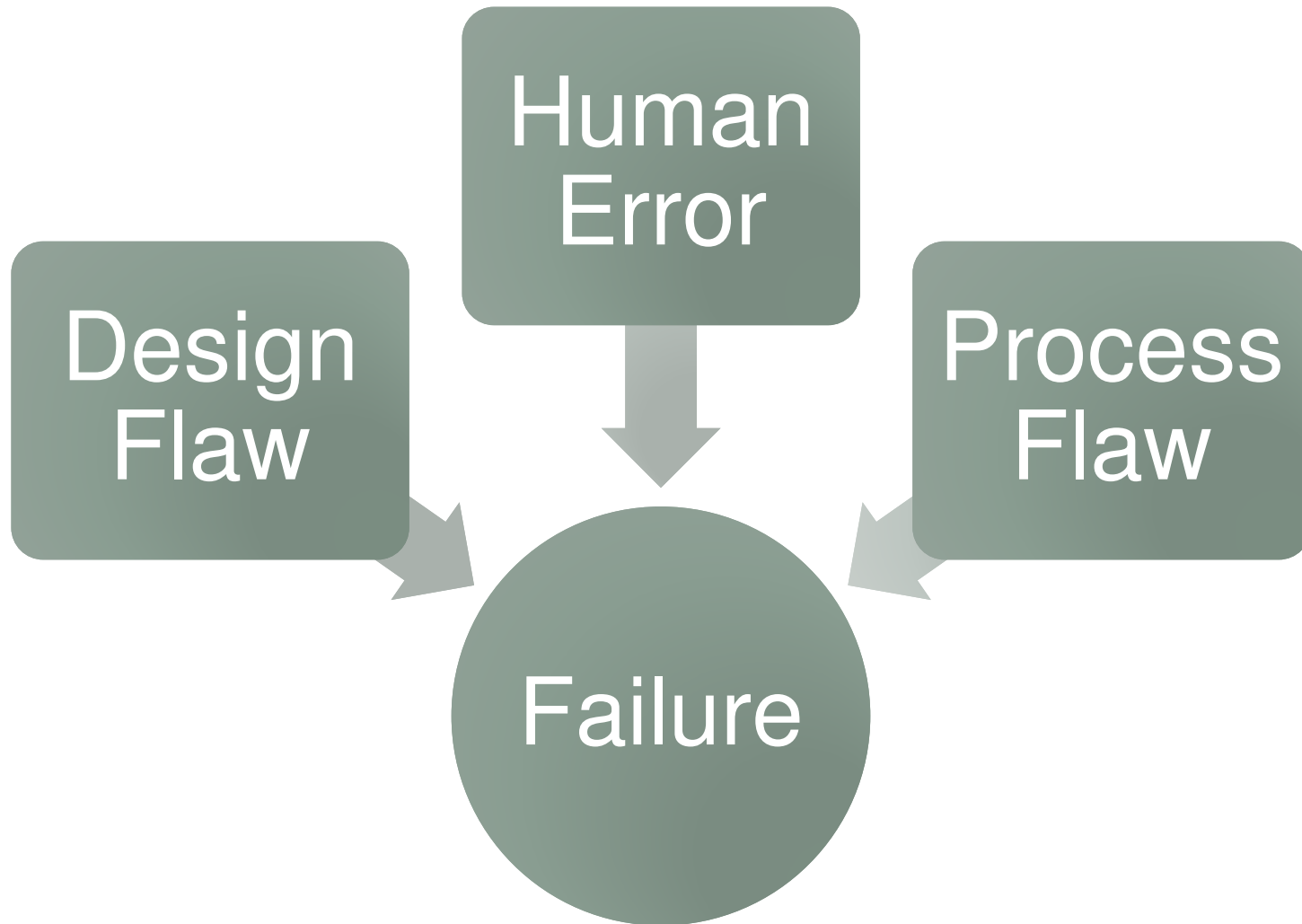


TECHNOLOGICAL AND REGULATORY CHALLENGES IN DEEP WATER DRILLING

Dr. Gene Beck
Texas A&M
College Station

What Causes a Failure?



What Went Wrong on the Deepwater Horizon/Macondo Incident?

- Float Equipment Failed (**Design Flaw, Process Flaw, Human Error**)
 - Float Valves in the shoe track did not prevent flow up the casing
 - 'Barrier' compromised
- A Barrier was removed without having another tested Barrier in place (**Process Flaw**)
 - Drilling Mud displaced with Seawater
 - Placed BOP's as only Barrier remaining in well
- BOP's Failed (**Design Flaw, Process Flaw, Human Error**)
 - All Barriers either removed or Compromised resulting in a blowout

What Went Wrong on the Deepwater Horizon/Macondo Incident?

- Influx recognition (kick detection) failed (Human Error, Process Flaw, Design Flaw)
 - Integral to failure of the BOPs
- Design Flaws, Process Flaws, Human Error all contributed to the Incident each step of the way
- Multiple Successive Failures = Disaster

What are the Technical Challenges?

- Are Subsea Blowout Preventers suitable for drilling in frontier deep water environments?
 - We need to be able to test blowout prevention equipment and systems at the temperatures and pressures under which these systems will be operating.
 - This will require a major facility and joint cooperation of Industry & Government – much like a National Lab.
- **A Blowout Preventer is a Component of an effective Well Control Plan. We need to focus on the Well Control Plan as a whole, not just on select Components.**

What Are the Regulatory Challenges?

- How can a Regulatory Agency help prevent failures/incidents/disasters?
 - Design Flaws– Testing Policies and Processes
 - Process Flaws – Operational Policies, Practices, Guidelines
 - Human Error – Training Requirements and Certifications
- Maintaining an experienced staff with the same skill sets as Industry personnel is critical to effective regulation. This is going to be the greatest challenge in providing effective regulation.

Can Deep Water Exploratory Wells be Safely Drilled with Current Technology?

- Absolutely. There are longstanding Practices used by the Industry that are successful at preventing Blowouts.
 - The Processes used on the Macondo well did not follow these practices, and there were ample warning signs long before the blowout occurred that should have led to corrective action.
- BUT...the reliabilities of equipment, process, and people can be greatly improved through a well thought out Regulatory system.