# Root Cause Analysis Report

**Near Miss - Risk of Explosion**

## Problem Statement

<table>
<thead>
<tr>
<th>Report Number</th>
<th>Sologic Video Example 3</th>
<th>RCA Owner</th>
<th>Brian Hughes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Date</td>
<td>12/10/2015</td>
<td>RCA Facilitator</td>
<td>Brian Hughes</td>
</tr>
</tbody>
</table>

### Focal Point: Potential for multiple fatalities/injuries, loss of station

#### When
- **Start Date:** 12/10/2015  
- **End Date:** 12/10/2015  
- **Start Time:** 7:15 AM  
- **End Time:** 7:15 AM  
- **Unique Timing:** While gas station store area was under construction.

#### Where
- **Site:** 76 Station - NE 124th Street, Kirkland WA USA  
- **Location:** Within 10 feet of gas pump, outside the front door of the store

#### Actual Impact

<table>
<thead>
<tr>
<th>Safety</th>
<th>None</th>
<th>$0.00</th>
</tr>
</thead>
</table>

**Actual Impact Total:** $0.00

#### Frequency
- **Frequency Note:** Unknown

#### Potential Impact

<table>
<thead>
<tr>
<th>Safety</th>
<th>Potential multiple fatalities and injuries</th>
<th>$0.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Potential fire and explosion</td>
<td>$0.00</td>
</tr>
<tr>
<td>Environmental</td>
<td>Potential for large release of fuel</td>
<td>$500,000.00</td>
</tr>
<tr>
<td>Revenue</td>
<td>Potential loss of all revenue from the site for months</td>
<td>$500,000.00</td>
</tr>
<tr>
<td>Cost</td>
<td>Potential loss of facility</td>
<td>$1,000,000.00</td>
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<tr>
<td>Reputation (External)</td>
<td>Potential community impact</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

**Potential Impact Total:** $2,000,000.00
Report Summaries

Cause and Effect Summary

On 10-December, 2015 at 7:15AM a high-risk event occurred involving a person smoking near an operational gas pump. No actual adverse impact was experienced as a result of this event.

A customer at a gas station observed a construction worker smoking a cigarette within 5 feet of the pump. The convenience store building was in the process of being remodeled at the time. A group of 3 workers was working on the project. The project area had been fenced in with temporary chain link fencing. The workers were inside the temporary fence. The fenced area included the fueling bays directly adjacent to the store. However, three other fueling bays remained open to self-service customers.

The high-risk was determined based on the potential for gasoline vapors to ignite while people were in close proximity. Potential ignition sources include the burning cigarette as well as the means of lighting the cigarette (match or lighter). Potential fuel sources include flammable vapors released during the fueling process or vapors from a potential gasoline spill. At the time of the event, three workers were present along with three customers. Other customers were coming and going at the time. The station is near a major thoroughfare with pedestrians periodically walking by.

It is unknown why the worker was smoking near the fueling area. It is possible there was no designated smoking area. It is also possible that the worker simply chose to smoke away from the designated smoking area.

-- END OF SUMMARY --
## Solutions

<table>
<thead>
<tr>
<th>Solution ID</th>
<th>Solution</th>
<th>Cause(s)</th>
<th>Note</th>
<th>Assigned</th>
<th>Criteria</th>
<th>Due</th>
<th>Status</th>
<th>Term</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO-0001</td>
<td>Close the pumps during construction</td>
<td>Gas pumps remained open during construction</td>
<td>This would be expensive in the form of lost revenue, but also best at reducing risk of fire and explosion for any reason. Compare to the cost of an actual fire/explosion.</td>
<td></td>
<td>Not Checked</td>
<td></td>
<td>Validated</td>
<td>short</td>
<td>$180,000.00</td>
</tr>
<tr>
<td>SO-0002</td>
<td>Close the inside bank of pumps during construction</td>
<td>Gas pumps remained open during construction</td>
<td>This would be a less extreme version of above. Two pumps would remain open, but the safety buffer between the construction and the pumps would be larger.</td>
<td>Cory Boisoneau;</td>
<td>Not Checked</td>
<td>1/18/2016</td>
<td>Approved</td>
<td></td>
<td>$60,000.00</td>
</tr>
<tr>
<td>SO-0003</td>
<td>Set up designated smoking area</td>
<td>No designated smoking area?</td>
<td>Make sure it's well away from the construction site and the fuel pumps behind the store. There is an outdoor area in the southwest corner of the lot. Include a pop-up tent, table, and chairs. Also include a fire extinguisher.</td>
<td></td>
<td>Not Checked</td>
<td></td>
<td>Identified</td>
<td>short</td>
<td>$250.00</td>
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<tr>
<td>SO-0004</td>
<td>Don't allow smoking on the site.</td>
<td>Worker chose to smoke outside of designated smoking area?</td>
<td>The problem with this is it will be difficult to enforce 100% of the time.</td>
<td></td>
<td>Not Checked</td>
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<td>Identified</td>
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<td>SO-0005</td>
<td>Discipline the worker</td>
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<td>Note</td>
<td>This would only be appropriate if he was violating an in-place policy and if he was a multiple offender.</td>
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<table>
<thead>
<tr>
<th>SO-0006</th>
<th>Solution</th>
<th>Add smoking to all safety meetings. When is it appropriate, where should smoking take place, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause(s)</td>
<td>Worker chose to smoke outside of designated smoking area?</td>
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<tr>
<td>Note</td>
<td>This should happen at all worksites.</td>
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<tr>
<td>Assigned</td>
<td>Criteria Not Checked</td>
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<td>Due</td>
<td>Status Identified</td>
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<td>Term</td>
<td>Cost</td>
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# Team

<table>
<thead>
<tr>
<th>Facilitator</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Hughes</td>
<td>Brian Hughes</td>
</tr>
<tr>
<td><a href="mailto:brian.hughes@sologic.com">brian.hughes@sologic.com</a></td>
<td><a href="mailto:brian.hughes@sologic.com">brian.hughes@sologic.com</a></td>
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<table>
<thead>
<tr>
<th>Participants</th>
<th></th>
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<tbody>
<tr>
<td>Jon Boisoneau</td>
<td>Chris Eckert</td>
</tr>
<tr>
<td><a href="mailto:jon.boisoneau@sologic.com">jon.boisoneau@sologic.com</a></td>
<td><a href="mailto:chris.eckert@sologic.com">chris.eckert@sologic.com</a></td>
</tr>
</tbody>
</table>
Potential for multiple fatalities/injuries, loss of station

**Potential Fire and Explosion - Gas Station**

1. **Potential ignition sources**
   - **Fuel:** Gasoline vapors
     - Fuel vapors from filling process at pump?
     - Fuel vapors from spilled fuel?
   - **O2:** Outside environment

2. **People need fuel**
   - **People need fuel**

3. **People are in proximity 24 hours/day**
   - **People are in proximity 24 hours/day**
   - **Workers**
   - **Customers**
   - **Passers-by**

4. **Possible ignition source: Cigarette**
   - Worker smoking within 5 feet of fuel pump?
   - Connects To: Worker smoking within 5 feet of fuel pump

5. **Possible ignition source: Lighter/match**

6. **No designated smoking area?**
   - **No designated smoking area?**

7. **Worker chose to smoke outside of designated smoking area?**
   - **Worker chose to smoke outside of designated smoking area?**

8. **Gas pumps remained open during construction**
   - **Gas pumps remained open during construction**
   - **Close the pumps during construction**
     - **Close the pumps during construction**

9. **Store area under construction**
   - **Store area under construction**
   - **Smoking habit by at least one worker**
   - **Smoking habit by at least one worker**

10. **Fuel vapors from filling process at pump?**

11. **Worker smoking within 5 feet of fuel pump?**

12. **Potential ignition source: Cigarette**

13. **Potential ignition source: Lighter/match**

14. **Potential for multiple fatalities/injuries, loss of station**

**Solutions**

- **Close the pumps during construction**
  - **Close the pumps during construction**
  - **Criteria**
  - **Status** Identified
  - This would be a less extreme version of above. Two pumps would remain open but the area would be large enough to incorporate the space needed for construction and the pumps would be larger.

- **Set up designated smoking area**
  - **Set up designated smoking area**
  - **Criteria**
  - **Status** Identified
  - Make sure it’s well away from the gas pumps. There could be wall space in the southwest corner of the lot. Include a pop-up tent, table, and chairs. Also include a fire extinguisher.

- **Don’t allow smoking on the site**
  - **Don’t allow smoking on the site**
  - **Criteria**
  - **Status** Identified
  - The problem with this is it will be difficult to enforce 100% of the time.

- **Discipline the worker**
  - **Discipline the worker**
  - **Criteria**
  - **Status** Identified
  - This would only be appropriate if he was violating an in-place policy and if he was a multiple offender.

- **Add smoking to all safety meetings. When is it appropriate, where should smoking take place, etc.**
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**Desired State**

- **Desired State**
- **Desired State**

**Terminated Because:**

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  - Other causal paths more productive
  - Desired State
  - Other causal paths more productive
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