

## Root Cause Analysis Report

### Near Miss - Risk of Explosion



## Problem Statement

|               |                         |                 |              |
|---------------|-------------------------|-----------------|--------------|
| Report Number | Sologic Video Example 3 | RCA Owner       | Brian Hughes |
| Report Date   | 12/10/2015              | RCA Facilitator | Brian Hughes |

## 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

|                             |         |        |
|-----------------------------|---------|--------|
| Safety                      | None    | \$0.00 |
| Actual Impact Total: \$0.00 |         |        |
| Frequency                   |         |        |
| Frequency Note              | Unknown |        |

### Potential Impact

|                       |  |                |
|-----------------------|--|----------------|
| Safety                | Potential multiple fatalities and injuries             | \$0.00         |
| Safety                | Potential fire and explosion                           | \$0.00         |
| Environmental         | Potential for large release of fuel                    | \$500,000.00   |
| Revenue               | Potential loss of all revenue from the site for months | \$500,000.00   |
| Cost                  | Potential loss of facility                             | \$1,000,000.00 |
| Reputation (External) | Potential community impact                             | \$0.00         |

**Potential Impact Total: \$2,000,000.00**

## Report Summaries

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### 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

|         |                 |   |                             |
|---------|-----------------|---|-----------------------------|
| SO-0001 | <b>Solution</b> | Close the pumps during construction   |                             |
|         | <b>Cause(s)</b> | Gas pumps remained open during construction   |                             |
|         | <b>Note</b>     | 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.  |                             |
|         | <b>Assigned</b> |   | <b>Criteria</b> Not Checked |
|         | <b>Due</b>      |   | <b>Status</b> Validated     |
|         | <b>Term</b>     | short   | <b>Cost</b> \$180,000.00    |
| SO-0002 | <b>Solution</b> | Close the inside bank of pumps during construction.   |                             |
|         | <b>Cause(s)</b> | Gas pumps remained open during construction   |                             |
|         | <b>Note</b>     | 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.   |                             |
|         | <b>Assigned</b> | Cory Boisoneau;   | <b>Criteria</b> Not Checked |
|         | <b>Due</b>      | 1/18/2016   | <b>Status</b> Approved      |
|         | <b>Term</b>     |   | <b>Cost</b> \$60,000.00     |
| SO-0003 | <b>Solution</b> | Set up designated smoking area  |                             |
|         | <b>Cause(s)</b> | No designated smoking area?   |                             |
|         | <b>Note</b>     | 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. |                             |
|         | <b>Assigned</b> |   | <b>Criteria</b> Not Checked |
|         | <b>Due</b>      |   | <b>Status</b> Identified    |
|         | <b>Term</b>     | short   | <b>Cost</b> \$250.00        |
| SO-0004 | <b>Solution</b> | Don't allow smoking on the site.  |                             |
|         | <b>Cause(s)</b> | Worker chose to smoke outside of designated smoking area?   |                             |
|         | <b>Note</b>     | The problem with this is it will be difficult to enforce 100% of the time.  |                             |
|         | <b>Assigned</b> |   | <b>Criteria</b> Not Checked |
|         | <b>Due</b>      |   | <b>Status</b> Identified    |
|         | <b>Term</b>     |   | <b>Cost</b>                 |
| SO-0005 | <b>Solution</b> | Discipline the worker   |                             |

|                 |  |
|-----------------|--|
| <b>Cause(s)</b> | Worker chose to smoke outside of designated smoking area?  |
| <b>Note</b>     | This would only be appropriate if he was violating an in-place policy and if he was a multiple offender. |
| <b>Assigned</b> | <b>Criteria</b> Not Checked  |
| <b>Due</b>      | <b>Status</b> Identified   |
| <b>Term</b>     | <b>Cost</b>  |

|         |                 |   |
|---------|-----------------|---|
| SO-0006 | <b>Solution</b> | Add smoking to all safety meetings. When is it appropriate, where should smoking take place, etc. |
|         | <b>Cause(s)</b> | Worker chose to smoke outside of designated smoking area?   |
|         | <b>Note</b>     | This should happen at all worksites.  |
|         | <b>Assigned</b> | <b>Criteria</b> Not Checked   |
|         | <b>Due</b>      | <b>Status</b> Identified  |
|         | <b>Term</b>     | <b>Cost</b>   |

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## Team

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### Facillitator

Brian Hughes

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### Owner

Brian Hughes

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### Participants

Jon Boisoneau

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Chris Eckert

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★ Potential for multiple fatalities/injuries, loss of station

Potential Fire and Explosion - Gas Station

People are in proximity 24 hours/day

O2: Outside environment

Fuel: Gasoline vapors

Potential ignition sources

Workers

Customers

Passers-by

Terminated Because:  
Other causal paths more productive

Fuel vapors from filling process at pump?

Fuel vapors from spilled fuel?

Potential ignition source: Cigarette

Potential ignition source: Lighter/match

Terminated Because:  
Other causal paths more productive

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Other causal paths more productive

Terminated Because:  
Other causal paths more productive

Gas pumps remained open during construction

Solutions

Close the pumps during construction

Criteria ▲ Status Validated  
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.

Close the inside bank of pumps during construction.

Criteria ▲ Status Approved  
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.

People need fuel

Wanted to keep making money while the store was shut down

Store area under construction

Smoking habit by at least one worker

No designated smoking area?

Solutions

Set up designated smoking area

Criteria ▲ Status Identified  
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.

Worker chose to smoke outside of designated smoking area?

Solutions

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

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.

Criteria ▲ Status Identified  
This should happen at all worksites.