Organizational Factors Inhibiting the Design of Effective Emergency Management Information Systems (EMIS)

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Abstract
The BP disaster in the Gulf of Mexico has led to a large number of articles in various news sources attempting to report on the reasons for and consequences of this disaster. We use this literature as a basis for exposing the possible systemic problems in BP that would explain this catastrophe and we offer some conclusions as to what designers should strive to do whenever possible to counter these difficulties. There are a large number of well known problems of organizational structure, behavior, and communications. It is entirely possible that these problems have become more pervasive and common in organizations than we would expect. The enormity of these issues may also contribute to the difficulty of designing and implementing effective Emergency Management Information Systems (EMIS) capable of dealing with all the tasks that such a system must be able to address.

1. Introduction

The situation we explore, the BP disaster in the Gulf of Mexico, can be viewed as the opposite organizational process to “organizational learning,” or some sort of “unlearning process” or a creeping “organizational Alzheimer’s Process.” This process is not limited to BP but quite common in many large scale disaster situations that cross man-made boundaries of any type (e.g. organizational, geographical, social, and political).

The paper examines some of the well known problems of organizational decision making and their associated biases. It focuses upon the recent BP Deepwater Horizon oil rig disaster as an example of an organization which has shown evidence of suffering from a large number of such difficulties. Although there are many other examples of prior occurrences of these problems, organizations, corporate or government, are generally reluctant to allow case studies of their mistakes and errors which make studying them difficult. However, the BP disaster seems to be one where almost every possible difficulty, because of considerable efforts by the press, has been publicly highlighted since this tragic occurrence.

This paper is largely based upon a collection of articles in the New York Times, or their related blogs, about the BP disaster in the Gulf. We will present an organizational problem statement, and related statements, followed by a description of a situation where the problem appeared to have been demonstrated in the BP Gulf disaster. We will present the circumstances, results with a short abstract of the contents in the news articles, which may be part quote, and part summary from a news article referenced at the end of that paragraph. We will then seek to offer some additional insights related to emergency preparedness and management.

One primary insight that we believe should be of concern for all those in Emergency Management is the fallacy of blaming this disaster, or any disaster, strictly on “human error” and thereby limiting organizational responsibility and liability for this disaster and future disasters of this type. Human error all too often refers to the poor performance of humans dealing with complex control systems such as airplanes or industrial process control systems. All too often this is used to blame humans when, in fact, the reason that humans make these errors is the poor interface design of the controls they are supposed to use. The poor design is often a result of the designer(s)’ ignorance of how to minimize human error and the cost cutting that is pushed by the organizational policies.

In the BP case, we have the unique distinction that human error has been used to explain decisions that increased the risks before the disaster started to actually occur. Yet, things like the removal of the “mud,” the design choice of only one preventer unit, the lack of carrying out required safety tests, etc. were the results of clear organizational policies to cut or minimize costs and reflect high level policies fostered from the highest level of management. Rather than human error, these errors are the result of management policies to decrease costs in a way that increased the risk of failures. To label it as “human error” is to redefine the term.
The use of the “human error” excuse is bad enough when it comes to poor design of human interfaces causing risks; however, the introduction of this new concept of human error caused by cost saving pressures by top management would be breaking new ground and would severely limit the organization’s responsibilities and liabilities for future disasters of this type. This should be of some concern to those having responsibility for emergency preparedness and management or business continuity as well as those concerned with regulatory policies.

This is no longer human error by the employees in the organization but human error in the organization policies determined by the top executives in the company. This should not in any way shape or form reduce the responsibility and/or liability of the organization with respect to possible negligence.

2. Difficulties and Supporting Evidence

As we review the BP disaster, one important point that must stay in our minds is that this is a rare example of a large scale national disaster where neither the U.S. federal government, nor any state or local government, had the ability to take over the handling of the disaster as part of a declared national disaster. In this particular case, it was only BP or one of the other major oil companies that had the resources to carry out a solution. This led to an important alliance (U.S. government and BP) in the final stages of the effort that is not usual for a major emergency and ultimately presents a host of new planning requirements for future situations of this type. A situation with similar issues could reoccur for any other large scale pollution situation, a pandemic, or for the results of a major terrorist attack. To some extent, the procedures to handle such situations are not clear in the current policies and laws governing national emergencies.

In any case, we start with our observations of the likely long term organizational processes which may have been the cause of this particular example.

1. The top executives in a company do not understand the technologies that the company is dependent upon.
2. The top executives do not listen to the views of the professionals in the organizations who do understand the technologies involved.
3. The top executives claim they do not influence the decisions of the professionals.

“I am deeply sorry,” he said, “Devastated, I am not a cement engineer, I’m afraid,” he said, “I was not part of that decision-making process,” Tony Hayward, CEO of BP said (NY Times, June 18th, 2010, A14) to a US Congressional Committee.

This sounds a lot like Enron testimony in earlier years by other executives. In the U.S., this led to the Sarbanes-Oxley Act to prevent the CEO from claiming ignorance of reckless or criminal decisions made by the company. In this case, there is the inference that the other decisions and policies of the CEO do not influence the decisions of its professionals. For example, if top management does not influence decisions, a major emphasis on cost cutting would not influence managers at all levels to inhibit or discourage more expensive but more reliable choices in technological decisions. Clearly, that is not realistic. Even worse is the likely result of a top management emphasis on cost-cutting that managers would be encouraged to make spending choices that were, on the basis of professional advice, less likely to be as safe as the more expensive ones. Apparently, they or their public relations staffs have no real scientific or professional understanding of the problems they are dealing with:

“The Gulf of Mexico is a very big ocean,” Mr. Hayward told the Guardian amid debate over the extent of the spill. “The amount of volume of oil and dispersant we are putting into it is tiny in relation to the total water volume [8].

Clearly the CEO has not encountered professionals who understand food chains in the ocean, which can be very sensitive to any impact on a given layer of the ocean, including the use of dispersants to sink the oil and dispersant’s strong chemicals and the oil to the bottom. The long term impact of that action and the use of one of the apparently most damaging dispersant choices for bio organisms may be a lot worse in long term outcomes than has been made clear and this has not been adequately investigated.

Richard Lynch, BP vice president, stated in his initial reaction to the disaster: “It was unthinkable, that is not to say it could not happen. But the probability and possibility of it happening is something I blatantly discounted” [7]. As we shall see, there was considerable evidence that this sort of accident can occur, and actually did, a significant number of times in the past. This was something that at least one of the contractors (Transocean) had investigated, but had not brought it to the attention of any of this highest level of BP executives. Neither did they apparently share it with any of the professionals in the other companies involved.

Workers at this particular well called it “the well from hell,” and a BP executive, refusing to verify this, admitted that this well “had a number of problems” [3].
As we will point out later, in the week before the explosion two major decisions were made that reduced the overall safety of the oil rig in favor of lowering costs. At least seven other decisions made prior to this were in the interest of saving time and money (i.e. tens of millions of dollars a day) but which significantly raised the risk [23].

It was clear that the principle component of the nature of a High Reliability Organization (HRO) was largely ignored. In an HRO, every employee is required to expose errors and things that might expose potential mistakes: Instead of taking every opportunity to understand and reduce risk, just the opposite was taking place, apparently as a result of managerial actions that discouraged workers from speaking out.

“The rig survivors also said it was always understood that you could get fired if you raised safety concerns that might delay drilling. Some co-workers had been fired for speaking out; they said [2].”

4. The principal advisors to CEO’s are made up of lawyers, public relations specialists (spin doctors), and finance specialists (usually cost cutting advocates).

5. No one person, or organization, was in charge of the decision process that led to the disaster.

6. Passing the buck; passing the risk; passing the blame; subcontracting responsibilities.

Once upon a time in any company dependent on a technology that was at the forefront of a given area and undergoing rapid change and advancement, we used to expect that at least one or more of the top level executives had a professional command of that technological area. This was apparently not the case for BP. Given the long term recession we have been going through, this is probably also true of a larger number of companies than we would normally suspect.

The first estimate by BP was 1,000 barrels being lost per day, and this ultimately grew to 60,000 only after a number of independent experts questioned BP’s estimates and the government demanded that the underwater videos of the leak be made public so that independent estimates could be made. BP avoided early on accepting any responsibility and used excuses wherever they could [8].

In the congressional hearings, all three companies involved with the disaster (BP, Transocean, and Halliburton) by contractual relationships accused the others of being responsible for this disaster. In addition, BP only owns 65 percent of the well. Mitsui Oil Exploration Company of Japan and Anadarko Petroleum Corporation owns the remainder. BP expects them to shoulder their share of the cost of the disaster. However, Anadarko has already suggested BP engaged in “gross negligence” and “willful misconduct.” Mitsui has suggested it is too early too early to draw a conclusion. One suspects the two partners will attempt to forgo any liability for the accident [16].

Shell oil held a public seminar/conference in which it compared its design of deep wells with that of BP and pointed out that Shell designs have many more redundant fail-safe points and blowout prevention systems compared to the BP design. This was to support the defense of the oil industry’s assertion that more deep-drilling is okay even as the BP investigation unfolded [14].

Under the 1990 Oil Pollution act the fine for BP could be between 5 billion and 15 billion if we assume 60,000 gallons a day [18] with the higher value if BP is found negligent. However, this is not as severe as its loss of $80 billion in its stock value. Twenty years after the Exxon Valdez accident, the court cases and payments are only now reaching a conclusion. How to handle penalties and incentives is still a very open issue in situations where companies have the potential for creating very damaging pollution situations.

Several days before the explosion, BP officials chose, partially for financial reasons, to use a type of casing for the well that the company knew was the riskier of two options, according to a BP document. If the cement around the casing did not seal properly, gases could leak all the way to the wellhead, where only a single seal would serve as a barrier. The alternative would have provided two barriers at the wellhead. Hours before the explosion, gases were leaking through the cement, which had been put in place by Halliburton [22]. Urbina, in his article [22] provides much more detail on what probably transpired shortly before the explosion on the rig.

Of the 126 people present on the day of the explosion, only eight were employees of BP (reported by Ian Urbina in the New York Times). The orders to remove the heavy “mud” from the well and replace it with sea water and the order to use a cheaper cementing process was made by a person from BP trying to save money for the company. These were two decisions in the week before the explosion that reduced the overall safety of the well and represented a clear conflict with the choices of those operating the well. In addition, a key safety test of the cementing failed and should have been recognized as an indication of something being wrong with the well.

7. The organizational monkeys: see no problems; speak no problems; and hear no problems.

8. Ignoring evidence when it exists and when it contradicts chosen views.
This organizational version of the three monkeys has each monkey placing their hands over the eyes, ears, and mouth of the other monkeys. This tends to occur at any given level due to various legal restraints to prevent the exposure of problems. The executives at the top cap their ears against information they don’t want to hear. In between is middle management who refuses to speak of problems to the top management. Finally, the professionals at the bottom know better than to look for problems lest the messenger of bad tidings is punished. Occasionally one can find these versions of the three monkeys.

The study concluded that blowout preventers of the type used by deepwater rigs (using one blind shear ram that crimps the well pipe in an emergency) had a failure rate of 45 percent [15]. Furthermore, a risk analysis in 2000 identified a shuttle valve in the preventer as the source of more than half of the total “failure likelihood” [13].

Tony Hayward called this kind of event a “one in a million chance.” There was another major blowout in the gulf 31 years ago by the Mexican rig Ixtoc 1. So was this really a one-in-a-million risk? You would like to think that the leaders of major corporations had some better understanding of the risks involved in their major operations.

Clearly, these elementary and intuitive simple probability calculations were not brought to any level of management that was willing to admit it. Professionals concerned with this area did not appear to have this information. What this tells us was that there was no careful threat analysis of data available to the industry since 2006. It also shows that when serious studies are done they are not open to all those concerned and might reside only with a contractor. However, the fact that the contractor in this case had ownership and operational control of this rig clearly increased the risks for this operation.

There is no way of knowing if Transocean’s study results went to any level of professionals or managers in BP. However, in the arguments reported at the rig when they decided to remove the mud in the well and replace it with ocean water, the reported remark of the professional on the rig to the BP manager insisting on this action to save money was that this left the preventer as the only thing to stop a disaster should escaping gas cause an explosion. If that professional had had the results of the above report, he might have had a better chance of defeating the decision to save money. Apparently, this “mud” is very expensive, heavier than water, and was needed to begin operation of a new well waiting for it. The current well was already late in completing its closing operations. This was leading to added costs above original estimates of this well and the new well that could not yet begin operations.

Because of the studies mentioned above, a number of oil companies and some European countries now require at least two units, rather than one unit of the blind shear ram, to be part of a blowout preventer. Even the U.S. federal regulatory body had some internal memos about this problem but had not turned them into any meaningful regulation and numerous reports pointed out the especially lenient treatment that the U.S. agency gave BP and other oil companies drilling the Gulf.
There is much evidence that decisions made before the Blowout over the long term by all the companies involved led to a riskier situation. One excellent example [6] is what occurred right after the cement job the day before the blowout. BP’s engineers had run a computer model suggesting that a good cement job was unlikely. The company had a crew from Schlumberger on hand to conduct “cement bond log” test which would have more fully evaluated the quality of the cement barrier. But BP officials decided not to proceed with the test and the Schlumberger workers left the Deepwater Horizon the morning of the disaster.

In one article [9] it was claimed there was documentation of 11 separate decisions that BP made ahead of the disaster that may have increased risks on the rig. At least 9 of the decisions were to save time and the majority of the decisions were made, not by the people on the rig, but by BP personnel on shore.

9. Ignoring the organizational history and its contradiction with public pronouncements.

On July 11, 2005, the BP oil rig, Thunder Horse started to list precariously to one side. Had it sunk it would have been as bad a leak as Deepwater Horizon. This incident was due to a valve that was installed backwards, but many other signs of problems were found in the follow up evaluation. They included a welding job so shoddy that it left underwater pipelines brittle and full of cracks. It was a warning that BP was taking too many risks and cutting corners in pursuit of growth and profits. BP has been chronically unable to or unwilling to learn from its mistakes. The Texas City refinery deadly explosion in 2005 was another indicator of problems. The company has grown very fast, with an emphasis on outside contractors, to undertake a wave of cost cutting and consolidation. It eliminated thousands of jobs in its takeovers. Tony Hayward once said that we do “the tough stuff that others cannot or choose not to do” [10]. Perhaps it was the risks they were willing to take that others were not willing to entertain.

The Texas City plant explosion was caused by poor communication among the several workers who had been on 12 hour shifts for more than a month straight. No one noticed that a 170 foot tower was being overfilled with liquid hydrocarbons. The US Chemical Safety Board called it a good example of the “Swiss cheese problem” of small errors or holes in safety barriers lining up to allow a really big problem to occur.

A year later, 267,000 gallons of oil leaked from BP’s network of pipelines in Prudhoe Bay, Alaska. This was the worse spill ever on the North Slope. It was the result of poor maintenance and inspection of several miles of pipe containing widespread corrosion.

When Mr. Hayward took over in May 2007 he declared, BP would make safety its “No 1 priority.” However, in 2009, 700 safety violations were found in the Texas refinery by OSHA inspectors and in 2010, 62 violations were found in BP’s Ohio refinery. BP was fined over $90 million in these cases. It is this paper’s author’s feeling that this is the result of cost-benefit oriented finance people having decided it is cheaper to pay the fines than to invest money in capital repairs or other changes to bring down the error rate.

Congressman Waxman, whose committee investigated the Deep water horizon accident, said to Tony Hayward: “There is a complete contradiction between BP’s words and deeds. You were brought into make safety the top priority of BP. But under your leadership, BP has taken the most extreme risks” [10]. BP insists it has balanced risk, safety, efficiency, and profit. Some sort of solution to the multi-criteria problem that still confounds those seeking an optimum one!

The NY Times article by Lyall [10] in the references gives almost six pages of history on BP with examples of the organization’s ignoring mistakes and taking unjustifiable risks to keep costs down.

10. The creation of plans for emergencies without including in the planning those who have to execute the plan, will rarely succeed.

11. Plans that do not get reviewed thoroughly are unlikely to be realistic.

About three miles off the coast of Alaska, BP is moving ahead with the “Liberty project” to drill two miles down under the sea and then six to eight miles horizontally to reach what is a very large oil reservoir under federal waters. This project has been granted status as an “onshore” project even thought is about three miles off the coast in the Beaufort Sea. It sits on an artificial island that is a 31 acre pile of gravel in about 22 feet of water that was built by BP. Federal regulators in 2007 allowed BP to write its own environmental review for the project as well as its own consultation documents relating to the Endangered Species Act. One federal scientist characterized the whole process as bizarre [21].

We have a situation where a company that up to now clearly chose to exercise high risk policies with respect to deep well safety, is able to ignore the regulations for offshore wells by creating an artificial island. Neither the company nor the federal regulators that allowed this can be considered to be working for increased safety and reliability in this area. There are at least some experts that have spoken out that the sort of gas “kicks” that triggered the recent disaster can be
more frequent and more difficult to detect when they occur in long sections of horizontal drilling than what has been assumed based upon vertical drilling data.

To be fair, the use of an artificial island can prevent surging ice floes from destroying a conventional floating or metal legged offshore drilling platforms. However, that is no excuse for ignoring the other regulatory requirements for off shore wells. One has to wonder, given the current performance by BP, if this is another potential disaster situation.

BP’s plan for the Deepwater Horizon rig in the Gulf called for the protection of walruses in the Gulf of Mexico, when clearly there are NO walruses in the warm waters of the Gulf. What this implies is that they, or a contractor, packaged a plan based upon Alaska wells and no one who was going to be responsible for carrying out the Deepwater Horizon plan ever carefully read it. It clearly did not consider the scale and impact of the actual disaster that occurred and how to react to it. In fact, the current plan for the “Liberty project” estimates that the worst case spill that they would have to handle is only 20,000 barrels a day. BP does acknowledge that the Liberty project will push boundaries of drilling technology even in comparison to the recent deep water disaster. It will be the largest land rig in the world with a drill’s top drive of 105,000 foot-pounds of torque compared to 40,000 foot-pounds of typical North Slope rigs [21].

Besides the above, there is ample evidence that the regulatory process for deep water wells needs significant improvement. In the Gulf, there are only 60 inspectors to oversee nearly 4,000 drilling facilities, while on the Pacific coast there are 10 inspectors to cover only 23 facilities, according to Ms Kendall, acting inspector general of the Interior Department [5].

12. We should not ignore what happened after the disaster started to occur.

The causes of the blowout is what received most of the attention. However, the safety features that were supposed to prevent the actual explosion and sinking of the well, on paper, seemed to be enough to have prevented what actually occurred. The understanding of what happened in the 9 minutes from the blowout to the explosion is a tale of unclear decision and action responsibilities in a situation that never received the training emphasis it should have for those involved [1]. Experts and investigators agreed that Deepwater Horizon should have weathered this blowout. The reasons for this not occurring appear to be a combination of the following:

- At critical points of time, members of the crew hesitated and did not take decisive steps.
- Many of the defense systems actually failed to work when they were deployed.
- There was a lack of training for a serious event such as what occurred.
- Some systems were poorly designed, such as one that had 20 different buttons that had to be manipulated to activate the system.
- While instructions were complete, the policies under which some of these systems were to be triggered were unclear and ambiguous in nature. The key was “How do you know it’s bad enough to act fast?”
- A nasty “Kick” (gas escaping and exploding in the well) in March of 2010 left millions of dollars of drilling tools jammed in the well.
- The plans for completing the well kept changing in ways that saved time but increased risks.
- The so called “negative pressure test” (withdrawing the Mud) has no industry standards or government rules, and the instructions from BP were only 24 words long.
- A choice was made to try diverting the blowout to a separation device rather than to the sea; an alternative that was rarely rehearsed.
- The automated switch to allow a general alarm to be issued throughout the rig based upon numerous sensor inputs, had been turned off, and the alarm could only be triggered manually. The person manning that station was hesitant to trigger the alarm even after 20 sensors were warning of gas in the rig.
- The same hesitation problem occurred with the final shut off switch to sever the rig from the preventer at the well head. As a result when it was thrown it no longer was working.

The final component was that the 10 year old preventer had never received the “90 day maintenance inspection procedure” that the manufacturer recommends for every 3 to 5 year interval. One can only infer that Transocean never wanted to shut down the operation for 90 days. The crew itself is composed of people in a blue collar job (very well paid) but without a college educations or relevant engineering educations. There is no engineer aboard who can take decisive action, such as a pilot who can command an airplane not to take off, or a nuclear engineer in a power plant who has authority to shut down the plant if necessary. All the instructions have caveats about not using some of the failsafe controls or devices unless it is a “very bad” situation. Many of these choices would have added costs, delayed production, or the urgent closing of the well.

The Captain of the rig apparently has the final authority to abandon the rig and some of the other
above decisions; however, it is not clear what his background was but I would suspect a naval background of some sort rather than a petroleum engineering background. Individuals in the crew were not clear if they had the authority to take some of the actions. Diverting the blowout to the ocean, freeing the rig from the preventer, triggering the full rig alarm, or shutting down the well by triggering the preventer, were all actions that would have cost large sums of extra spending. All these decisions were to be made “only in exceptional circumstances.”

Nine minutes is not a long time for all these decision options to be discussed and cleared and when one reads the details form the news reports [1] it is clear that the people manning the crucial stations were hesitant about triggering what should have been triggered in the first few minutes. There are a number of other case studies in disaster management where unclear authority to be able to make irrevocable decisions was a critical factor.

3. Information Design Implications

One might think that the problems brought out here cannot be impacted by the design of information systems; but in fact, they can. What we see is a lack of true collaboration across all the organizations or in this case contractors involved in this process, including subcontractors who do such things as specialized tests, some of which were ignored in the process leading to the Deepwater well explosion. Certainly, there has to be a policy leading to creation of an effective information system for reducing the degree of risk and ensuring that such accidents don’t occur.

What we know about planning for emergencies and understanding the nature of the risks involved in a given situation are that all the professionals in all the organizations involved have to have open and free communications and exchanges of information on risks and plans to be able to be effective in a real emergency [20]. In this case, it seems to be that BP, Transocean, and Halliburton did not foster this open exchange so that the consequences of individual decisions made by one party were not always recognized by the other parties as being risk avoiding or risk taking in nature. One expects as the result of legal proceedings that will be triggered in this situation we will get further insights into what occurred in this regard. However, that will take many years to occur. It is crucial that the professionals across all the organizations involved in a single risk situation such as an oil well have mutual unrestricted access to one another and this is what could be an important outcome from this disaster if recognized and encouraged by the regulation process. These people must mutually develop the response plans, train for them, and be prepared to execute them as needed.

The essence of this recommendation is the need for the establishment of an internal network based “Community of Practice” that allows all the relevant professionals and all the contractors and subcontractors working on the project to freely communicate about problems they have observed or encountered in a free exchange of information that cannot be censored by management [19]. To promote effective free exchange of information and ideas, the following should be included in system design and procedures:

- The reporting of all potential risks and problems that have been occurring and any potential solutions or efforts that could eliminate them.
- The use of assured anonymity if any participant feels the need to protect themselves against management penalties.
- No censorship of anything relevant to the above objective by management.
- A representative of the various corporate executive groups would prepare every two weeks a summary report to circulate to the executive level consisting of direct quotes of anything which impacts or is of concern to their particular corporate role.
- There should even be the inclusion of the regulatory inspector for the site as a member or at least as an observer of this ongoing record of current risks and their investigation and solution.

This would be a free and open lateral network of communications among all the professionals involved and as subgroups they can develop discussion threads on any particular problem of concern. This has to be supported by the executive level of the corporations involved in terms of ensuring by policy that it is a free and open internal network of professionals. Certainly, such a group will be interested in seeing this effort lead to successful operations of the rigs involved, with every incentive to be honest and open. To promote this, there might be a reward system for successful improvements that clearly reduce risk for this collection of participating organizations in any major project.

If companies do not undertake to provide this type of solution to what has been uncovered in this recent BP incident, then this facility could be set up by the regulators or become part of the regulatory requirements for any major industrial undertaking that poses a possible threat to any geographical area extending beyond the immediate locality of the effort. Recognition of organizational ignorance of what are well understood management safety policies should be part of an audit approach by regulatory bodies.
4. Conclusions and Observations

BP is a company that has focused on acquiring other companies, reducing its workforce by contracting and outsourcing much of the actual work and technology. Once upon a time, it was thought that critical technology should remain an integral part of a company to give it a long term edge over potential competitors. BP has taken an opposite approach of relying on others to build or supply the equipment it needs. This resulted in what appears to be a distancing between the top management of BP and the experts on the technology who would otherwise introduce a greater concern for caution and more careful assessments of risks. The executive level is to some extent cut off from the professional expertise it needs and seems to concern itself more with issues of finance, contractual relationships, and public image. Its advisors would largely appear to be lawyers, finance experts, regulatory specialists, and public relations specialists. In an analogous sense BP is a major contractor at the executive level dependent upon other organizations and suppliers for its technology.

The information the executives obtain about risks and difficulties is filtered by both the process of “bad news not traveling well up the corporate ladder” and the interface of advisors who have very little first hand knowledge of critical technologies underlying the oil extraction process. There was no professional ever identified as in charge of what was happening on the failing rig that last week. There were differences among representatives of the different contractors and other subcontractors, along with the interactions with the BP representatives, who seemed to have had the upper hand in making decisions that were clearly not in the interests of safety but in the interest of saving money. Perhaps the following quotes from the Goodman article [8] provide a reasoned picture of what BP board deliberations might have been like:

1. The company had to contend with a classic corporate quandary of balancing advice from counselors with starkly different considerations, according to people familiar with BP’s deliberations who requested anonymity because the advice was confidential
2. In times of crisis, communications professionals and lawyers often pursue conflicting agendas. Communications strategists are inclined to mollify public anger with expressions of concern, while lawyers warn that contrition can be construed as admission of guilt in potentially expensive lawsuits.
3. We tend to anthropomorphize corporations,” says Mr. Hearit at Western Michigan. “There’s this myth of managerial rationality, the idea that corporations can learn. Well, they have no soul to kick. You can’t put a corporation in jail.”

4. Above all, crisis management is conducted with stress and sleeplessness layered atop the usual factionalism and politics afflicting any big organization. Mr. Dezenhall, the strategist, says, “The reality is absolute chaos. Nobody knows what the facts are. The lawyers are trying to get the P.R. consultants fired and the P.R. consultants are criticizing the lawyers. Everybody despises each other. It’s a totally unmanageable situation. A corporation in crisis is not a corporation. It is a collection of panicked individuals motivated by self-preservation.”

The above may be a bit extreme but not uncharacteristic of emergencies where there is a major conflict in how to handle the situation between different stakeholders. The stakeholders here had very different objectives and no true expertise in the type of emergency, but they have overriding control of the situation.

We do know that the moment the survivors of the explosion reached shore there were BP representatives waiting with legal documents for them to sign which forced them to commit to not speaking to anyone except the company people about their experiences. This also extended even to the economic victims of the disaster who were hired by BP to help in the cleanup [2].

It should be clear that neither BP nor the government (through the Minerals Management Service) were prepared for the BP spill. The MMS said that if they had had to take over the response they would have had to hire another oil company [4] to handle the situation. Despite multibillion-dollar profits over the past several years, none of the oil companies have devoted much money to planning to control or clean up after a significant spill. Furthermore, we only need to look at a place like Nigeria to see what happens when there is no strong regulation and oil companies are allowed to drill and take out oil without any enforcement of any code to protect the environment and the lives of people against unrestricted exploitation of oil sources [12]. Profit and cost cutting become the only objectives of the local practices with no concern for impact on the environment and the people who live in it. There are many professionals who are expressing concerns about the impact of the BP spill on the environment and the food chain in the Gulf as well as long term health risks for those that eat seafood from that area [11].

The major concern we need to have is that this is not an isolated situation with respect to the behavior of major organizations. Many of the problems discussed
here may in fact be commonplace. The area of business continuity needs to be taken more seriously by the private sector. The evaluation of risks has to be a process at the highest decision levels in organizations/

Unfortunately, it would seem the recent nuclear disaster in Japan has many of the same properties. The regulating body does not seem to have been effective. All the initial claims at the start were more positive then they should have been and only now are facts emerging [17] that the initial radiation leaks were twice as much as first stated. The company had a proven history of falsifying reports, ignoring warnings about the problem of losing power. Regulators were extending the life of the reactors beyond what should have been the case.

Some companies have learned from this recent disaster that "just in time delivery" of supplies can be extremely risky which clearly illustrates the paradox between cost savings and risk avoidance. More companies have to recognize the inherent conflict between risk avoidance and maximum efficiency (lowering costs).

In the above recent emergencies, the combination of risks that are erroneously thought to be vanishingly small, complex technology that isn’t fully grasped by either top management or regulators, and tricky relationships among companies that are not sure how much they can count on their partners, present a toxic recipe for catastrophe. Both top management in these companies and the management of the regulatory bodies involved were either incompetent or dishonest with respect to the planning, foresight, and risk avoidance methodologies that they should have mastered and utilized.


The presidential panel report on this disaster appeared after the first draft of this paper. Largely it is consistent with this paper. However, it is written in the style of a text book with little emotional content. It does not contain any intensity of emotion present in the actual congressional hearings, interviews, and viewpoints found in the various news stories and it lacks the specificity of some of the viewpoints expressed in this paper. The results of the study are expressed in the four paragraphs quoted below with our comments. (Note that the commission refers to the well site as “Macondo” rather than using the name of the rig, “Deep Water.”)

“The well blew out because a number of separate risk factors, oversights, and outright mistakes combined to overwhelm the safeguards meant to prevent just such an event from happening. But most of the mistakes and oversights at Macondo can be traced back to a single overarching failure—a failure of management. Better management by BP, Halliburton, and Transocean would almost certainly have prevented the blowout by improving the ability of individuals involved to identify the risks they faced, and to properly evaluate, communicate, and address them. A blowout in deepwater was not a statistical inevitability.” (Page 90)

Certainly true but the word “management” is much too broad since the aspects of management are very numerous and it might have been better to point out that a far greater emphasis was placed on the reduction of costs than on the reduction of risks. This was the key management flaw in the view of this author. The next important aspect was the seeming lack of technological knowledge among top management.

“As this narrative suggests, the Macondo blowout was the product of several individual missteps and oversights by BP, Halliburton, and Transocean, which government regulators lacked the authority, the necessary resources, and the technical expertise to prevent. What we nonetheless do know is considerable and significant: (1) each of the mistakes made on the rig and onshore by industry and government increased the risk of the well blowout; (2) the cumulative risk that resulted from these decisions and actions was both unreasonably large and avoidable; and (3) the risk of a catastrophic blowout was ultimately realized on April 20 and several of the mistakes were contributing causes of the blowout. (Page 115)

What the commission did not realize here or did not feel was part of its charter was the emphasis made by management on the reduction of costs as a primary guide to every decision even when it increased risk. This was clearly expressed in the decision choose “saving time” but of course they were talking about a cost of millions of dollars for every day that was delayed in closing the well.

“In the future, the instrumentation and displays used for well monitoring must be improved. There is one apparent reason why more sophisticated, automated alarms and algorithms cannot be built into the display system to alert the driller and mudlogger when anomalies arise. These individuals sit for 12 hours at a time in front of these displays. In light of the potential consequences, it is no longer acceptable to rely on a system that requires the right person to be
looking at the right data at the right time, and then to understand its significance in spite of
simultaneous activities and other monitoring responsibilities.” (Page 121)

One has to wonder if the lack of use of available knowledge about human errors and behavior under
stress in designing real time control systems is deliberate so that a failure can be blamed on human
error in order to avoid organizational responsibility. Note that the only automatic fail safe for setting off an
alarm over the whole rig was turned off to require a human action to trigger, even when the original
engineering design called for this automated fail safe. The justification was, once again, to save money by
eliminating any possible “false alarms” causing a shut down of the whole operation and delays to bring the
system back up.

“BP, Transocean, and Halliburton failed to communicate adequately. Information appears to
have been excessively compartmentalized at Macondo because of poor communication. BP did
not share important information with its contractors, or sometimes internally even with
members of its own team. Contractors did not share important information with BP or with each
other. As a result, individuals often found themselves making critical decisions without a full
appreciation for the context in which they were being made (or even without recognition that the
decisions were critical).” (Page 123)

This is a clear violation of everything we know about the design of “High Reliability Organizations” and the
need to have open information among all the professionals involved, no matter what organization
they belong to [24]. One must also remember that the professionals on the rig for the most part did not have a
college education and there is no evidence of the presence of a person with related engineering training or
experience who had final authority on the rig.

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