DEEPWATER HORIZON OIL SPILL

Cause Map

Oil spill lasts for months as solution after solution fails

"Given the risk factors attending the bottomhole cement, individuals on the rig should have been particularly attentive to anomalous pressure readings. Instead, it appears they begin with the assumption that the cement job had been successful and kept running tests and proposing explanations until they convinced themselves that their assumption was correct."

- Chief Counsel's Report of the Presidential Oil Spill Commission

"Efforts to develop multiple source control options simultaneously were herculean. The hundreds of individuals who spent the spring and summer of 2010 working to stop the spill, under enormous pressure and conditions of great uncertainty, have much in which to take pride."

- Presidential Oil Spill Commission

1 Problem

What	Problem(s)	Well blowout, explosion on rig, fatalities
When	Date	April 20, 2010
	Time	9:49 PM (explosions)
	Different, unusual, unique	Confusing pressure test results
Where	Facility, site	Macondo Prospect, Gulf of Mexico
	Unit, area, equipment	*Deepwater Horizon* rig
	Task being performed	Final phase of drilling exploratory well

Impact to the Goals

Safety	11 fatalities, 17 injuries
Environmental	~4.9 M barrels (206M gallons) oil spilled
Customer Service	Negative publicity, loss of share value
Regulatory	All new drilling stopped in Gulf of Mexico
Production/ Schedule	Production stopped
Property/ Equipment	Complete loss of oil rig
Labor/ Time	Cleanup, response

Frequency	First time of this magnitude in this area

Photo by US Coast Guard

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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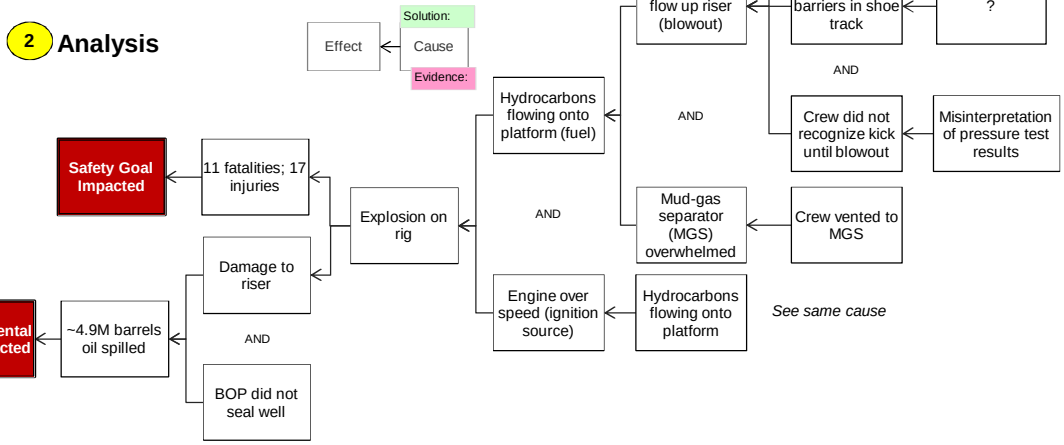
2 Analysis



3 Solutions

The Cause Map is used to identify all the possible solutions for given issue so that the best solutions can be selected. The possible solutions can also provide backup plans in case the initial solutions selected didn't work, as happened in this case.

Plan A: The first plan (action item) was to attempt to use functionality within the blowout preventer (BOP) which had failed to seal the well. It didn't work. Attempts to intervene with the BOP ended May 5th.

Plan B: Plan B involved the installation of a cofferdam, a dome that would be placed over the leak and divert the oil to a surface ship. The cofferdam reached the bottom of the Gulf May 7th, but couldn't be forced down

Plan C: The next plan was to use a Riser Insertion Tube Tool (RITT) that would siphon some of the flow from the end of the riser and redirect it to a surface ship for collection. The RITT did divert some of the flow., but not all.

Plan D: The next plan aimed to end the flow from Macondo well by ramming heavy mud and cement directly into the well itself. The operation was stopped when it became clear the mud was no match for the flow from the well.

Plan E: The next plan attempted to capture ALL the flow with a 3-ram capping stack, and divert it to two surface ships. The cap was finally placed on July 12th and the flow was choked on July 15th. Now the flow was captured, but the Macondo well was still releasing oil at a high rate.

Plan F: Plan F had been a long time in coming. The relief wells were dug in starting on May 2nd with the plans of intercepting and pumping mud, then cement, down into the Macondo reservoir, a permanent fix to the spill (known as a "static kill"). The static kill was completed on August 4th. That still wasn't the end. The last cement was placed on September 18th and it was announced that the well was 'effectively dead'.