ASPECTS RELATED TO RISK MANAGEMENT IN OIL AND GAS INDUSTRY

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ABSTRACT

The presence of risk in almost every human situation, activity and sector has determined the increasingly rapid development of the risk management discipline. Depending on the context, there are various descriptions of what risk management involves**.** Like in many other industries, oil and gas companies are facing many kinds of risks and uncertainties that make the execution of projects more and more complex and difficult. Taking into consideration the fact that in risk evaluation and treatment the potential impact is a key issue the oil and gas industry is one of the fields where addressing risks will remain one of the major concerns in order to assure the limitation of human life and environmental damages.

Keywords: *risk management, risk evaluation, oil and gas industry*

1. INTRODUCTION

Risks have been a part of our everyday life from ancient times to the present day. While the risks assumed by primitive people were mostly physical, today people can risk their money or business without putting their lives into danger.

The oil and gas industry is one of the most exposed to high risks with potential effects on human life and environmental impacts.

2. RISK MANAGEMENT – CONCEPTS AND PRINCIPLES

2.1. What is Risk?

Considering the presence of risk in almost every activity and the large literature on risk covering a range of disciplines from mathematics to psychology, we find ourselves in front of a multitude of definitions for this term. Here are just a few of the numerous perspectives that may contribute to a better understanding of the risk notion:

"The objective uncertainty as to the occurrence of an undesirable event. It varies with uncertainty and not with the degree of probability the greater the probable variation of the actual loss from the average, the greater the degree of uncertainty" (Willet, 1951)

"Hazard, danger, chance of loss, failure or injury; the degree of probability of loss; a person, thing or factor likely to cause loss or danger.- to expose to risk; to incur the chance of unfortunate consequences, loss or danger by (doing something)" (Chambers dictionary, 1992)

"Risk is a combination of the chance of a particular event, with the impact that the event would cause if it occurred. Risk therefore has two components – the chance (or probability) of an event occurring and the impact (or consequence) associated with that event. The consequence of an event may be either desirable or undesirable…In some, but not all cases, therefore a convenient single measure of the importance of a risk is given by: Risk = Probability ×Consequence." (Sayers *et al.* 2002)

"Risk is the actual exposure of something of human value to a hazard and is often regarded as the combination of probability and loss". (Smith, 1996)

"Risk might be defined simply as the probability of the occurrence of an undesired event [but] be better described as the probability of a hazard contributing to a potential disaster…importantly, it involves consideration of vulnerability to the hazard". (Stenchion, 1997)

"The possibility of an event occurring, that will have an impact on the achievement of objectives. Risk is measured in terms of impact and likelihood" (The Institute of Internal Auditors).

2.2. Role of risk management

*In order to have g*ood management and decision-making at all levels it is important for an organization to have an effective risk management. All the departments of an organization handle risks permanently in less or more rigorous ways and sometimes even without knowing it.

For years, companies faced different types of risks in a slightly disorganized way. Today, instead, there are methods of *"definition and control"*, which are put together in a systematic approach known as "Risk Management", which provides improved defense against harmful events.

One of the most prominent frameworks of risk management ISO 31000 refers to risk management as a central part of the strategic management of any organization. It is the process whereby organization methodically address the risks attached to their activities. A successful risk management initiative should be proportionate to the level of risk in the organization, aligned with other corporate activities, comprehensive in its scope, embedded into routine activities and dynamic by being responsive to changing circumstances.

2.3. Contemporary perspective on risk management

"Risk is like fire: If controlled it will help you; if uncontrolled it will rise up and destroy you." (*Theodore Roosevelt)*

Until now we have considered that the purpose of risk management is to remove and reduce the risk exposures without considering successful firms in any industry get there not by avoiding risk but by actively seeking it out and exploiting it to their own advantage.

Risk management should be a continuous process that supports the development and implementation of the strategy of an organization. It should methodically address all the risks associated with all of the activities of the organization. In all types of undertaking, there is the potential for events that constitute opportunities for benefit (upside), threats to success (downside) or an increased degree of uncertainty.

3. RISK MANAGEMENT PROCESS

3.1. Establishing context

This first step consists in closely understanding both the external environment and the internal culture of the organization .This analysis requires:

− to establish the strategic, organizational and risk management context of the organization

− to identify the opportunities and constraints of the environment.

The culture and context of the organization are established through a number of environmental analyses including standards and codes, previous risk management and business plans, relevant corporate documents, industry guidelines, imposed laws and restrictions.

Another important aspect of this stage is developing risk criteria that will reflect the organizational context, often depending on the strategic direction, objectives and goals of the organization, internal policies, interests and expectations of stakeholders.

3.2. Risk identification

In this phase the potential risks are determined and described by analyzing all possible sources of risk, within the areas of risks that where identified when defining the context. Using the information gathered from the context, particularly from the SWOT and PEST analysis, the next step is to identify the risks that are likely to affect the achievement of the goals of the organization, activity or initiative. It should be underlined that a good exploitation of risks can become opportunities for the organization.

Key questions to identify risks:

− When, where, why, and how are risks likely to occur while achieving our goals?

− What are the risks related with achieving each established priority?

− What are the risks that could prevent us from achieving these priorities?

− Who might be involved (for example, suppliers, contractors, stakeholders)?

3.3. Risk analysis

Risk analysis involves prioritizing risks for further analysis in order to determine their consequences, their probability of occurrence and their impacts. Risks will receive priority with regard to how they will be managed considering their likelihood and consequences.

The level of risk is analyzed by combining estimates of likelihood and consequences to determine the priority level of the risk. Once this analysis has been made, action plans can be formulated and controls implemented to eliminate or reduce the risks.

Depending on the risk, the purpose of the analysis and the information and data available there are different types of analysis techniques than can be used.

Lower risks are estimated using qualitative and semi-quantitative techniques (hazard matrices, risk graphs, risk matrices) while higher risks require more expensive quantitative techniques.

3.4. Risk evaluation

Once the risk has been analyzed the next step is to compare it with the previously established risk criteria and decide whether it can be accepted or not. If the risk is considered acceptable, it may be accepted with minimal treatment or with no further treatment beyond the current controls. These risks should be monitored and periodically reviewed to ensure they remain acceptable. If the level of the risk is higher than the accepted level, additional control measures and improvements are required to reduce risk as low as is reasonably possible.

The person responsible for managing the risk, known as the risk owner, will decide whether the risk should be accepted, avoided or treated. The risk decision weights the issues of risk and opportunity. An organisation cannot develop without capitalising on opportunities that will always have associated risks

3.5. Risk treatment

In the previous step, risks were assessed and decisions were made concerning the acceptability of risks. While in theory ceasing the activity that generates the risk may be considered as an option, it is rarely applied in practice. In case the risk cannot be accepted as it is or the existing controls are not efficient enough, the formulation of risk treatments will be required.

Risk treatment involves identifying the range of options for treating risks, evaluating these options and preparing and implementing treatment plans. The selection of the option will correspond with the significance of the risk and the cost-benefit analysis of treatment. The purpose of a risk treatment is to decrease the expected level of an unacceptable risk.

3.6. Monitoring and review

There are a few aspects of the risk management process that need to be systematically monitored and reviewed: the risks, the treatment strategies and general progress on the project.

Monitoring and review should be a planned part of the risk management process and involve regular checking or surveillance. Although they are similar processes, the differences between monitoring and

review are important in the situation of risk management. While monitoring is a continuous surveillance of the internal and external environments, the review is a periodic analysis of the current status or situation, usually having a specific focus.

The information gathered during monitoring and review activities help an organization determine whether or not the risk management approach and process are achieving expected outcomes and provide warning about potential gaps, inefficiencies, and opportunities for improvement.

3.7. Communication and reporting

The communication and reporting of risk information to the appropriate levels of the organization is essential for the decision-making process. Risk information can be communicated not only internally, to employees across different operational areas of the organization, but also externally with clients and stakeholders concerned by the organization's actions and decisions.

Risk communication and reporting has the purpose to make stakeholders aware of the risk management process, practices and to clarify the outcomes and limitations of the risk assessment.

Risk information can also be used for other processes in order to avoid useless risk assessments on the same area for different purposes.

4. RISKS IN OIL AND GAS INDUSTRY

4.1. Importance of risk management in oil and gas industry

The large amounts of fuel consumed and the use of energy in nearly every industry makes gas and oil essential in our modern society.

Nowadays oil and gas companies are facing many kinds of risks whether operational, man-made or natural. If not properly planned, executed and controlled the activities in oil and gas industries could result in accidents involving death or physical injuries, financial catastrophes, delayed operations and other severe consequences. Therefore risk management is fast becoming an integral part of everyday business activities in this industry.

Risk management is imperative in this industry because:

- both upstream and downstream risks must be managed to ensure commercial viability of an oil and gas project

- the upstream sector is characterized as "high-risk" industry as a result of the sizeable investment level, geological uncertainties and risks associated with fiscal and political uncertainties with host producing countries,

- the downstream sector faces risk associated with uncertainty of the crude supply and the marketing of products.

- risk management can also be used for making marginal oil and gas fields (projects) more viable.

4.2. Top 10 risks

The following list presents the Top 10 risks identified in the oil and gas sector using Ernst & Young's radar:

- the risk of a health, safety or environmental incident, and in ensuring regulatory compliance ;

- price volatility; managing long-term investment with the potential for extreme price volatility;

- access to reserves or markets;

- cost escalation and inflation;

- uncertain energy policy;

- worsening fiscal terms;

- human capital deficit (e.g., skills shortages, aging workforce);

- competition from new technologies and new sources (e.g., alternative fuels);

- IT security;

- increasing project scale and complexity.

As we can see in the above risk ranking, health, safety and the environment remain a priority in oil and gas industry. At the same time new risks such as IT security are added to the list as companies realize they need to do more to protect against data theft and cyber-attacks. Managing the increasingly interconnected supply chains in the oil and gas industry, while dealing with the different and changing policies and regulations of the multiple governments involved is another important aspect. These risks and many others such as regulatory compliance, price volatility and the increasing challenge associated with accessing reserves and markets need to be taken into consideration for facing today's and tomorrow's challenges.

5. CONCLUSIONS

"Risk" is a frequently used term in the present society. Although not all the activities involving risks require risk management, for some of them it is considered a very important issue. It is the case of oil and gas industry where effective risk management all levels is essential.

The potential results of accidents in this industry such as explosion of Deepwater Horizon which killed 11 men working on the platform and injured 17 others, when oil spill flowed for three months, becoming the largest accidental marine oil spill in the history of the petroleum industry, are strong arguments in taking all possible measures in limitation of risks impact.

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