
CONTINUOUS IMPROVEMENT THROUGH SAFETY MANAGEMENT SYSTEM ELEMENTS

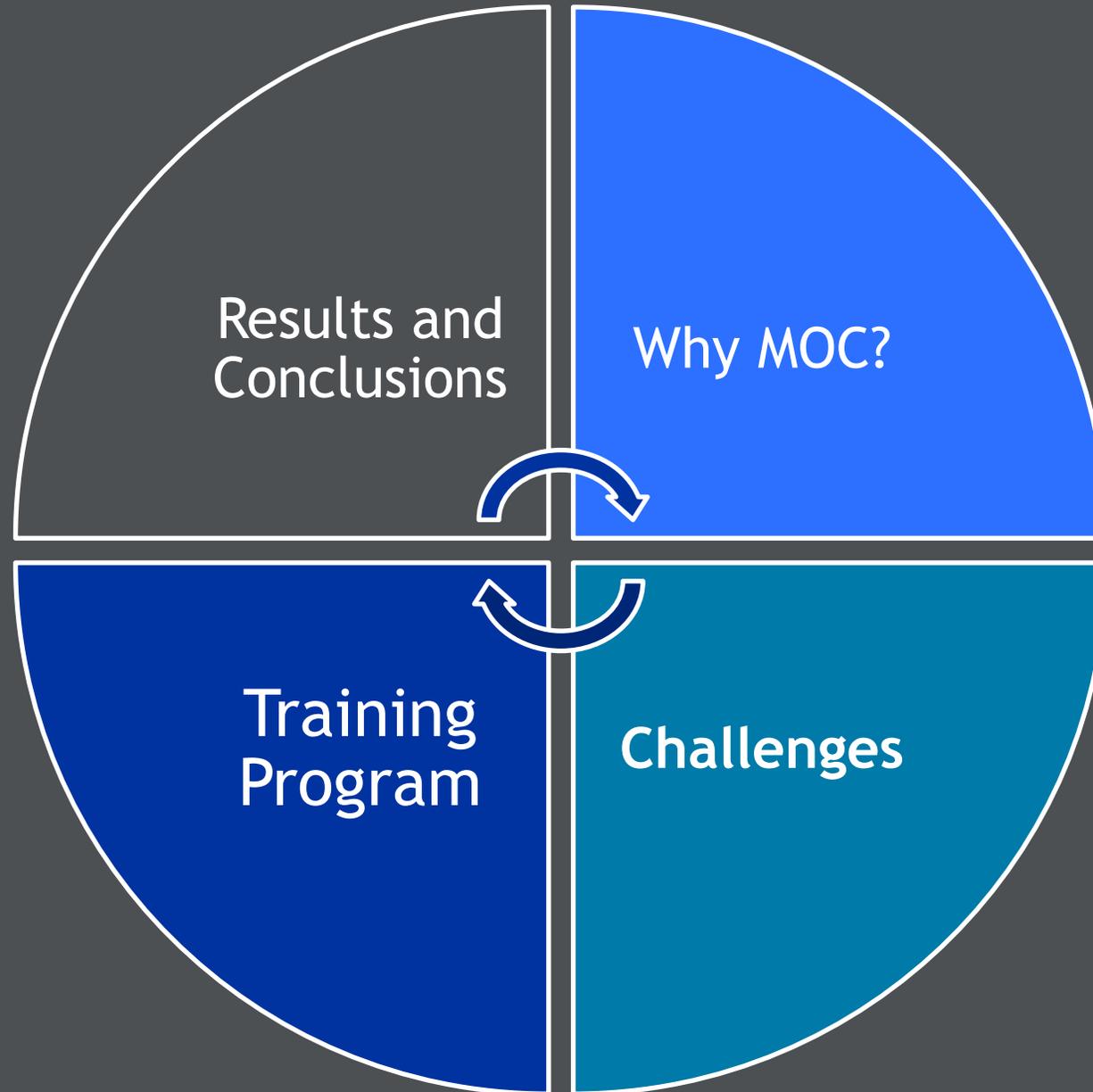


PROCESS STEPS and TRAINING FOCUS AREAS



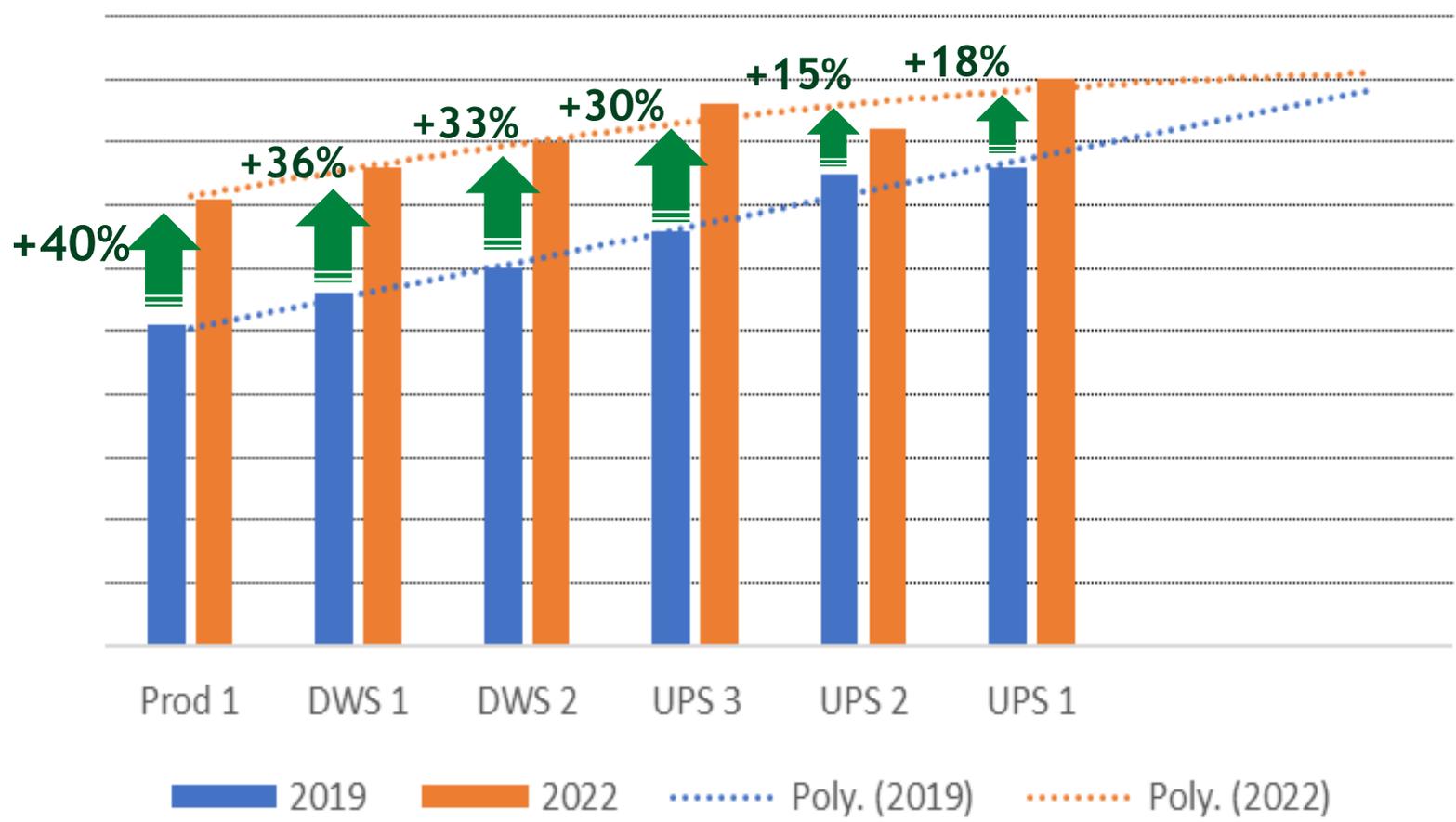
PREPARATION AND DELIVER



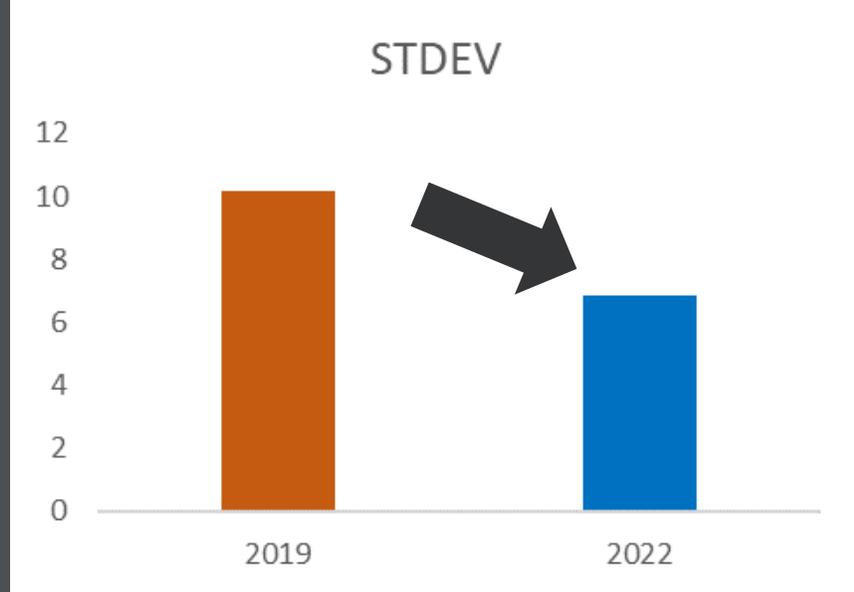


OBSERVED RESULTS

MOC IMPROVEMENT INDICATORS



Based on a three-year Compliance Review Cycle, MOC KPI evidenced significant improvement



CONCLUSIONS AND FINAL THOUGHTS

CHANGES NEED TO BE IDENTIFIED AND MANAGED TO AVOID CATASTROPHIC INCIDENTS

THE ORGANIZATION SHOULD PROMOTE A RISK BASED APPROACH, SENSE OF VULNERABILITY AND OPERATIONAL DISCIPLINE TO BUILD A ROBUST PROCESS SAFETY CULTURE

TRAINING PROGRAM SHOULD IDENTIFY KEY POSITIONS TO ANCHOR SUCCESS

PLAN, PREPARE, DELIVER, MEASURE, ADJUST ... and START AGAIN

Thanks...

