

# 1 Problem

What	Problem(s)	Fatality, hot work explosion, no combustible gas testing
When	Date	July 28, 2014
	Time	~9:30 AM
	Different, unusual, unique	?
Where	Facility, site	Fish processing plant - Moss Point, Mississippi
	Unit, area, equipment	Storage tank containing stick water (water and fish matter)
	Task being performed	Welding on storage tank

## Impact to the Goals

Safety	One fatality, one serious injury
--------	----------------------------------

Frequency	At facility, CSB investigated 3 other serious hot work incidents (all with fatalities) involving hot work on tanks of biological or organic matter
-----------	--

# FATALITY AT FISH PROCESSING PLANT

Cause Map

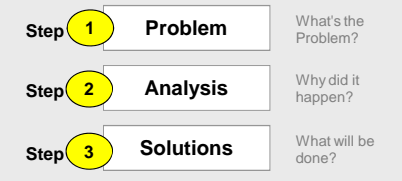
## Explosion during hot work on fish oil storage tank

While repairs were being made to a fish storage tank, an explosion occurred killing one worker and seriously injuring another. Workers were welding on a storage tank which contained ~8" of a mixture of water and fish matter. The material, thought to be non-hazardous, was producing flammable methane and hydrogen sulfide which created the necessary fuel source for the explosion. No combustible gas testing was performed on the vapor space in the tank in preparation for the hot work activity.

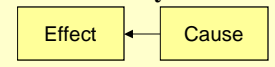
Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

### CAUSE MAPPING

Problem Solving • Incident Investigation • Root Cause Analysis



### Why?

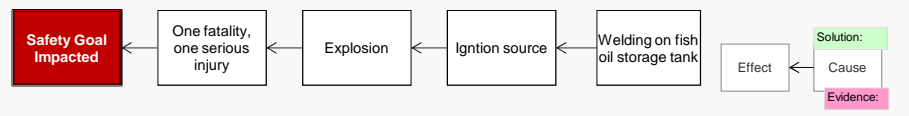


NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.

# 2 Analysis

Basic Level Cause Map - Start with simple Why questions.

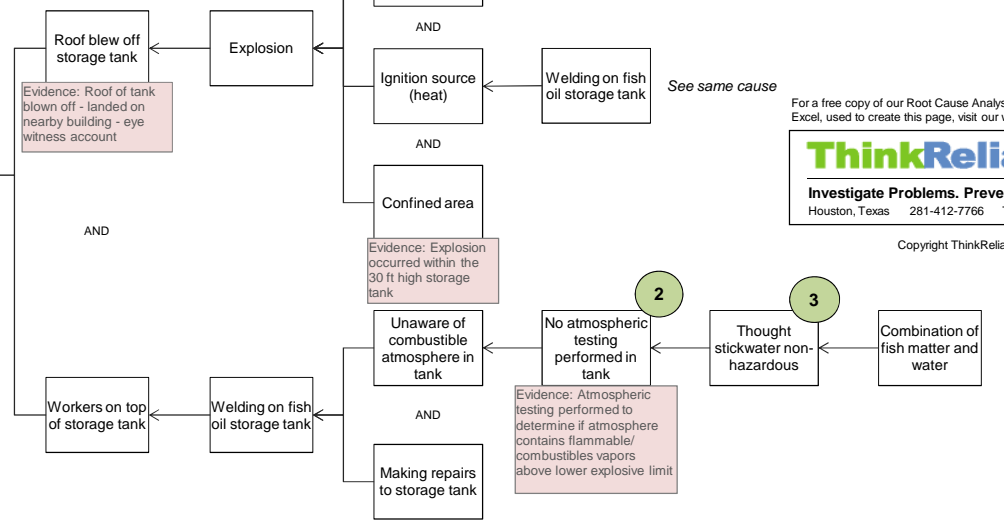
Basic Cause-and-Effect



More Detailed Cause Map - Add detail as information becomes available.

Safety Goal Impacted

One fatality, one serious injury



For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.



Copyright ThinkReliability 2014

# 3 Solutions

No.	Action Item	Cause
1	Require tank to be drained prior to hot work activity	Stickwater present in bottom of tank
2	Require atmospheric gas testing prior to hot work	No atmospheric testing performed in tank
3	Share lessons learned across industry of potential flammability of biological material off-gases	Thought stickwater non-hazardous