

# 1 Problem

What	Problem(s)	Employee deaths, wastewater leak
When	Date	July 2, 2016
	Time	See timeline
	Different, unusual, unique	Employees removed SCBAs
Where	Facility, site	Wichita Falls, Texas waste water treatment plant
	Unit, area, equipment	Primary #2 basement pump 223
	Task being performed	Repairing valve/ wastewater leak

Impact to the Goals	
<b>Safety</b>	2 employee fatalities
<b>Environmental</b>	High levels of hydrogen sulfide
<b>Property/ Equipment</b>	Valve repair
<b>Labor/ Time</b>	Emergency response
	External incident investigation

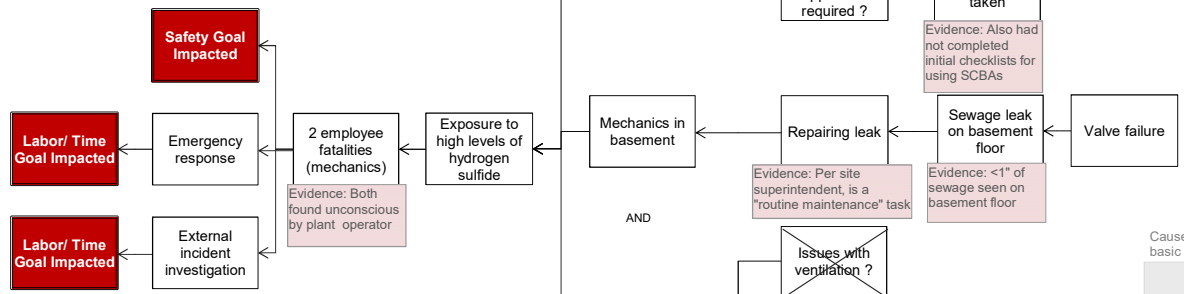
# 2 OVERCOME BY GAS IN SEWAGE PLANT Cause Map

## Both had removed breathing devices

Two workers were overwhelmed by hydrogen sulfide and later died of their injuries after attempting to fix a sewage leak at a waste water treatment plant in Wichita Falls, Texas on July 2, 2016. The employee fatalities resulted from exposure to high levels of hydrogen sulfide, which resulted from the leak of sewage with high levels of sulfur. The sewage was contained in the pipes (as it was a waste water treatment plant) and leaked from a failed valve.

# 2 Analysis

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



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

**Step 1 Problem**      What's the Problem?

**Step 2 Analysis**      Why did it happen?

**Step 3 Solutions**      What will be done?

Timeline	Date	Time	Description
	July 2, 2016	2:42 PM	Sensor alarm notifies operators that >1/2" liquid on floor of primary #2 basement
		~3:30 PM	Senior maintenance mechanic & assistant called to repair valve on primary pump 223 Mechanics don SCBA tanks Mechanics enter basement to make repairs
		4:00 PM	Mechanics notify operator that they are going to pick up new SCBA tanks
		5:00 PM	Operator performs rounds Operator finds both mechanics unconscious on stairs Operator contacts another employee to request emergency response
		5:01 PM	EMS & Fire engine 2 dispatched
		5:04 PM	Squad 2 dispatched
		5:06 PM	First responders on site Employees extracted & transported to hospital
		5:10 PM	HAZMAT EN5 dispatched
		5:25 PM	Police & risk management notified Relief maintenance crews called in to finish repairs Gas monitor registers 509 ppm hydrogen sulfide Repairs complete
		11:30 PM	Relief mechanics leave site Gas monitor registers 0 ppm hydrogen sulfide Mechanic assistant dies from his injuries Senior mechanic dies from his injuries

**Environmental Goal Impacted**

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

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**Property/ Equipment Goal Impacted**

Valve designed to trap debris

AND

Time since valve cleaned

Evidence: Valve normally requires bi-weekly cleaning; had been cleaned the day prior

July 10, 2016  
July 22, 2016