Process Safety Maturity

Eline Beulens

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Cargill® Helping the world thrive

Cargill® Helping the world *thrive*

Eline Beulens

Cargill Process Safety Director EMEA

Personal introduction

Cargill Process Safety team

- Since 2019 leading the EMEA Process Safety team in Cargill across businesses
- 5 years: Process Safety Lead for Starches, Sweeteners and Texturizers.

DuPont de Nemours

- 16 years in Operations, Technology and Continuous Improvement, in high hazardous processes

MSc. **Chemical Engineering**

Meet Cargill

Cargill® Helping the world *thrive*

Our purpose is to nourish the world in a safe, responsible and sustainable way.

At a glance

155,000 employees

Working in **70** countries

More than **155** years of experience

A trusted partner for food, agriculture, financial and industrial customers in more than 125 countries.

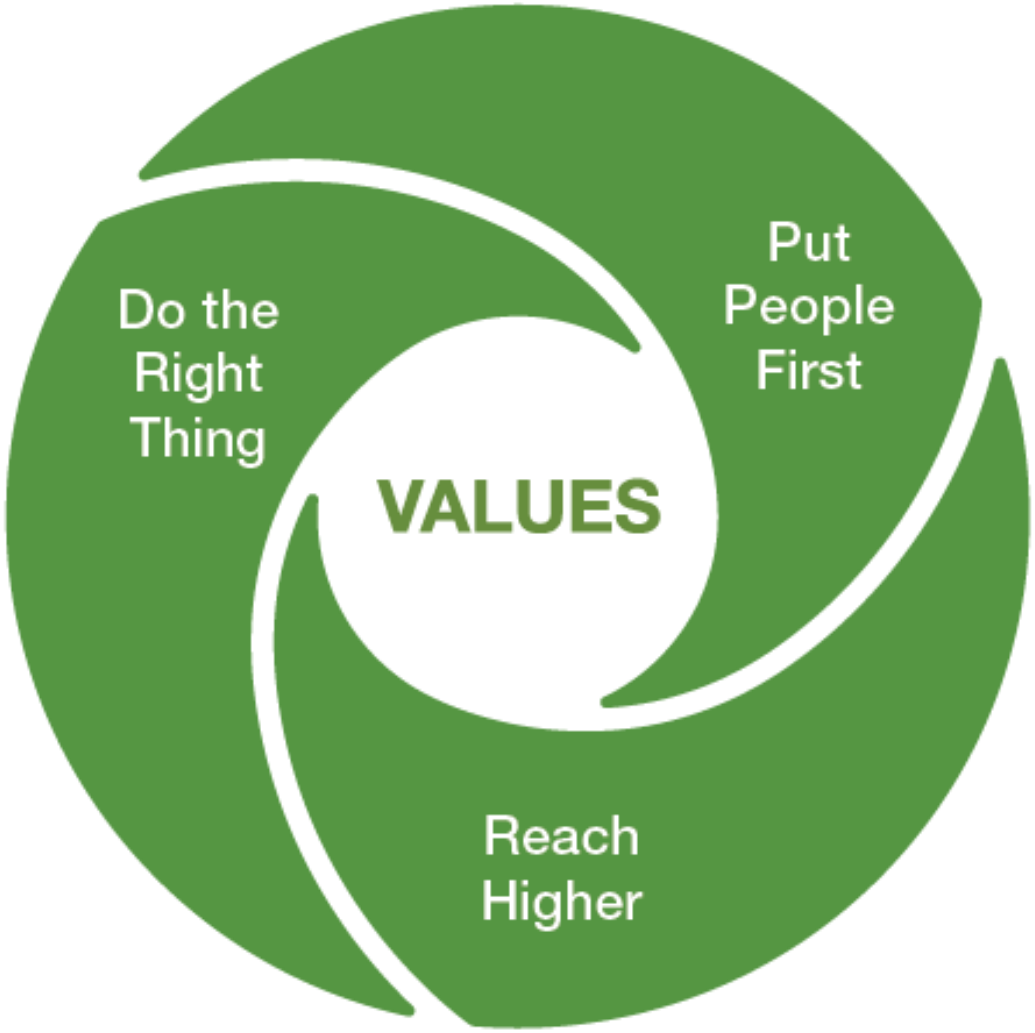
Agriculture

Food

Animal nutrition and protein

Financial and industrial

Our Cargill Values



Global EHS Strategy

One Team	ZERO Harm	One Commitment to Value

Strengthen EHS Capabilities

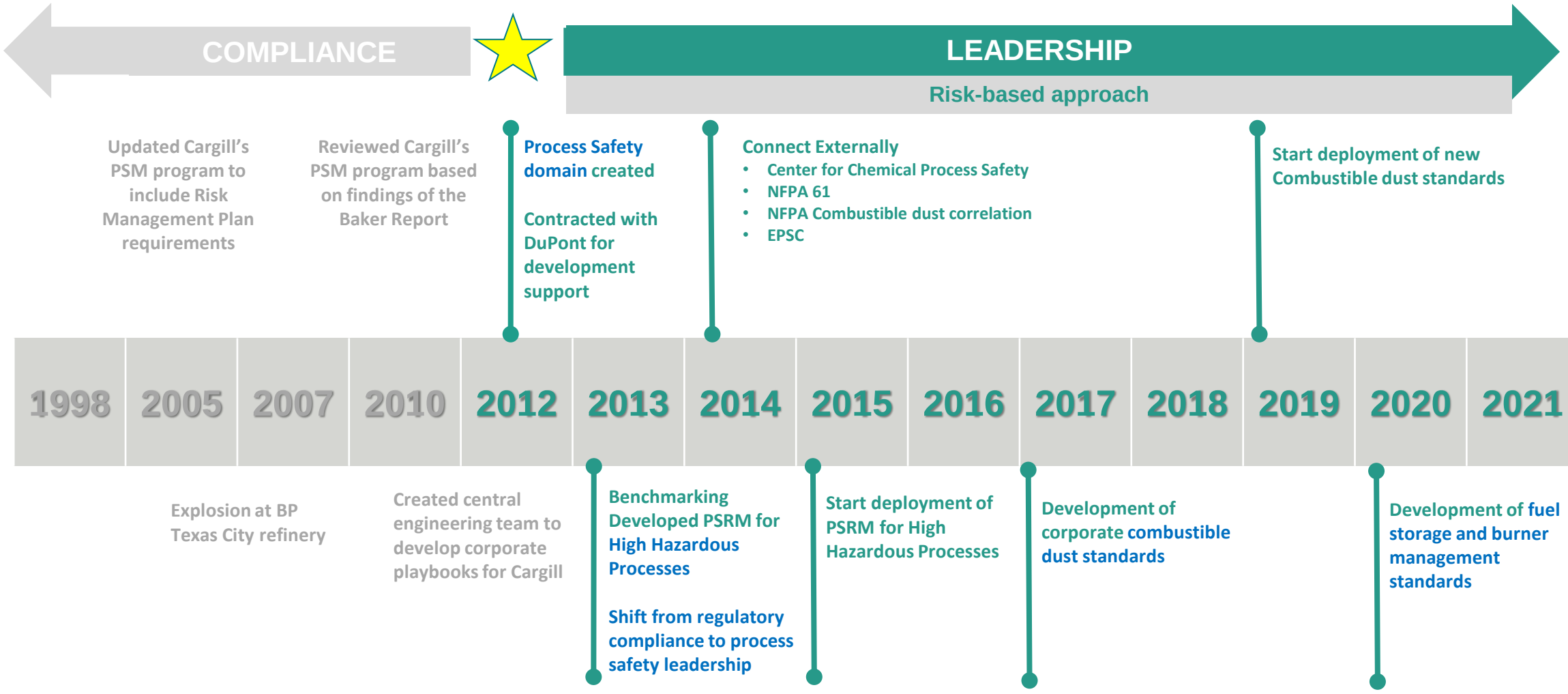
Operationalize EHS

Standardize Process

Drive Out Risk

Demonstrate Value

Our Process Safety Risk Management journey …

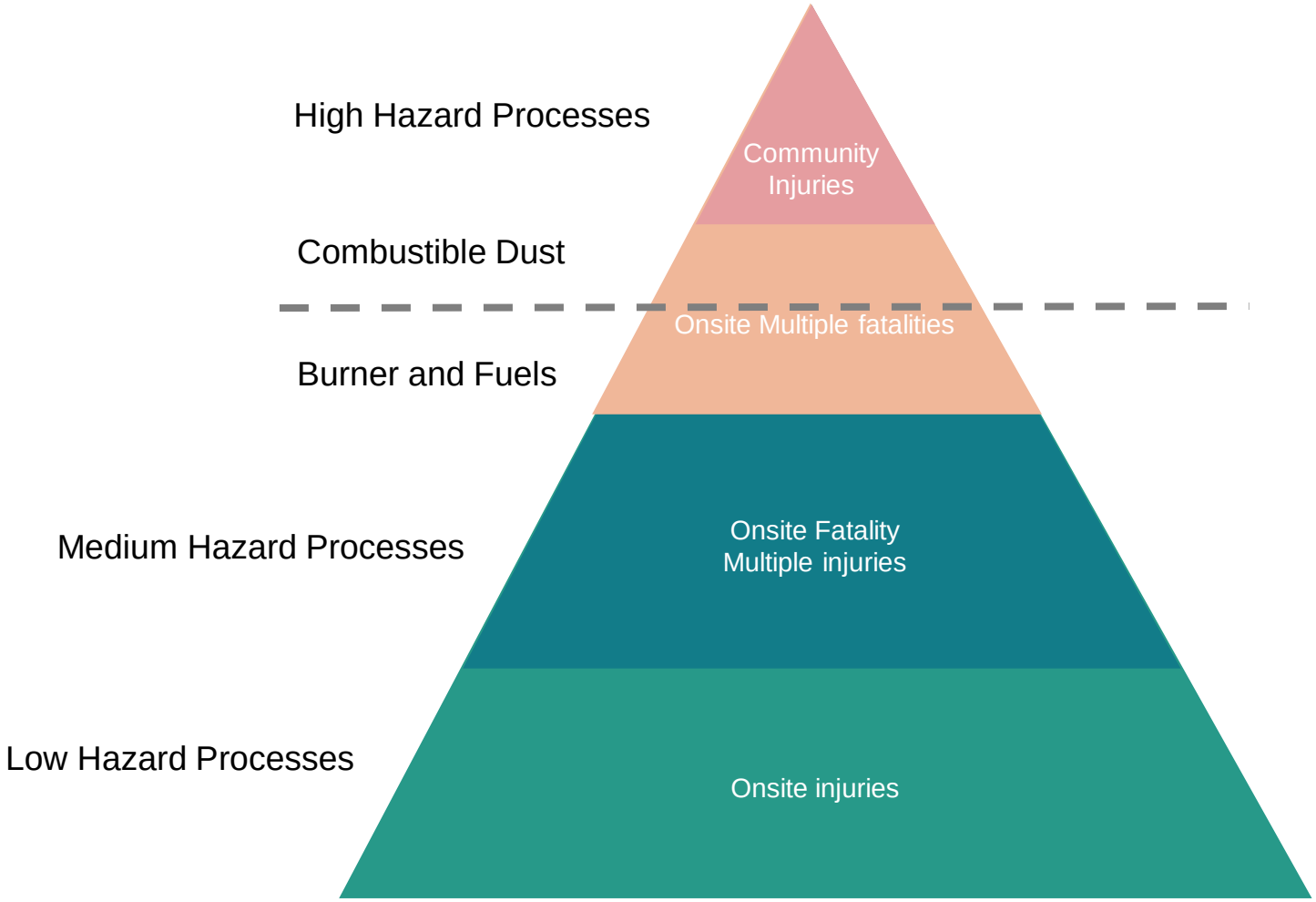


Cargill's Process Safety Risk Management

- Process Safety Risk Management Procedure established
  - Governance
  - Metrics
  - 12 element framework

- The 12 elements are management systems that provide an integrated risk management framework to:
  - Identify Hazards
  - Evaluate Risk
  - Control Risk

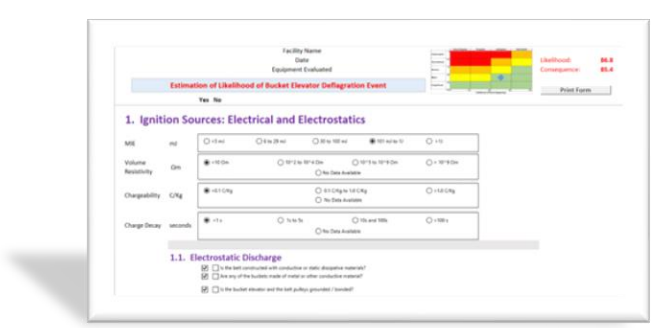
Cargill Process Safety Risk Overview - Hazards



High Hazard Processes: a.o.
Acetone
Ammonia, Anhydrous
Butanol
Epichlorohydrin
Ethanol
Formaldehyde (Formalin)
Hexane
Hydrochloric Acid, Anhydrous
Hydrogen
Hydrogen Sulfide
Isopropyl Alcohol
Methanol
Methyl tert-butyl ether
Morpholine
Peracetic Acid (>40%)
Phosphorus Oxychloride
Propylene oxide

Strategy to reduce the Process Safety Risk in Cargill

Understand the risk	Control the risk	Sustain
Process Risk Assessments, Dust Hazard Analysis	Manage Safeguards, Asset Integrity	Management System



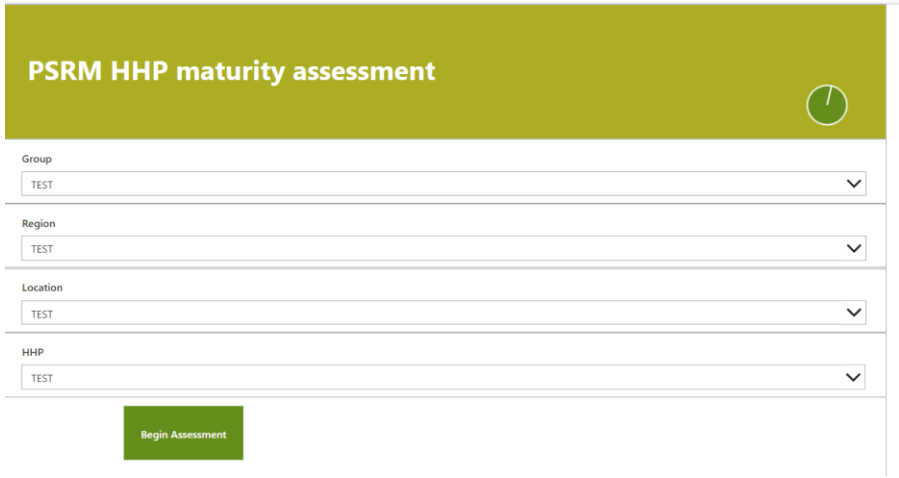
Sustain Controls via Management System

Key Criteria per PSRM Element

Maturity level from 1 to 4

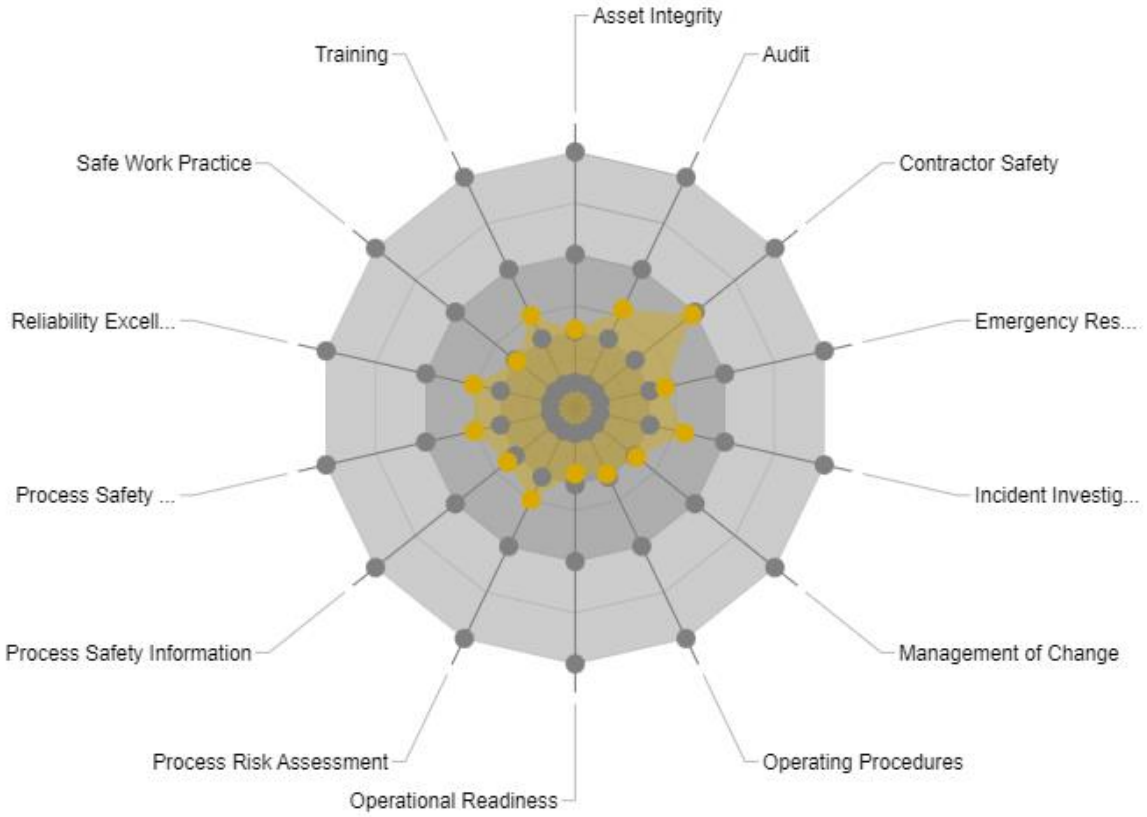
	3. Process Risk Assessment
3.1.1	PRA was conducted for the site high hazard process and there is a documentation indicating that
3.2.1	The most recent site High hazard processes PRA 5 years review was conducted on time without any PRA past due.
3.2.2	A PRA was conducted for the site HHP following Cargill PRA risk matrix
3.2.3	A PRA was conducted for the site HHP using Cargill PRA third party approved facilitator list
3.2.4	A PRA was conducted for the site HHP using Cargill PRA job aid (Risk matrix, approved facilitator, etc.) and LOPA (layers of protection analysis) for A scenarios been assessed
3.2.5	A PRA was conducted for the site HHP using Cargill PRA job aid (Risk matrix, approved facilitator, etc.) and MTL group inputs are included
3.2.6	A PRA was conducted for the site HHP using Cargill PRA job aid (Risk matrix, approved facilitator, etc.) with the minimum process safety information required for PRA (e.g. most recent P&ID, Consequence analysis …etc).
3.3.1	A PRA was conducted for the site HHP using Cargill PRA job aid (Risk matrix, approved facilitator, etc.) with site manager approval signature for the report and recommendations.
3.3.1	A PRA was conducted for the site HHP using Cargill PRA job aid (Risk matrix, approved facilitator, etc.) and report and recommendations are uploaded into Enablon with site manager approval signature
3.3.2	Site follow-up management system in place to pro-actively track completion of PRA recommendations
3.4.1	Site implements PRA recommendation using MOC system to assess the change and closes the recommendations with effectiveness review.
3.4.2	No overdue high hazard process PRA recommendations
3.4.3	Site conducts PRA (SWIFT, HAZOP, MOC check list….etc) for small and medium projects as per Cargill job aid, with report and recommendations been uploaded into Enablon/e-MOC.
3.4.4	Site PRA is evergreen/always up-to-date or at least actively linked with MOCs in the plant or organisation

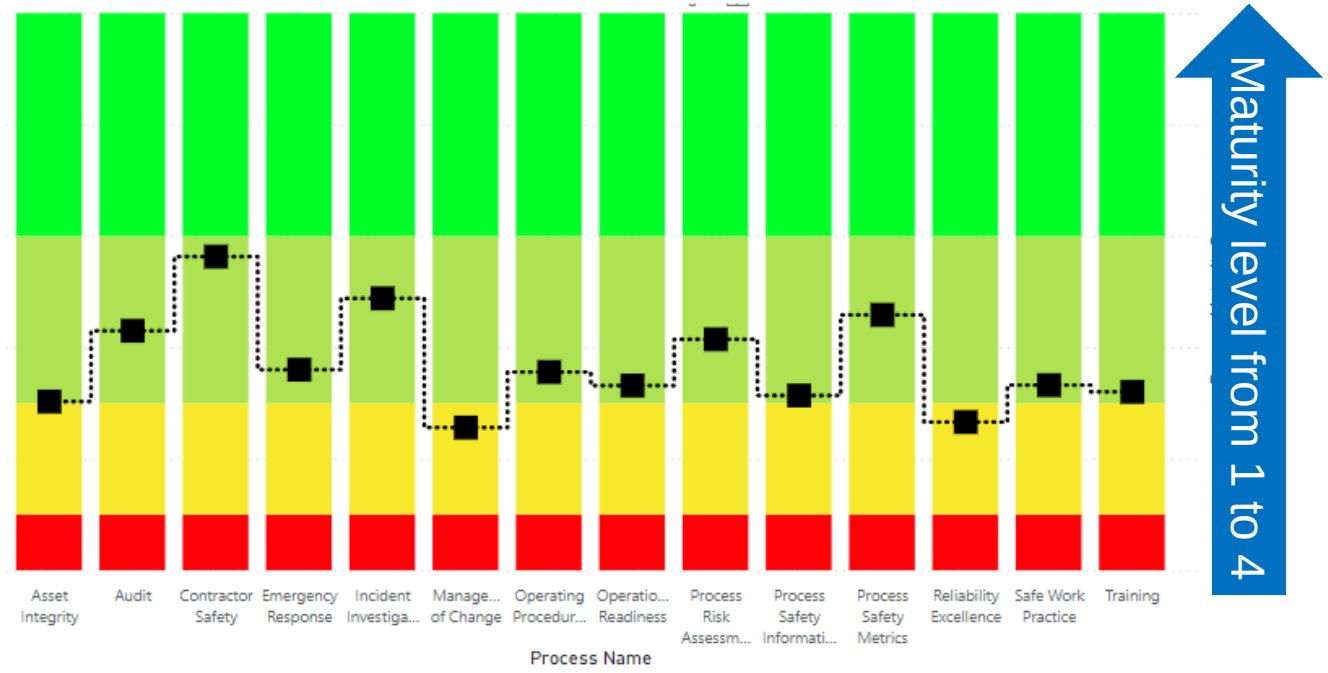
Tool for Facilitated Assessment



Sustain Controls via Management System

Business Planning Tool





Sustain Controls via Management System

Business Planning Tool

GAP LIST

Back to report | GAP LIST

Question_Number	Question
01.1.01	The facility have measurement in place for process safety leading and lagging indicators.
01.1.02	The facility Leadership Team is trained on the concepts of Process Safety leading and lagging indicators levels and threshold.
01.2.01	The facility do report in Enablon process safety lagging indicators L1 &L2.
01.2.02	The facility do investigate process safety lagging indicators L1&L2 using root cause analysis tools.
01.2.03	The facility report in Enablon process safety leading indicators L3 &L4.
01.3.01	The facility report in Enablon more than 2 events/month in average of process safety leading indicators L3 & L4.
01.3.02	The facility report and track in Enablon PRA recommendations on monthly basis.
01.4.01	The facility report and track in Enablon EHS audit recommendations on monthly basis.
01.4.02	Process Safety leading and lagging indicators data are reviewed by site leadership during plant quarterly business review.
01.4.03	The facility leverages the results of the PSRM leading and lagging indicators to help in the decision making to minimize risk (e.g., prioritize the initiative, properly allocate resources)
02.1.01	The facility have some records in place for process safety information (e.g. silos data sheets, procedures, records of RE routines, records of housekeeping routines, etc.).
02.1.02	Site P&ID's & Process flow diagrams in place and stored in shared accessible location.
02.1.04	Site Protective safety systems information are in place and up to date including Emergency alarms and communication system Explosion Protection Document and Fire protection system design basis and calculations.
02.2.01	List of process safety alarms and interlocks settings are defined and documented for site high hazard process.
02.2.02	Safe operating limits document is in place including operator response to alarms.
02.2.03	More than 50% of Physical asset information (equipment & piping sizing, design basis and area plot plans) are in place and stored in shared accessible location.
02.2.04	Site operating philosophy and material & heat energy balance models exist and up to date.
02.2.05	Site electrical and automation information (i.e. control system drawings, area classifications drawings and Explosion Protection Document i.e. ATEX if applicable) protective instrument system drawings and descriptions exist and up to dat
02.2.06	Site CSDs and SDs list defined, maintained, inspected and tested as per Cargill CSD policy.
02.2.07	Site consequence analysis document is in place and up to date.
02.3.01	Site CSDs and SDs are managed via a Computer Maintenance Management System (CMMS) (e.g., SAP or Maximo)
02.3.02	Site Design basis and calculations for relief systems, secondary containment, building ventilation, detection and suppression systems and Process ventilation and scrubber/flares are in place and up to date.
02.3.03	The site has documented that equipment (process equipment, piping, buildings, instrumentation and controllers) complies with recognized and generally accepted good engineering practices (RAGAGEP). (e.g. ASME BPVC Section VIII, AP NFPA 70, GB for China, NBR's for Brazil)
02.3.04	PSE L3 (Near-Miss) reporting is in place in case of true demand or failure during testing for CSDs.
02.4.01	site have a records in place, existence of all process safety and Equipment/Process information with management of change(MOC) implemented to assure accurate documents even with changes and projects.
02.4.02	Site have a RASCI is in place to govern document ownership.
02.4.03	Audit (global EHS, PSI audit) confirm that a Management System are in place and complete records exist for PSI.
03.1.01	PRA was conducted for the site high hazard process and there is a documentation indicating that.
03.2.01	The most recent site High hazard processes PRA 5 years review was conducted on time without any PRA past due.
03.2.02	A PRA was conducted for the site HHP following Cargill PRA risk matrix.
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PER ELEMENT

Process Safety Element

- **Process Safety Information**
  - **Transitional**
  - **Proactive**
  - **Leading**
  - **Emerging**
- **Process Risk Assessment**
- **Management of Change**
- **Asset Integrity**
- **Total**

PER MATURITY LEVEL

ProcessMaturityLevel

- **Transitional**
- **Proactive**
- **Leading**
- **Emerging**
  - Process Safety Information
  - Process Risk Assessment
  - Management of Change
  - Asset Integrity
- **Total**

Next steps

Strategy to reduce the Process Safety Risk in Cargill

Understand the risk

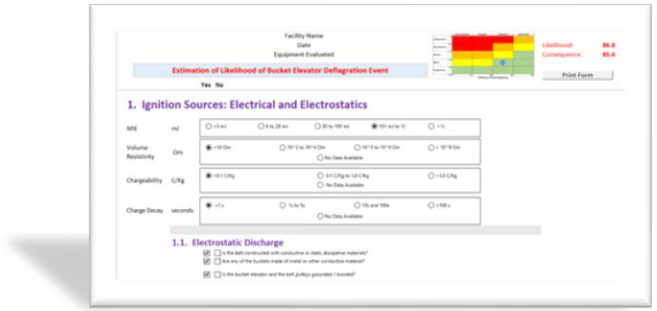
Control the risk

Sustain

Process Risk Assessments, Dust Hazard Analysis

Manage Safeguards, Asset Integrity

Management System



HHP Maturity and Combustible Dust Maturity

Cargill

Questions?