

1 Problem

Where

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

Photo by US Coast Guard

Cause Map™ Diagram

"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."

"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."

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2 Analysis

Cause Mapping*

Why? Possible Solution: Evidence:

Effect Cause Building Block

Safety Goal Impacted

11 fatalities; 17 injuries

Damage to riser

Explosion on rig

Hydrocarbons flowing onto platform (fuel)

Uncontrolled flow up riser (blowout)

Failure of barriers in shoe track

AND

Crew did not recognize kick until blowout

Misinterpretation of pressure test results

AND

Mud-gas separator (MGS) overwhelmed

Crew vented to MGS

See same cause

Hydrocarbons flowing onto platform

Engine over speed (ignition source)

AND

~4.9M barrels oil spilled

BOP did not seal well

Environmental Goal Impacted

3 Solutions

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 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'.