

Deepwater horizon oil  
spill engineering  
professionalism  
management essay



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The decisions made by BP leading up to the disaster as well as actions taken by BP in the aftermath of the disaster will be evaluated based on the various ethical theories and techniques learnt in the EG2401 module. Cross referencing will also be made using case studies such as the Exxon Valdez oil spill and the Piper Alpha explosion in order to make an accurate judgement of the ethics involved, in the circumstances faced by BP in the Deepwater Horizon oil spill.

## **Deepwater Horizon Oil Spill: A General Background**

The Deepwater Horizon oil spill is a massive oil spill in the Gulf of Mexico that is the largest offshore spill in U. S. history. The spill stemmed from a sea-floor oil gusher that resulted from the April 20, 2010 Deepwater Horizon drilling rig explosion. The explosion killed 11 platform workers and injured 17 others. On July 15, 2010, BP said the leak had been stopped by capping the gushing oil wellhead, though there is a risk that a significant pressure shift could create a new leak on the sea floor. The drilling of relief wells to permanently close the well is still ongoing.

Figure 1: Oil rig in flames

The process of recovery is still ongoing, and the closure will take years and billions of dollars. Meanwhile, engineers must examine and evaluate their part in this matter and focus on any ethical considerations that were compromised.

## **Ethical Issues Involved**

It is possible to classify the actions taken by BP as well as the ethical issues involved in the Deepwater Horizon oil spill into 3 main categories namely, Pre-accident, Post-accident and the Aftermath of the disaster.

### **Pre-Accident Ethical Issues**

It was a combination of wrongly and poorly made decisions that led to the Deepwater Horizon disaster. In this section we will look at the ethical issues that arise before the accident.

### **Blowout Preventer and BP's decision**

#### Background

One of the main reasons for the uncontrollable spill is the failure of the Blowout Preventer (BOP), which is a set of large valves. In the event of an oil spill, the BOP will ideally perform its role by shutting out the oil well. A 2001 report by Transocean, which operated the drilling rig on behalf of BP, has suggested the BOP is "apparently defective" when it recorded a total of 260 design failure possibilities [1].

#### Figure 2: Picture of the BOP used

When the explosion occurred, the first attempt to close the BOP manually failed as cables that linked the BOP to the oil rig were damaged and the automated switch which should be activated when there is catastrophic event onboard also failed. [2] The BOP in Deepwater Horizon oil rig did not have a third way of closing the valve remotely via acoustic-controlled switches known as an acoustic switch. BP decided to ignore the failure of the

BOP and rejected proposals to install the acoustic switch. The BOP failed to function when required and it eventually led to the oil spill of the largest magnitude in U. S. history.

### Ethical Issues Involved

As no procedures and no products can be risk free, thus it is unfair to deem any non-obvious risk being neglected as unethical. However when the risks are eminent, it is justifiable to say that failure to take reasonable steps in reducing such risks can be considered unethical. In the case of BP, they have failed to reduce the risk when there were numerous counts of failure as mentioned earlier. In view of the BOP unreliability, BP was unwilling to conduct any detailed review on the BOP and had repeatedly dismissed reports of problems on its BOP and the potential risks. By ignoring the paramount importance of BOP in ensuring safety in oil drilling activities, the refusal to review the BOP suggests that BP assumes oil spills are rare and that the BOP need not be activated. This cost cutting practice by BP inevitably puts the safety of the oil rig workers, the marine life and the public at risk.

One might argue that risk is usually proportional to benefits, while safety is proportional to cost. Thus it is unrealistic to expect any corporation to invest large amount of money in ensuring safety, for which could adversely affect the survivability of the corporate. However this is not the case for BP as they fiercely rebutted the proposal of the federal to install an acoustic switch, which is an additional remote controlled shut off switch, in all oil rigs. The cost of an acoustic switch which is about US\$500 000 is only marginal

compared to BP's annual turnover profit of US\$ 14 billion [3]. BP might have used a cost and benefit analysis in the best case scenario, which assumed that the BOP would not be activated due to the rarity of oil spills and thus the decision of not installing the acoustic switch was reached. Although the decision of not installing an acoustic switch is lawful, BP has not done enough to justify their decision from an ethical perspective.

The second argument provided by BP for not installing was that the efficiency and effectiveness of the device was unclear and untested as there were no major oil spills in recent years. This may seem to be reasonable. However with the 260 design failures in the BOP as mentioned, its reliability is questionable. Tests and simulations have proved that the acoustic switch to be a reliable third layer of protection, with less maintenance needed [4]. In addition, acoustic switches are a common feature complimenting BOP and regulators of two major oil-producing countries, Norway and Brazil, have required all offshore rigs to install acoustic triggers. These suggest that the arguments made by BP could not be justified. In fact, BP has violated the basic design criteria of exploring safer alternative design and improving the safety of the current design. Oil drilling has its potential risks and failure to take necessary steps in ensuring the BOP functions means that BP has failed to assume responsibility to protect the safety and well-being of the public.

## **Human Errors and BP's Policy**

### Background

Poor crew training and human errors are always major contributing factors towards technological disasters, such as the Chernobyl disaster. The BP

Deepwater Horizon disaster is of no exception. Prior to the accident, a negative-pressure test was done to check the mechanical barrier. Despite results being unsatisfactory, they were misinterpreted by both Transocean rig crew and BP well site leaders. The influx of hydrocarbon was not detected until it went into the riser which subsequently led to the explosion [2].

As mentioned in the previous section, there is an automated way of activating the BOP. However it did not respond efficiently during the explosion as the system battery charge was low. The next part of this section identifies and analyses a string of human errors which led to the Deepwater Horizon disaster.

#### Ethical issues

Although the negative pressure results and ominous signs of the rising hydrocarbon levels were obvious, it is a little too harsh to put the blame on BP for failing to provide adequate training to its employees. This is because the Transocean rig crew also misinterpreted the readings. Incompetency is often linked to human error, but the level of competency of their employees is something BP could not have a complete control. Thus human errors are bound to occur and are usually impossible to eradicate, with minimization as the only alternative.

However it is still too much of a coincidence that a series of human errors were allowed to happen. Company policies can have an effect in increasing the possibility of human error. In the case of BP, importance is placed on profit generation with little emphasis in safety. In fact, the battery of the BOP

was found to have been recharged at a lower frequency than the <https://assignbuster.com/deepwater-horizon-oil-spill-engineering-professionalism-management-essay/>

recommended specification [2]. Given the pivotal role of the BOP in the prevention of an oil spill, more emphasis should at least have been placed on the proper charging of its batteries. In the event of any accident, the employees responsible for the maintenance of the BOP would be subjected to the immediate dangers and it is unlikely that they wish to jeopardize their own life. Thus if BP had sent out the correct safety messages to its employees and had taken the proper steps in educating them, the disaster could have been prevented.

BP's stand on safety standards has an effect on the training of its employees. While BP could be pardoned for its failure to ensure their staff's ability to make accurate interpretations of results, the failure to ensure their staff in conducting frequent, periodic maintenance and by allowing their staff to be subjected to unknown risks could not be viewed as ethical.

## **Ignoring internal whistle blowing**

### Background

It was also revealed that many of the crew feared reprisals if they reported mistakes. In the rare occasion when such reports were made, they were largely ignored by BP [3].

This is shown in the case where Barry Duff, a member of BP's deep-water Gulf of Mexico Atlantis subsea team, warned the BP officials that the piping and instrument diagrams (PIDs) for the Atlantis subsea components were not updated. In addition, Barry Duff pointed out that documents that are not finalized amounts to thousands [5]. Despite these administrative lapses,

there has been no intention to prevent the normal functioning of the facility.  
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Proper paperwork and up-to-date PIDs are dictated by law and BP has an obligation to follow them. However, when the warnings were made known to the BP officials, there was no response. Instead, BP continued to request approval from the federal regulator for an expansion of the drilling project.

### Ethical issues

In any project, the company involved is bounded ethically to provide safe designs. This is especially important in industries involved in operations that could be potentially hazardous. Oil drilling is one such activity and in this case, BP is oblivious to the imminent dangers that poor designs generates. In this case, BP has not passed the basic criteria for safe designs as the design did not comply under the applicable laws. Proper paperwork and up-to-date PIDs are dictated by law and yet was not followed by BP. This questions the commitment of BP in ensuring the safety of their designs which could have direct implications on the safety of the crew and the environment.

As PIDs are important documents containing schematic details of the project's piping and process flows, valves and safety critical instrumentation. This is particular important when any abnormalities occur on the platform as the PIDs can aid the crew in solving the issue. As shown in previous points, inappropriate actions can lead to severe consequences. When BP officials did not ensure that the PIDs were updated, they had placed the crew on the platforms at risk. BP had placed their crews under unnecessary involuntary risk unknowingly to the crew. This is unethical of the company especially when the problem is made known to the officials but ignored. In addition, BP showed no remorse about their mistakes and instead attempted to expand



their drilling project. This once again brings up the question of whether the company is too profit driven and its unwillingness to invest time and money in ensuring safety issues in their projects.

## **Post-Accident Ethical Issues**

In the current section, we will examine the ethical issues of the decisions made by BP in the immediate aftermath of the accident.

## **Choice of Chemical Dispersants**

### Background

One of the most controversial issues regarding the Deepwater Horizon Accident involves the choice of chemical dispersants. Although chemical dispersants are effective agents that can speed up the process of dispersing the spilled oil, the toxic nature of these chemical dispersants is very harmful to marine life. BP has committed an ethical crime when they ignored the better rated chemicals recommended by experts. The following paragraphs will elaborate more in detail on the choice and usage of chemical dispersants.

### Ethical Issues

In the Deepwater Horizon Accident, although environmentalist recommended twelve other better toxicity-rating chemical dispersants, BP declined the offer and chose Corexit that has the worst toxicity-rating compared to the other recommended chemicals [6].

Figure 3: Comparison of Chemical Dispersants

In addition, the amount of chemical dispersants used, which is about 7 million litres, is several times larger in the history of oil spill accidents [7]. In reaching the decision on which chemical to use, BP disregarded the concerns of the environmentalists and used Corexit in a large scale knowing the negative impacts on the ecosystem. Due to the side effects of Corexit on the environment, the environmentalists raised objections in the use of it. BP's decision in using Corexit clearly violated the principle of " respect for individual".

The validity of BP's reasoning in using Corexit is far from convincing. BP uses " availability" as the main reason to defend its choice of chemical dispersants. However, US Polychemical Corporation countered that reasoning by saying that it could produce about 230, 000 litres daily of one of the alternative dispersants [8]. This amount is more than the daily rate of Corexit usage, which is about 100 litres. BP shares extremely close ties with Nalco, the company contracted to provide Corexit. The unusual choice of dispersant and close ties with Nalco suggests that cost could be the real motivating factor. Hence with the above argument, it is a reasonable call to deem the decision make by BP as unethical.

As the spill stabilizes, BP announced that the dispersant usage will be stopped. However this is not true as there are evidences suggesting BP's continual usage of Corexit in silence [9]. This dishonest action clearly violates virtue ethics, one of the main ethical theories. In short, although BP's choice and usage of Corexit as the chemical dispersants is legal, it is ethically unjustified.

## Effects on the Environment

### Background

As mentioned earlier, the Corexit used in the Deepwater Horizon oil spill is a toxic chemical which is harmful to marine life. The environmental effects of Corexit would be gradually felt even years after the diminishing of oil traces and the toxic chemicals would inevitably have a chain effect on our ecosystem [6]. The impact of Corexit on the environment will be elaborated in detail in this section.

### Ethical Issues

Although there are no existing regulations or rules present as a guideline regarding moral responsibility to protect the environment but on closer analysis, BP could have done much more to minimize the environmental impact. In addition, BP also exploited the perspective of commoner view, which tends to see delayed harm as less risky than immediate negative effect. The usage of Corexit can have the immediate advantage of breaking up the spilled oil but it also has long term environmental consequence on marine lives.

BP have violated ethical codes set to protect the environment and created a significant amount of pressure on the ecosystem. They have violated the degree-of-harm criterion in the choice of their chemical dispersants, which requires the toxic and pollutants of chemicals to be reduced as much as possible without consideration for cost. As ecology is interlinked, the destruction of the environment leads to significant impacts on human. The

effected ecology could have caused an imbalance in the food chain, as deep <https://assignbuster.com/deepwater-horizon-oil-spill-engineering-professionalism-management-essay/>

sea plants begin to die out due to the lack of sunlight penetration. This may cause other organisms to suffer from a lack of food causing a disruption in the food chain and ultimately affecting human. The oil spilled and other toxic chemicals could get into the bodies of organisms and the marine life, resulting in undesirable consequences. BP in the course of removing the oil from the sea have used more toxic chemical dispersants for economical reason which results in greater damage to the environment. The decisions made could have resulted in a greater loss of biodiversity in the future.

## **Media blackout**

### Background

Despite claims by BP that it was striving to keep the public and the government informed, BP imposed restrictions and prevented journalists from documenting as well as refused to reveal information of the disaster. BP also stonewalled on releasing any data and video footage on the spill, repeatedly stating it is impossible to determine the size of the spill [10]. Sick clean-up workers were barred from speaking to the press and flyover permits were revoked.

### Ethical Issues

BP's attempt of media blackout is clearly an unethical act. It could be viewed in the same light as for instance, a doctor withholding information of a failed operation to the family of patient. In the context of the Deepwater Horizon oil spill, the worldwide audience could refer to the family, while the gulf could refer to the patient of the failed operation. People living near the site had already felt the primary impact of the spilled oil while secondary effects such <https://assignbuster.com/deepwater-horizon-oil-spill-engineering-professionalism-management-essay/>

as consumption of contaminated food would pose a problem which could potentially affect the rest of the world. The gulf doesn't belong to BP and the world has every right to know the full extent of the damaged done to their ocean.

Credit to BP as they eventually bowed to demands from experts and members of Congress and posted a live video featuring the gushing of oil on the ocean floor. [11] However BP only agreed to provide live video feed one month after the accident, thus hindering external experts from estimating accurately the full extent of the oil spilled. Similar to the choice of chemical dispersant, BP violate the principle of " respect for individual" when they refused to share data and restricting the media from accessing the site.

## **Magnitude of oil spill**

### Background

The actions and decisions made by BP contributing to the varying versions of the magnitude of oil spill will be the last ethical issue regarding the Deepwater Horizon Accident which would be discussed. The intention and motivation of downplaying the actual rate of leakage of oil will also be analysed in detailed.

### Ethical Issues

Following the disaster, BP rejected help from various experts, such as the offer to build better equipment on the sea floor to accurately determine the rate of leakage. The initial estimation of leakage at 1, 000 barrels per day provided by BP is a few times below the 15, 000 barrels estimation by

government and certainly way off the actual rate of 100, 000 barrels. The irony is that the government was able to obtain much higher values than BP's estimation using satellite imaging while BP had access to the footage of the plume [12]. The erroneous estimation by BP could either be due to their sheer incompetence or intention to escape fines which are based on the leakage level. The latter seemed more likely as BP certainly has a team of experts investigating the rate of spillage. By refusing the help of external experts through media blackout, it simply shows that BP is indeed hiding some important facts to safeguard their interest [13]. In fact Carol Browner, the director on energy and climate change in the Obama administration suggested that BP could have "vested financial interest" in downplaying the size of the leak so as to avoid heavier fines [14]. The intention of hiding important fact hindered serious attempts to reduce and contain the impact of the spill. In fact, more can surely be done via worldwide cooperation to minimize the impact of the oil spill if BP was more honest and transparent in their approach following the accident. In short, virtue ethic is definitely missing from BP in the dealing of the crisis.

## **Aftermath of Accident**

In this section, we will discuss about the actions taken by BP couple of months after the disaster. The focus in the following part will be with regards to the compensation given out and the various corrective actions taken by BP.

## **Initiatives for Compensation and Rehabilitation of the Environment**

Background

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In the aftermath of the Deepwater Horizon Accident, BP set up a claim system on their website to allow individuals and government to claim their losses with BP. In a summary of the claims posted on BP's website, the total claims paid or approved for payment amounts to close to US\$3 billion [15].

Figure 4: Claims and government payments public report as of October 14 [15]

In addition, BP started several programs to repair of the environment. BP set up rapid response teams to clean up beaches that are affected by the oil spill. Finally, to minimise the negative impact of the accident on the economy, BP also provide grants for businesses who have suffered losses due to the spill.

#### Ethical Issue

Due to the pressure from various parties such as the public and environmentalists and in an attempt to salvage their plunging reputation, BP response to the aftermath of the accident is commendable in term of the efforts to make up to those affected by the oil spill. Large amount of money is committed by BP for compensations and initiatives to repair the environment. In this sense, BP is willing to take responsibility in the restoration of the environment and for the lost income of affected businesses, such as fishing and tourism industries.

However some damages are not repairable and despite BP's efforts, the effects are permanent. For instance, the full extent of the side effects caused

by the chemical dispersants is unknown and could be detrimental to the ecology as time progresses.

## Case Studies

In the following section, we will be using two case studies as references in order to enhance our argument regarding the ethical issues involved in Deepwater Horizon Accident.

### Case Study: Exxon Valdez Oil Spill

The Exxon Valdez Oil Spill could be used as a case study. Although the nature of oil spill was different as the Exxon Valdez oil spill originated from an oil tanker, the ethics concerned are roughly similar. The disaster was caused by poor decision making and monetary concerns.

### Background

The Exxon Valdez incident was a major oil spill which took place on March 23, 1989 at Prince William Sound in Alaska.

The crew behind the Exxon Valdez noticed icebergs in their planned route. Instead of trying to weave through the icebergs, they decided to go in another direction. On the new route, the oil tanker hit shallow land, which punctured the hull of the ship. Oil began leaking from tanks located in the hull of the ship.

Figure 6: Oil covering large areas of Prince William Sound



At Prince William Sound in Alaska, many animals were affected by the Exxon Valdez oil spill. Some of the many species that were affected includes harbour seals, killer whales, salmon, sea otters and sea birds. [16] Exxon took 4 years to clean up the spill, due to the magnitude of impact. Oil could still remain on the beaches even till today. [17]

On the contrary to popular beliefs, the leader of the containment efforts in the critical hours after the tanker ran aground wasn't Exxon Mobil Corp. It was revealed that BP had a controlling interest in the Alaska oil industry consortium which spearheaded the cleanup, Alyeska Pipeline Service Co. Alyeska was required to draft a plan for cleanup and respond to the spill. Due to the slow response by Alyeska, Exxon took over in the cleanup efforts with the U. S. Coast Guard. [18]

Unpreparedness

Ethical Issues

Within minutes of the Exxon Valdez oil spill, Alyeska officials were notified. A lack of preparation for emergencies resulted in delays for up to seven hours before they sent in a helicopter to investigate the situation with an U. S Coast Guard investigator. Frequent cost cutting measures over the years and poor planning had led to elongated delays. In addition, there were also limited booms in the containment of the spread of oil. The team assigned to handle the oil spill was also insufficiently trained. Failure to control the spread of oil due to a lack of equipment and preparation caused the area covered by oil to increase exponentially.

In order to contain the oil that is spilled during the Deepwater Horizon catastrophe, a 100-ton containment box was constructed. As a result, it was only deployed a fortnight after the spill, which led to the questioning of a lack of emergency measures. Similar to the Exxon Valdez oil spill, the delay led to an exponentially increasing area affected by the oil leakage, establishing serious environmental impacts along the Gulf of Mexico.

During the application for a permit for the operation of Deepwater Horizon, BP had predicted the unlikelihood of a catastrophic oil spill. Even if it had occurred, BP believed that they had the technology to counteract it.

Likewise, Alyeska had made a similar statement prior to the Exxon Valdez oil spill, and downplayed the possibility of an oil spill. [19]

Due to the fact that BP has already assured the government that any catastrophic spill was unlikely, preparing for a possible leakage by, for example, spending shareholder's money in building a 100-ton containment box would ultimately create confusion and panic across all boards. Hence, the declaration of any unlikely spill due to complacency was a mistake to begin with.

BP had already faced a similar scenario in the Exxon Valdez oil spill 20 years ago. However, the inability to control oil spills of such scale has still not been addressed. This has led to another environmental disaster in the Gulf of Mexico as we have seen, 20 years on the Exxon Valdez oil spill.

Figure 7: Unloading crude oil from the Exxon Valdez after the Valdez ran aground

## Choice of Chemical Dispersants

### Ethical Issues

The chemical dispersant used in the Exxon Valdez oil spill was the Corexit 9850. It was an earlier version of the chemical dispersant which BP is currently using to clear up the oil slick in the Gulf of Mexico. In the case of the Exxon Valdez, the chemical dispersant used was in fact greater in toxicity compared to the one used by BP in Deepwater Horizon. However, 20 years ago, there were not many choices of chemical dispersants.

### Figure 8: Oil cleanup on the shorelines of Prince William Sound

Some critics argue that the chemical dispersant used by BP in the clearance of oil slicks were meant to cover the layer of oil by the chemical dispersant, and thereby reducing the effective area that the oil encompasses visually. Oil could be hidden under these chemical dispersants resulting in oil underneath and hence affecting the wildlife in the ocean. BP has claimed that this is the lesser of necessary evil, in which the chemical dispersant used, although toxic, could reduce the effective area of the spread of the oil. This is to prevent the spreading of oil to shore lining areas where organisms living close to the shore and in areas with shallow waters would experience a greater impact when the oil slick moves close to their natural habitat.

### Figure 9: Cleanup efforts after the Exxon Valdez Oil Spill

BP in this case had choices in which they used the one with greater toxicity to clean up the oil. In this case, they are adopting an out-of-sight, out-of-mind strategy in which the first thing on hand is the responsibility to remove <https://assignbuster.com/deepwater-horizon-oil-spill-engineering-professionalism-management-essay/>

the oil as much as possible. It has resulted in the use of chemical dispersants with seemingly higher toxicity. As a result, it becomes an ethical issue when choice is present. In the Exxon Valdez oil spill, the limited amount of choices for chemical dispersants resulted in an outrage of perhaps in a smaller scale.

## Communication with the Media

### Ethical Issues

Exxon gave limited information in the extent of the problem. In addition, company executives refused to comment on the problem for almost a week. The CEO of Exxon waited 6 days to make a statement to the media. Exxon did not communicate openly and effectively. Exxon chose to conduct all of its communication in the small town of Valdez in Alaska, in which the remote location proved to be inadequate, having limited communication capabilities. In addition, statements made to the press by high-ranking executives were often inconsistent and contained contradictory information, leading the press to question the credibility and truthfulness of Exxon.

BP, similarly, adopted a media blackout strategy in the Deepwater Horizon disaster. The refusal to speak to the media was probably a decision made by the lawyers. This could be understandable from a business perspective.

Exxon and BP both tried to release minimal information to the public with regards to the extent of the respective disasters. Both adopted this strategy to buy time as well as assess the situation as accurately as possible. Hence, it could be seen in another way that they were attempting to give a

responsible reply by fully assessing the extent of the situation and to avoid making irresponsible assumptions.

Ethically speaking, it could be an attempt to rectify the situation as soon as possible without attempting to cause any public fear when the public gets to know about the situation. For instance, there is no indication or evidence that the oil might have affected the food chain. Releasing such information would definitely create panic among the general public. Both companies might have intended to adopt LeMessurier's strategy in the Citicorp case of attempting to mitigate the damage as far as possible without publicising the potential damage.

However, by not revealing information to the public, certain immediate dangers posing risks to the public may have been left unexplained. In addition, by revealing a certain degree of information to relevant authorities and organisations, help could be received in the most effective manner. Professionals and environmental experts can be informed of the situation and hence provide a certain degree of help, by offering suggestions or the setting up of voluntary organisations in the efforts to protect the environment. By not revealing minimal information to the public, both BP and Exxon have not exercised social responsibility in informing the public for immediate actions to be taken.

Hence, the revealing of certain information is still necessary. The balance depends on the consequence or how immediate is the pending danger on the general public.

Case Study: Piper Alpha

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## Background

Piper Alpha was a North Sea oil production platform operated by Occidental Petroleum (Caledonia) Ltd. On the Piper Alpha, there were two main pumps, known as Pump A and Pump B that provided the power on the platform. In a routine maintenance, the pressure safety valve of Pump A was removed. This routine maintenance was expected to be completed within a fortnight and an overhaul of the pump was planned. During the maintenance, the open condensate pipe of Pump A was temporarily sealed with a blind flange.

### Figure 11: Piper Alpha before explosion

When the maintenance work on Pump A did not finished within the expected two weeks, the on-duty engineer filled out a permit which stated that Pump A was not ready and must not be switched on under any circumstances. However, this warning was not passed down when the next shift took over as the permit was lost.

When Pump B stopped suddenly and could not be restarted, the manager assumed that it was safe to turn on pump A in an attempt to prevent total power failure. Gas was allowed to flow into Pump A, and because of the missing safety valve, it produced an overpressure which the loosely fitted metal disc could not withstand. Gas audib