SafeOCS SPPE Briefings for Industry

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Allison Fischman, Safety Data Analyst, BTS

July 13 and 14, 2021
Agenda

SafeOCS SPPE Program Drivers

Findings from Recent Annual Reports

Partnership with BTS: SafeOCS Data Processing and Evaluation
Why Safety and Pollution Prevention Equipment Failure Reporting?

• Post-Macondo renewed focus on low frequency, high consequence events

• **Exprosoft report**: Causal factors of LWC events worldwide 2000-2015
  • “Should there be a large spill caused by a LOWC event, the risk analysis indicates that with around a 40% probability, it will occur during exploration drilling from a floater. The proportion from a producing well is close to 30%, and from a workover event is around 20%. If there should occur a large spill during production, it is likely to be caused by an external load as a hurricane.”

• BSEE and Industry concurred on the benefit of a more comprehensive and formalized reporting for critical safety equipment failure

• 2016: BSEE Production Safety Systems Rule
Type of Reported Failure Event in Order of Significance

- **Internal Leak on Platform**: 72.9%
- **Internal Leak Away from Platform**: 15.6%
- **Failed to Close Away from Platform**: 6.2%
- **Failed to Close on Platform**: 3.1%
- **External Leak**: 4.4%
- **HSE Incident**: 0.0%
## Type of Reported Failure Events by Type of Valve

<table>
<thead>
<tr>
<th>Type of Failure</th>
<th>On Platform</th>
<th>Away from Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SSV</td>
<td>BSDV</td>
</tr>
<tr>
<td><strong>External Leak</strong></td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td><strong>Failed to Close</strong></td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Internal Leak</strong></td>
<td>160</td>
<td>3</td>
</tr>
<tr>
<td><strong>Failed to Open</strong></td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Type of Reported Failure by Well Rate

Well rate units are BOE/day (average produced volumes)
Water Cut Range

<table>
<thead>
<tr>
<th>Water Cut Range</th>
<th>SPPE Failures</th>
<th>Active Wells</th>
<th>Actual to Expected Failure Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Production</td>
<td>10 (4.6%)</td>
<td>2,128 (39.9%)</td>
<td>0.12</td>
</tr>
<tr>
<td>0%</td>
<td>18 (8.3%)</td>
<td>191 (3.6%)</td>
<td>2.31</td>
</tr>
<tr>
<td>0-10%</td>
<td>9 (4.1%)</td>
<td>513 (9.6%)</td>
<td>0.43</td>
</tr>
<tr>
<td>10-50%</td>
<td>62 (28.4%)</td>
<td>964 (18.1%)</td>
<td>1.57</td>
</tr>
<tr>
<td>50-90%</td>
<td>70 (32.1%)</td>
<td>1,076 (20.2%)</td>
<td>1.59</td>
</tr>
<tr>
<td>&gt;90%</td>
<td>49 (22.5%)</td>
<td>463 (8.7%)</td>
<td>2.59</td>
</tr>
<tr>
<td>Not Reported</td>
<td>7</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>Total</td>
<td>218 (100%)*</td>
<td>5,335 (100%)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- A disproportionately higher number of reported failures occurred in wells with 0% water cut or >90% water cut.
Well Stream Contaminants

Of the 9 failure reports indicating the presence of $\text{H}_2\text{S}$;
- 7 SSV failures
- 2 SCSSV failures

Of the 7 failure reports indicating the presence of $\text{CO}_2$;
- 3 SSV failures
- 3 SCSSV failures
- 1 GLSDV failure
How Failures were Detected

- Leakage Test: 87.1%
- Normal Well Operations: 12.4%
- ESD Response: 5.3%
- Not Reported: 2.2%
- Process Upset: 1.8%
- Emergency Condition: 0.4%
Reported Corrective Actions

E.g., the internal leakage across the valve’s sealing component was resolved by a simple service, such as a water wash or greasing the valve.

E.g., the leak required a more robust corrective action, such as repairing or replacing a component or replacing the valve.
Root Causes of Reported Failure Events & Time to Failure

- Wear and Tear: 72.0%
- Unknown: 12.9%
- Scale: 4.9%
- Maintenance Plan: 3.6%
- Paraffin: 3.6%
- Sand: 3.1%
- Design Issue: 2.2%
- Task Execution: 2.2%
- Manufacturing Defect: 1.3%
- Debris: 0.9%
- Unspecified Contaminants: 0.4%
Repeated Failures

• In 2019, a total of 30 events of repeated failures indicate that the cause of the first failure may not have been fully resolved and further investigation is warranted.

• Repeated failures may indicate a need to conduct additional RCAs to better understand the operating environment to which these SPPE valves are exposed and the suitability of the valve design to the operating conditions.
Data Quality Improves with Complete Reporting

<table>
<thead>
<tr>
<th>Operator Summary:</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Operators</td>
<td>57</td>
<td>58</td>
<td>56</td>
</tr>
<tr>
<td>Producing Operators</td>
<td>55</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Reporting Operators (Percent of Active Operators)</td>
<td>7 (12.3%)</td>
<td>14 (24.1%)</td>
<td>15 (26.8%)</td>
</tr>
<tr>
<td>Reporting Operators’ Percent of Active Wells</td>
<td>32.6%</td>
<td>66.8%</td>
<td>60.6%</td>
</tr>
<tr>
<td>Reporting Operators’ Percent of Production</td>
<td>39.8%</td>
<td>62.3%</td>
<td>75.7%</td>
</tr>
</tbody>
</table>

Figure 1: Sources of SPPE Failure Records

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, SafeOCS program.
Bureau of Safety and Environmental Enforcement

Bureau of Transportation Statistics
SafeOCS Program Administration by the Bureau of Transportation Statistics

• DOT’s principal statistical agency
  o 13 principal statistical agencies
  o 90+ additional agencies and units engaged in statistical activities

• As DOT’s principal statistical agency, BTS
  o Provides timely, accurate and credible information transcend all modes
  o Is the trusted source of data through
    ▪ Ensuring deliverables are free of perceived political bias (from data user’s perspective)
    ▪ Protecting data through legislative authority (from data provider’s perspective)
      ❖ Legal discovery and subpoena
      ❖ Protections to individuals and businesses (Title 13 data)
Data Processing Overview

- Reporting required under BSEE regulation 30 CFR 250.803
- Operators must submit these reports directly to the Bureau of Transportation Statistics (BTS) via www.safeOCS.gov
- BSEE and BTS MOU
Data Confidentiality

• BTS operates SafeOCS under the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA)

• All confidential data (sensitive, proprietary, or private data) is protected from release under CIPSEA

• Confidential data...
  • cannot be released to the public, BSEE, or other non-CIPSEA federal agencies
  • protected from subpoenas and FOIA requests
  • may be used only for statistical purposes

• Additional information about BTS and CIPSEA protections can be found here
What event information is shared with BSEE?

• When you submit a notice of SPPE failure to SafeOCS, an automated email is sent to BSEE with only date, company name, company ID if available, and event reference number. **No other information about the event is shared.**

• BTS shares this information with BSEE to provide proof that you are in compliance with the reporting regulation without sharing the details of your report, which are CIPSEA-protected.

• Following detailed quality evaluation and statistical analysis, de-identified aggregated information is shared with all stakeholders, including BSEE, via published annual reports and data dashboards.

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Notification of an SPPE equipment failure:

- **Submittal Date:** Mar 25, 2021
- **Company Name:** CompanyABC Corp.
- **Company ID:**
- **Reference Number:** SPPE2021#000000
- **Event Date:** Mar 31, 2021

Respectfully,
The SafeOCS Team
SafeOCS@dot.gov
1-844-OCS-FRST (1-844-627-3778)
2020 SPPE Data Collection Form Improvement Effort

• Form improvements based on BTS and BSEE concerns for improved clarity:
  • Distinguish failure types from contributing factors
  • Clarify failure type definitions (e.g., failure to close vs. external leak)
  • Better capture well contaminant information
  • Clarify selections for how failures were detected
  • Improve corrective action definitions
  • Collect better information on time to failure

• Updated form in use for all 2021 equipment failure notifications
SafeOCS: Sharing Results

- All reports of aggregated information are posted to SafeOCS website: www.safeocs.gov
  - Includes 2019 SPPE Annual Report

- SafeOCS SPPE Dashboard is updated monthly with summary statistics on reported failure events
Next Steps

• **BTS** - Preparing 2020 Annual Report

• **BTS** - Areas of interest for current data analyses
  • Measuring component life, in cycles and time, to evaluate testing and replacement frequencies
  • Quantifying operational impact in terms of production interruptions and deferrals when failures occur
  • Enhancing analysis of SPPE failure rates
  • Further evaluating well age as a potential factor in SPPE failures

• **BSEE & BTS** - Outreach and engagement
  • Continue to grow program participation
  • Identify opportunities to improve reporting of specific RCFA results and learnings that may have industrywide benefit