



# PROCESS SAFETY EVENTS – LEARNING FROM DATA

TSX | IPL

CCPS Calgary Regional  
Meeting

# AGENDA

- **Company Background**
- **Background**
- **Challenges in Existing Environment**
- **Power of Business Intelligence**
- **Reporting Process Safety Events with Power BI**
- **Current Challenge(s)**

# COMPANY BACKGROUND

- **Inter Pipeline operates in four business segments**
  - ✓ Oil Sands Transportation - > 3,300 km of operating pipelines and 3.8 million barrels of storage
  - ✓ NGL Processing –Three straddle plants on TransCanada Alberta system and off-gas processing facilities in Fort McMurray
  - ✓ Conventional Oil Pipelines - >3,900 km of pipelines
  - ✓ Bulk Liquid Storage – 23 terminals in Europe and the UK
- **Inter Pipeline is also in the process of constructing and eventually operation of an integrated petrochemical facility that will be producing 525 kT of Polypropylene annually.**
- **Process Safety program in relative infancy**
  - ✓ Several elements have higher priority driven by internal gap assessments and external feedback
  - ✓ Classification of Process Safety Events (PSEs) started in 2017 as per API RP 754

# BACKGROUND

- Incident reports are entered in a Third-party software by company employees
- Data is manually extracted from the software and used for scorecards/follow-ups etc by H&S and Process Safety teams
- Prior to 2017, incidents reported did not have an associated Process Safety classification as per API RP 754 or any other guideline
- 2017 (Q1-Q3) – manual/off-line classification of internal incident reports
- 2017 (Q4) – integrated PSE forms in incident reporting tool to allow for initial classification by reporting personnel

# CHALLENGE IN EXISTING ENVIRONMENT

- **2018 – Excel used extensively for data export/analysis**
  - ✓ Pivot tables / pivot charts heavily used
  - ✓ Rework to add additional data analysis capabilities / data visualization etc.
  - ✓ Existing data was contained in single spreadsheet making it difficult to manage/update
- **Process Safety team often the bottleneck in communicating data around Tier 3s/Tier 4s to O&M organization due to variety of data users and variable needs**
  - ✓ Significant effort to identify meaningful trends

# POWER OF BUSINESS INTELLIGENCE

- **Variety of Business Intelligence (BI) tools available**
  - ✓ Tableau
  - ✓ PowerBI
  - ✓ SAP (used as financial tool at organization)
  - ✓ Other tools
- **PowerBI selected as part of existing Office365 license**
  - ✓ In-house IT support available
  - ✓ Can also provide data visibility via MS PowerApps
- **Puts the end-users in the driving seat for additional data parsing to identify key trends or zoom in to specific information**

# REPORTING PROCESS SAFETY EVENTS WITH POWER BI



## KPIs, Metrics and Scorecards

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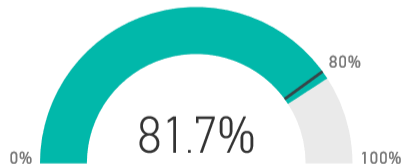
PSE Count August 2019

System	Tier 1	Tier 2	Tier 3	Tier 4	Overall
System A	0	0	3	2	5
System B	0	0	2	5	7
System C	0	0	3	0	3
System D	1	0	7	2	10
Total	1	0	15	9	25

PSE Count YTD 2019

System	Tier 1	Tier 2	Tier 3	Tier 4	Overall
System A	1	0	52	34	87
System B	0	1	48	68	117
System C	0	0	37	7	44
System D	1	0	62	19	82
Total	2	1	199	128	330

August 2019 Closure Rate



Tier 1 and Tier 2 PSER

Year	Hours Worked	Tier 1	Tier 1 PSER	IOGP Tier 1 PSER	Tier 2	Tier 2 PSER	IOGP Tier 2 PSER
2017	491,771.64	4	1.63	0.13	0	0.00	0.39
2018	493,293.70	7	2.84	0.13	4	1.62	0.39
2019	326,623.57	2	1.22	0.13	1	0.61	0.39

August 2019  
**0.15**  
Tier 1 PSER

August 2019  
**0.00**  
Tier 2 PSER

YTD 2019 Tier 1 and Tier 2 PSEs

Incident #	Incident Date	District / Plant	PSE Tier	VIMS Description	Quantity (m3)	Material
20190206001	1/24/2019	Plant A	Tier 2	Incident description as submitted in VIMS	1	Material A
20190208007	2/8/2019	District A	Tier 1	Incident description as submitted in VIMS	1	Material B

### Monthly PSE Count YTD 2019

Click on "Focus mode" to expand table

Supported by: Process Safety Team  
Update Frequency: Weekly

KPIs, Metrics and Scorecards

Business Unit 1 PSE Summary

Business Unit 2 PSE Summary

Process Safety Event List

PSE Reclassification List

# REPORTING PROCESS SAFETY EVENTS WITH POWER BI



## Business Unit 2 PSE Summary

**System**

☐ System A  
☐ System B

**District / Plant**

☐ Plant A  
☐ Plant B  
☐ Plant C

**PSE Tier**

☐ Tier 1  
☐ Tier 2  
☐ Tier 3  
☐ Tier 4

**Status**

☐ Closed  
☐ Open

**Year**

☐ 2017  
☐ 2018  
☐ 2019

**Quarter**

☐ Qtr 1  
☐ Qtr 2  
☐ Qtr 3  
☐ Qtr 4

**Last 12 Months Only?**

☐ Yes

**Last Month Only?**

☐ Yes

**Current Month Only?**

☐ Yes

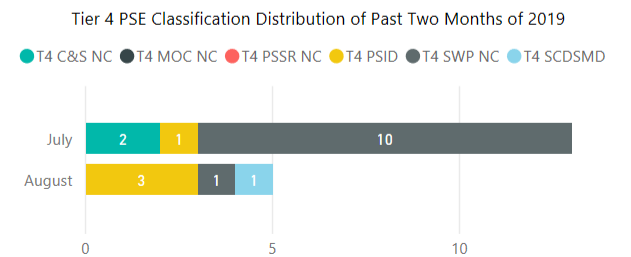
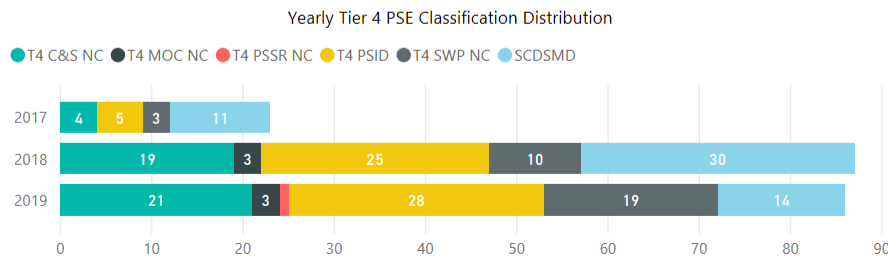
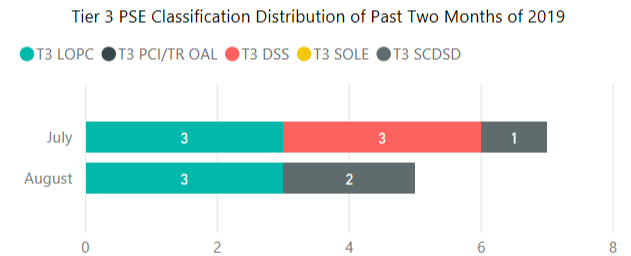
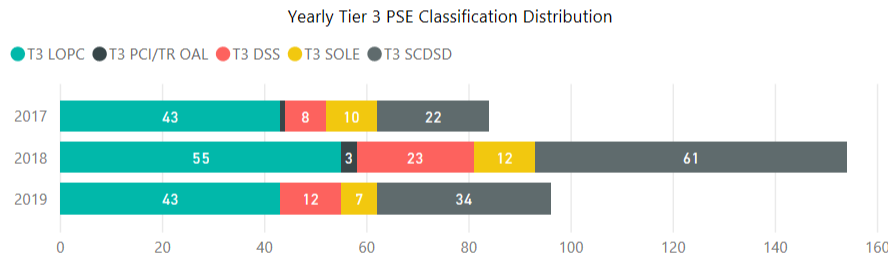
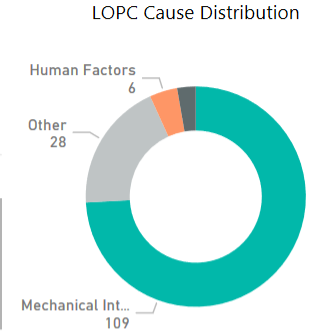
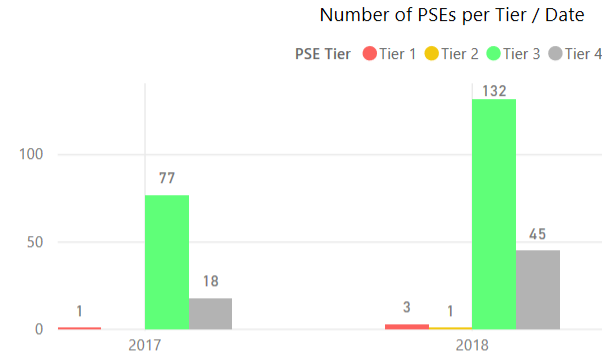
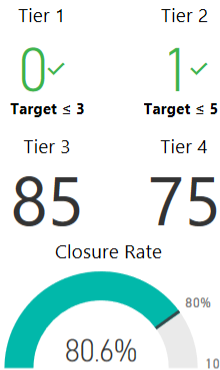
This filter only applies to the Yearly T3 and T4 Distribution Charts

**Month**

All

**Legend :**

T3 - Tier 3  
T3 LOPC - Loss of Primary Containment





# REPORTING PROCESS SAFETY EVENTS WITH POWER BI



## Business Unit 2 PSE Summary

System  
☐ System A

District / Plant

- ☐ Plant A  
☐ Plant B  
☐ Plant C

PSE Tier

- ☐ Tier 1  
☐ Tier 2  
☐ Tier 3  
☐ Tier 4

Status

- ☐ Closed  
☐ Open

Year

- ☐ 2017  
☒ 2018  
☒ 2019

Quarter

- ☐ Qtr 1  
☐ Qtr 2  
☐ Qtr 3  
☐ Qtr 4

Last 12 Months Only?

☐ Yes

Last Month Only?

Current Month Only?

This filter only applies to the Yearly T3 and T4 Distribution Charts

Month

All

Legend :

T3 - Tier 3

T3 LOPC - Loss of Primary Containment

Tier 1

0✓

Target ≤ 3

Tier 2

1✓

Target ≤ 5

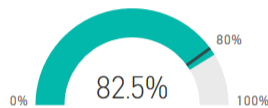
Tier 3

14

Tier 4

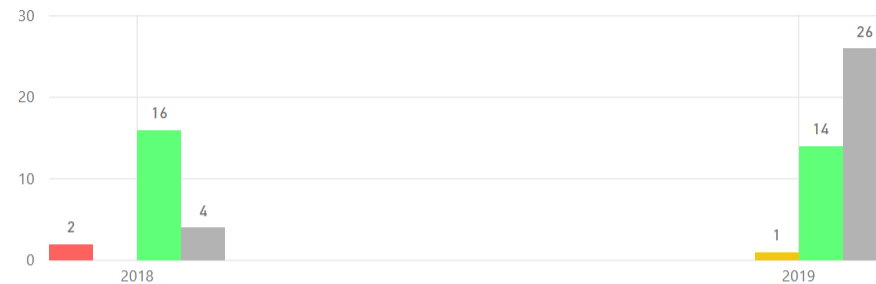
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Closure Rate

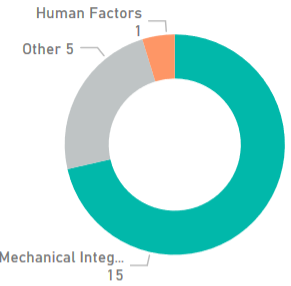


Number of PSEs per Tier / Date

PSE Tier ● Tier 1 ● Tier 2 ● Tier 3 ● Tier 4

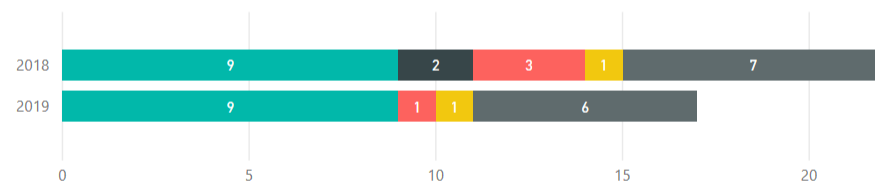


LOPC Cause Distribution



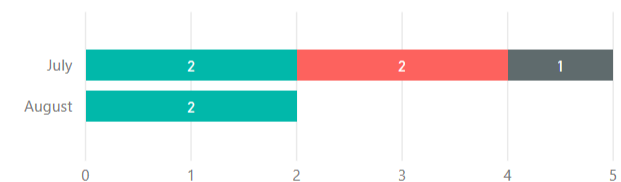
Yearly Tier 3 PSE Classification Distribution

● T3 LOPC ● T3 PCI/TR OAL ● T3 DSS ● T3 SOLE ● T3 SCDSO



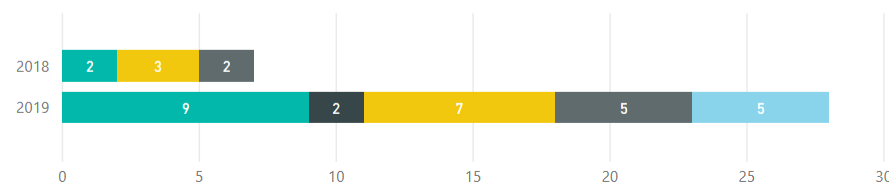
Tier 3 PSE Classification Distribution of Past Two Months of 2019

● T3 LOPC ● T3 PCI/TR OAL ● T3 DSS ● T3 SOLE ● T3 SCDSO



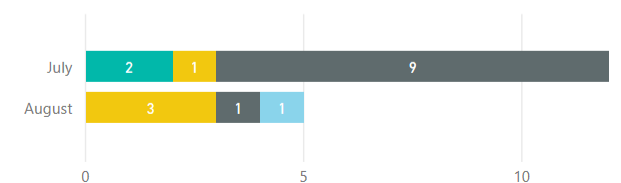
Yearly Tier 4 PSE Classification Distribution

● T4 C&S NC ● T4 MOC NC ● T4 PSSR NC ● T4 PSID ● T4 SWP NC ● T4 SCDSMD



Tier 4 PSE Classification Distribution of Past Two Months of 2019

● T4 C&S NC ● T4 MOC NC ● T4 PSSR NC ● T4 PSID ● T4 SWP NC ● T4 SCDSMD



KPIs, Metrics and Scorecards

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PSE Reclassification List

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## PSE Reclassification List

Search VIMS Incident #



### Supervisor

- ☐ Supervisor 1
- ☐ Supervisor 2
- ☐ Supervisor 3
- ☐ Supervisor 4
- ☐ Supervisor 5
- ☐ Supervisor 6
- ☐ Supervisor 7
- ☐ Supervisor 8
- ☐ Supervisor 9
- ☐ Supervisor 10

### PSE Tier

- ☐ Not a PSE
- ☐ Tier 1
- ☐ Tier 2
- ☐ Tier 3
- ☐ Tier 4

### Year

- ☐ 2017
- ☐ 2018
- ☒ 2019

### Quarter

- ☐ Qtr 1
- ☐ Qtr 2
- ☐ Qtr 3
- ☐ Qtr 4

### Last 12 Months Only?

- ☐ Yes

### Last Month Only?

- ☐ Yes

### Current Month Only?

### Tier 3 Classification Filters

T3 LOPC T3 DSS T3 SOLE T3 SCDS D T3 PCI OAL

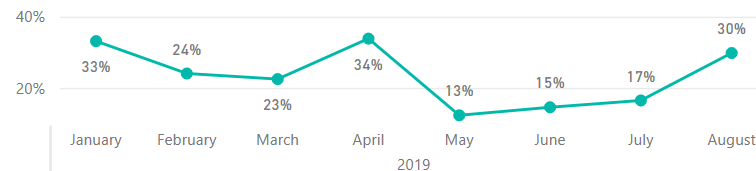
☐ 1 ☐ 1 ☐ 1 ☐ 1

### Tier 4 Classification Filters

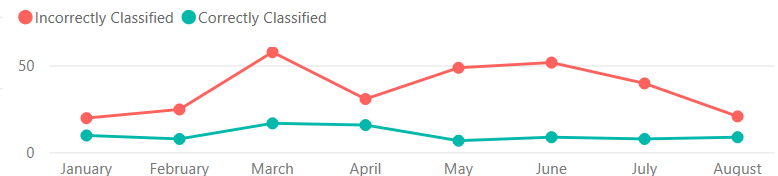
T4 C&S NC T4 MOC NC T4 PSSR NC T4 PSI D T4 SWP NC T4 SCDS MD

☐ 1 ☐ 1 ☐ 1 ☐ 1 ☐ 1 ☐ 1

Correct Classification Rate by Year and Month



Correct vs Incorrect Classification by Year and Month



Reclassified VIMS List + Rationale

Incident #	Incident Date	District / Plant	VIMS Description	PSE Classification (VIMS)	Initial Classification (VIMS)	Rationale
20190829010	8/29/2019	Plant B	Incident description as submitted in VIMS	Tier 4 Process safety information deficiencies,	No initial classification	Explanation of why the event reported is a Process Safety Event that qualifies as a Tier 4 Process safety information deficiency
20190825004	8/25/2019	Plant B	Incident description as submitted in VIMS	None for Process Safety	Tier 3 PSE Demand on a Safety System,	Explanation of why the event reported does not qualify as a Tier 3 PSE Demand on a safety system and the reason why it cannot be considered a Process Safety Event
20190827015	8/24/2019	District A	Incident description as submitted in VIMS	None for Process Safety	Tier 4 Safety critical device/system management deficiency,	Explanation of why the event reported does not qualify as a Tier 4 Safety critical /system management deficiency and the reason why it cannot be considered a Process Safety Event

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# ADVANTAGE(S)

- **Very easy to access and view up to date information once the dashboard is built.**
- **Very easy to maintain. Only Excel files require maintenance. With Power BI its just a matter of refreshing the data.**
- **Once data is set up it is fairly easy to build dashboards showing different information or in different formats**
- **Significant gains in efficiency in stewarding Tier 3/Tier 4s**
- **Relevant analysis can be performed on reports to get useful information from collected data**
- **Dashboards now visible to variety of end-users, removing the Process Safety team as intermediaries to access relevant information**

# CHALLENGE(S) – GROWING PAINS

- **Data has to be restructured** - No formulas (PowerBI does that internally). Restructuring the data also allows to merge data from different spreadsheets and build relationships in power BI
- **Data conventions:** Consistent naming conventions and data entry approach throughout all spreadsheets. Ensures visuals, counts and other measures are accurate.
- **Multiple people working on a PowerBI Report:** Power BI does not allow multiple people to be able to work on the report at the same time, so coordination regarding who is making changes to the file is needed.
- **Database location:** Also the data files as well as the PowerBI file needs to be placed in a central location such as SharePoint and not in an individual's hard drive
- **Sharing the report:** Because only those with a Power BI Pro license are able to access the Power BI report the amount of people we are able to communicate the dashboard and reports we build is limited

# SUMMARY

- **Data around Process Safety Events now tracked via appropriate business intelligence tool**
- **Significant improvement in data analysis, communication and access**

**Questions?**