



Defence in Depth Module

Defence in Depth

Sample Only - Not For Training

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Safety Talks

Defence in Depth Module

Defence in Depth Support Material

Script

Located 77 kilometres off the coast of Louisiana the huge floating drilling rig called the Deepwater Horizon had just completed drilling an ultra-deep well.

The bottom of the well was five and a half kilometres below sea level.

On the 20th of April 2010, the Macondo blowout in the Gulf of Mexico became the biggest oil spill in US history. Five million barrels of oil is the rough estimate, about twenty times the size of the Exxon Valdez oil spill in Alaska in 1989. Apart from being an environmental catastrophe, the Macondo was also a human disaster with 11 people killed.

The real causes of the accident are the human and organisational factors which we find at work in many other big accidents.

The best way to look at these causes is to start with the Swiss cheese model that we've all seen before. BP itself used this kind of analysis to explain the accident. It's a very useful way of looking at accidents. In this program we will identify a few of the barriers that failed, but more importantly we will look at the human and organisational causes of these barrier failures.

The first failure was the cement job. The bottom of the well was supposed to be cemented in, to prevent oil and gas getting into the well, but the cement job was not effective. The crew carried out a procedure designed to test the integrity of the cement. The results of the test showed very clearly that the well was not properly sealed, that the cement job had failed, but the results were misinterpreted and the test was declared a success. Finally, the drillers were supposed to be monitoring the well to the very end of the process, but they failed to do so.

The idea of defence in depth is that we need more than one safety barrier or defence, because each defence is fallible. Since we cannot rely on any one defence, we must do our best to make sure that all the defences are functioning as well as possible. If we decide that a particular test we are doing is basically redundant because we believe that the first defence is effective, then we are not operating in accordance with the philosophy of defence in depth. In the minds of these drillers, one defence was good enough. In other words, they had no commitment to the philosophy of defence in depth. We need to train people to understand that they

must put energy into making sure every defence has as much integrity as possible, because we never know when other defences will fail.

Suggested Discussion Questions and Answers

1. What would be in a program to review defence in depth?
 - Identify major hazard events
 - Identify defences for each major hazard
 - Identify ownership
 - Develop review program
 - Include on audit program
2. How do we educate our personnel about defence in depth?
 - Informal discussion
 - Formal training courses structured for front line employees, supervisors, management and executives
 - Part of induction and refresher training program
3. What should a 'Defence in Depth' training course cover?
 - Case study such as Macondo
 - Analysis of a Major Hazard and its controls
 - Identification of operational ownership/accountability
 - Identification of design ownership/accountability
 - Independence of each barrier