On June 13, 2013, an explosion at a chemical plant in Louisiana killed two and injured more than seventy others. The cause of the explosion is still unknown, but the federal Occupational Safety and Health Administration and the U.S. Chemical Safety Board are investigating the accident.

### Cause Mapping

**Problem**

<table>
<thead>
<tr>
<th>What</th>
<th>Problem(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosion at chemical plant, 2 fatalities, 70+ injuries</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/13/13</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant being expanded, many contract workers on site</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Where</th>
<th>Physical Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical plant in Ascension Parish, LA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact to the Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Goal</td>
</tr>
<tr>
<td>Schedule Goal</td>
</tr>
<tr>
<td>Material Goal</td>
</tr>
</tbody>
</table>

**Analysis**

- **Safety Goal Impacted**
  - 2 fatalities, 70+ injured
  - Evidence: Statements by company.

- **Schedule Goal Impacted**
  - Plant shut down for extended time
  - Evidence: Statements by company.

- **Material Goal Impacted**
  - Significant damage to plant
  - Evidence: Photos of damage.

**Evidence:**

- Oxygen present in environment
  - AND
- Spark
  - AND
  - ?

- Explosion at chemical plant
  - AND
  - Hundreds of workers at plant at time of explosion
  - AND
  - 2 fatalities, 70+ injured
  - Evidence: Statements by company.

- Significant damage to plant
  - AND
  - Evidence: Photos of damage.

**Evidence:**

- Photos of damage. Eye witness accounts of accident.
  - AND
- Photos of damage.

**Evidence:**

- Large quantities of petrochemical propylene present at plant
  - AND
  - Plant produces polymer grade propylene

- Raw materials are found in the region
  - AND
  - Profitable

**Cause Map**

**High Level**

**Step 1 Problem**

- Problem
- Why did it happen?
- What will be done?

**Step 2 Analysis**

- Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

**Step 3 Solutions**

The final step of the Cause Mapping process is to use the Cause Map to develop solutions that can be implemented to help prevent a similar problem from occurring in the future. Once a final Cause Map is built that incorporates all the findings from the investigation, it will be helpful in understanding any lessons to be learned and discussing potential solutions.