Potentially Serious Incidents Summary

2019 Q1 - 2022 Q2 DATA

October 2022
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EXECUTIVE SUMMARY

To help industry understand common trends and encourage conversations around prevention efforts, this report summarizes potentially serious incident (PSI) data from the Alberta oil and gas industry for the period Q1 2019 to Q2 2022.

The number of companies reporting PSIs increased from 118 to 152 since the 2021 report; however, only a small portion (6%) of active oil and gas companies have submitted PSI reports. This 6% makes up approximately a third of the industry activity.

Since the last report, the overall number of PSI submissions declined by 28%, which is associated with a decrease in COVID-19 reports. In relation to COVID-19 reporting, the number of people exposed per incident has dropped while the number of injured workers per incident has increased. This may be the result of evolving risk management practices for COVID-19. The submission of non-COVID-19 PSIs has stabilised since the 2021 report.

ESC analyzed Struck by falling object and Inhalation of substance PSIs, grouping the incidents into various categories to identify additional insights. This analysis is included in Appendix A and identifies the need for a balanced approach to both human performance and organization performance in the prevention of serious incidents and fatalities.

Industry is encouraged to reflect on their operations in relation to these findings, remembering that every PSI is an opportunity to learn and, often, all that separates a PSI from an actual serious incident or fatality is luck.
1.0 INTRODUCTION & OBJECTIVE

In 2018, it became mandatory for Alberta employers to report potentially serious incidents (PSIs) to Alberta Occupational Health and Safety (OH&S). OH&S has provided some of the resulting data to Energy Safety Canada (ESC), for ESC’s funding industry codes.

This report provides a summary of potentially serious incident data from the Alberta oil and gas industry for the purposes of understanding common trends and encouraging broader conversations around industry prevention efforts.

Data represents the time period of Q1 2019 to Q2 2022.

2.0 REPORTING RATES & TRENDS OVER TIME

The number of reports has decreased due to waning COVID-19 numbers.

68 Reports submitted between Q1 and Q2 in 2021.

28% DECREASE

49 Reports submitted between Q1 and Q2 in 2022.

Over the last two years, there were about 2,600 registered companies in Alberta’s oil and gas industries with more than one employee. Only a small portion of active oil and gas companies (6%) have submitted PSI reports since the program began. For comparison, around half (1,400 companies) had an incident that became an injury claim with the WCB.
2.0 REPORTING RATES & TRENDS OVER TIME

Opportunities exist to encourage more reporting across the entire industry.

REPORTED POTENTIALLY SERIOUS INCIDENTS, BY QUARTER

<table>
<thead>
<tr>
<th>Year</th>
<th>Participating companies</th>
<th>PSI report count</th>
<th>People exposed</th>
<th>People injured</th>
<th>Average exposed per PSI</th>
<th>% injured per exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>83</td>
<td>142</td>
<td>266</td>
<td>52</td>
<td>1.87</td>
<td>20%</td>
</tr>
<tr>
<td>2020</td>
<td>75</td>
<td>115</td>
<td>265</td>
<td>40</td>
<td>2.30</td>
<td>15%</td>
</tr>
<tr>
<td>2021</td>
<td>81</td>
<td>105</td>
<td>1055</td>
<td>45</td>
<td>10.05</td>
<td>4%</td>
</tr>
<tr>
<td>2022 Q1-Q2</td>
<td>46</td>
<td>49</td>
<td>88</td>
<td>66</td>
<td>1.80</td>
<td>75%*</td>
</tr>
<tr>
<td>Total</td>
<td>212</td>
<td>411</td>
<td>1674</td>
<td>203</td>
<td>4.07</td>
<td>12%</td>
</tr>
</tbody>
</table>

*Impact is associated with COVID-19.

During a PSI, on average four people were exposed to risk, and 12% of exposures resulted in an injury. Companies are encouraged to reflect on their own ratio of near miss PSIs to injury PSIs.

COVID-19 PSIs have, on average, larger numbers of risk-exposed persons, which impacted the trend since 2020.
3.0 REPORTS PER INDUSTRY SECTOR

PSI REPORTS (INCIDENT RELATIONSHIP BY SECTOR)

- **Oil & gas - upstream**: 39%
- **Oilsands operations**: 22%
- **Oilfield downhole services**: 6%
- **Refining crude oil**: 6%
- **Oil field maint/construction**: 5%
- **Drilling – oil/gas wells**: 4%
- **Well servicing with service rigs**: 12%
- **Other oil and gas sectors**: 5%

Reports where both a prime contractor and the employer were involved are counted twice.

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**POTENTIALLY SERIOUS INCIDENTS SUMMARY**

- **39%** Oil & gas – upstream
- **22%** Oilsands operations
- **6%** Oilfield downhole services
- **6%** Refining crude oil
- **5%** Oilfield maintenance/construction
- **5%** Drilling – oil/gas wells
- **4%** Well servicing with service rigs
- **12%** Other oil and gas sectors
4.0 INCIDENT CLASSIFICATIONS

The graphs below show the most common types of incidents that could have caused serious injuries and the sources of those potential injuries.

Outside of COVID-19, over half of the PSIs are line of fire related, most significantly with workers being struck by construction materials.

**TOP 10 INCIDENT TYPES (INCIDENT COUNT)**

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>Incident Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to infectious disease or illness (e.g. COVID, SARS)</td>
<td>80</td>
</tr>
<tr>
<td>Contact or struck with object, tool, equipment</td>
<td>60</td>
</tr>
<tr>
<td>Struck by falling object</td>
<td>40</td>
</tr>
<tr>
<td>Caught in or between object, tool</td>
<td>20</td>
</tr>
<tr>
<td>Inhalation of substance</td>
<td>20</td>
</tr>
<tr>
<td>Contact or struck with pressured air or water</td>
<td>20</td>
</tr>
<tr>
<td>Contact or struck with running equipment, tool</td>
<td>10</td>
</tr>
<tr>
<td>Fall to lower level</td>
<td>10</td>
</tr>
<tr>
<td>Collision between vehicles</td>
<td>10</td>
</tr>
<tr>
<td>Contact with overhead power line</td>
<td>10</td>
</tr>
</tbody>
</table>

**TOP TEN SOURCES OF INCIDENT (INCIDENT COUNT)**

<table>
<thead>
<tr>
<th>Source of Incident</th>
<th>Incident Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-worker / infectious agent</td>
<td>80</td>
</tr>
<tr>
<td>Construction materials</td>
<td>60</td>
</tr>
<tr>
<td>Motor vehicle</td>
<td>40</td>
</tr>
<tr>
<td>Hydrogen sulphide (H₂S gas)</td>
<td>20</td>
</tr>
<tr>
<td>Industrial vehicle - powered</td>
<td>20</td>
</tr>
<tr>
<td>Hand tool - non-powered</td>
<td>20</td>
</tr>
<tr>
<td>Hoist</td>
<td>10</td>
</tr>
<tr>
<td>Material handling machinery</td>
<td>10</td>
</tr>
<tr>
<td>Aromatic hydrocarbon</td>
<td>10</td>
</tr>
<tr>
<td>Crane-mobile, truck, rail mounted</td>
<td>10</td>
</tr>
<tr>
<td>Contact with overhead power line</td>
<td>10</td>
</tr>
</tbody>
</table>
4.0 INCIDENT CLASSIFICATIONS

4.1 SOURCE PER TYPE

The main sources of the top five incident types are listed below.

Note that *Struck by falling object* and *Contact or struck with object, tool, equipment* each have a large *Other* category for source of incident. This is simply due to the large number of potential sources (hoists, machinery, ice, fasteners, etc.); there is no major source of incident that is not shown.

**SOURCES OF THE TOP FIVE INCIDENT TYPES (INCIDENT COUNT)**
5.0 INJURED PERSON DEMOGRAPHICS

The graphs below show the demographics of people who were injured during a PSI. PSIs where no people were injured are not accounted for.

INJURED PERSON OCCUPATIONS

- Central control and process operators, petroleum, gas and chemical processing
- Oil and gas well drilling and related workers and services operators
- Oil and gas drilling, servicing and related labourers
- Contractors and supervisors, oil and gas drilling and services
- Construction trades helpers and labourers
- Steamfitters, pipefitters and sprinkler system installers
- Mine service workers and operators in oil and gas drilling
- Boilermakers
- Petroleum engineers
- Transport truck drivers
- Other

INJURED PERSON AGE GROUPS

- 14 – 19: 10%
- 20 – 29: 23%
- 30 – 39: 40%
- 40 – 49: 22%
- 50 – 59: 10%
- 60 – 69: 1%

Age Groups

- 14 – 19
- 20 – 29
- 30 – 39
- 40 – 49
- 50 – 59
- 60 – 69
6.0 INCIDENT FOLLOW-UP

On average, one or two follow-up actions are implemented after a potentially serious incident is reported.

Training and Changed Policy are the most common follow-up actions.

A stronger focus on elimination, substitution and engineering controls should be considered.

### FOLLOW-UP CONTROLS IMPLEMENTED

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022 Q1-Q2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training / Re-Training</td>
<td>55</td>
<td>77</td>
<td>77</td>
<td>25</td>
<td>234</td>
</tr>
<tr>
<td>Changed Policy</td>
<td>56</td>
<td>50</td>
<td>45</td>
<td>10</td>
<td>161</td>
</tr>
<tr>
<td>Applied Engineered Controls</td>
<td>26</td>
<td>47</td>
<td>32</td>
<td>17</td>
<td>122</td>
</tr>
<tr>
<td>Eliminated Hazard</td>
<td>36</td>
<td>26</td>
<td>26</td>
<td>20</td>
<td>108</td>
</tr>
<tr>
<td>Substituted Equipment</td>
<td>11</td>
<td>11</td>
<td>7</td>
<td>5</td>
<td>34</td>
</tr>
<tr>
<td>Other</td>
<td>26</td>
<td>39</td>
<td>38</td>
<td>12</td>
<td>115</td>
</tr>
<tr>
<td><strong>Total PSI Count</strong></td>
<td>142</td>
<td>115</td>
<td>105</td>
<td>49</td>
<td>411</td>
</tr>
<tr>
<td><strong>All Controls</strong></td>
<td>210</td>
<td>250</td>
<td>225</td>
<td>89</td>
<td>774</td>
</tr>
</tbody>
</table>

Controls per PSI: 1.5, 2.2, 2.1, 1.8, 1.9
APPENDIX A

Additional analysis of Struck by object and Inhalation of substance PSIs.

ESC analyzed Struck by object and Inhalation of substance PSIs to identify additional insights. The data was grouped into categories: personal or process safety, human error or equipment failure, and alignment with Life Saving Rules. However, a few incidents were excluded from the groupings due to their complexity.

The data consists of a total of 69 data points: 44 Struck by falling object and 25 Inhalation of substance or related category. Across this data, one-third are process safety while two-thirds are personal safety. Most of the process safety PSIs were Inhalation of substance PSIs. These PSIs originated predominantly from exposure to H₂S with a few other hazardous substances, such as SO₂ and hydrocarbons.

PERSONAL SAFETY VERSUS PROCESS SAFETY

Similarly, across both Struck by falling object and Inhalation of substance data, roughly half were equipment failure and half were human error, highlighting the need for a balanced approach between human performance and organization performance. The human error category was roughly 20% individual errors PSIs, that is, errors that predominately resided with the individual, while 80% were organizational weaknesses, meaning errors that were strongly associated with system issues where the worker was not set up for success.

EQUIPMENT FAILURE VERSUS HUMAN ERROR

Approximately 40% of follow-up actions for PSIs involving human error have built capacity to fail safely if an error or mistake is made, while 60% have not. This 40% is very positive and indicative of follow-up actions that make a lasting difference in preventing serious incidents and fatalities. However, with 60% not building capacity to fail safely, substantial work remains.

One-third of the process safety PSIs involving H₂S were uncontrolled releases while two-thirds were unintentional releases. Similarly, one-third of those same PSIs involved equipment failure while two-thirds involved human error. This identifies the need for improved equipment design, asset management, managing change, work planning and the use of Life Saving Rules (LSR).
Life Saving Rules applied to approximately one-third of both personal and process safety PSIs with the most prevalent being Working at Height and Bypassing Safety Controls, respectively.

The top three dropped objects in the PSIs submitted were construction materials, hoists, and hand tools. More than half of these were classified as equipment failure.

Two-thirds of the dropped objects were dynamic and one-third static. In other words, approximately one-third fell on their own, whereas two-thirds fell because of the presence of hazardous energy such as motion, pressure, etc. This further corroborates the need for industry to make improvements in asset management such as equipment risk registries, reliable securing, preventative maintenance, inspection programs, etc. as part of a formal dropped objects program.
RESOURCES

Energy Safety Canada PSI Program
Energy Safety Canada PSI Guideline
Potentially serious incident reporting: legislation updates
List of oil and gas industry sectors

GLOSSARY

Industry Sector
Groupings of employers who have similar businesses and risks as one another. Defined by WCB Alberta. This report contains data from all Alberta oil and gas industry sectors.

Person
A PSI is not limited to workers. If it involves someone who is not a worker, it is still considered a PSI if it resulted from work activities at the work site or could have happened to a worker.

PSI
Potentially serious incident. A PSI is reportable when the incident had a likelihood of causing a serious injury or illness, and there is reasonable cause to believe that corrective action may need to be taken to prevent recurrence.

WCB
Workers’ Compensation Board. The mandate of the WCB is to provide compensation to workers who are injured on the job, and help them recover and return to work.

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