CASE NATIONAL GAS COMPANY

Introduction

NGC is a national gas company with considerable assets in property, mainly gas extraction plants and platforms. These platforms can have considerable damage after natural disasters appear. However, there is a possibility for NGC to insure itself against these disasters. These insurances come in different packages with different profiles. If the company would be willing to accept more risk, it could take a more expensive insurance and be sure about what amount to pay on premium.
This report will discuss the different policies and the changing environment. As it is not yet known what disasters will occur or what damage will be caused, there needs to be a simulation of different disasters and different damages. These occurrences need to be compared with the different packages in order to know what the cheapest alternative is for the company. This alternative could however change with each simulation, therefore an extensive simulation should be set up and a good analyses needs to be made.

Problem statement

After the ignition problem had been mentioned, a more specific problem statement should be made in order to come to a more accurate and better specified result.
The problem statement was defined as follows:

"What is the best insurance structure and policy for NGC"

This problem was tackled by using the up-to-date data from NGC's property insurance and simulating the different possibilities of calamities that could occur. The other three main questions, which are stated are as follows:

1. The cost of insurance
2. The expected self-insured losses
3. Expected total cost of risk
4. The probability of risk exceeding $2.5 Million

Available Data

Data used for the research was provided by NGC, and was the most up-to-date data which could be gathered. This data focused on the different natural occurrences, which caused property damage, and the different amounts of damage these occurrences caused. The most important numbers that are of fundamental importance to the analysis will be mentioned in this part of the report.

Last 11 years, the following accidents occurred:

- Damage to offshore Pipeline $1.258.000
- Fire damage to regulator station machinery $ 658.000
- Compressor breakdown $ 243.000
- Damage to offshore pipeline $ 3.750.000
- Damage to offshore pipeline $ 210.000

These occurrences all had different damages in different heights. This data was used as a starting point in simulating future occurrences.

There are different policies available in order to insure the company against these calamities. There are four packages available. These packages take into account different cost of the

policy and the different deductibles these policies bring with them. These numbers look as follows.
Figure 1. Insurance deductibles

The deductibles are the amounts which the company has to pay for itself after a calamity has occurred. These amounts therefore have a great influence on the total costs to be paid by the company each year.

Results and Recommendation
After careful analysis the following data was extracted. This information is the key to the decision and is therefore showed below.

The cost of the insurance, which means the premium are given by the insurance company in the different packages. This number is however only a part of the total cost, as there is also a need to pay for the insurance deductibles or self-insured losses. The different packages and applicable premiums are:

Current:	1.480.000
A:	1.010.000
B:	785.000
C:	515.000

The total self insured losses, or in other words the deductibles, for which the company has to pay for itself are as follows:

Current:	68.425
A:	199.604
B:	301.840
C:	423.650

This self insured loss has to be paid by the company after a calamity occurs. This means that the higher this number the higher the risk is that the company needs to pay a substantial amount of money. Therefore, the company risks making its earnings more volatile and thereby endangering the stability of the company.

After the simulation, the different policies carried different total costs, which need to be paid each year. These costs include the deductibles and the premium to be paid each year. These mean numbers are:

Current:	1.548.425
A:	1.209.604
B:	1.086.840
C:	1.109.883

This is the total cost to be paid each year. However, these costs can fluctuate, as it is only a mean number. Therefore, the company will increase its earnings volatility and the risk of losing great sums of money. That means that the company will need to make a decision about how much risk it is willing to take. If the company feels that stability is of fundamental importance it should not take policy C, but should keep the current policy, which has the lowest deductible and the lowest standard deviation. On the other hand if the company is willing to take the risk, it would pay the lowest premium and have the lowest average total cost over a long period of time. However, this does imply that the company is open to volatility in earnings and potential losses. If a calamity would occur multiple times during a year, the cost could pose a significant risk to the operations of the company, because a situation could exist in which the cash is not available, or the company is doing less well than in previous years. This would open the company to potential lawsuits and may even prove to be a cause of bankruptcy.

In order for the company to get a clearer view on what the possible yearly payments are, it is advisable to take a look at the ranges in which the yearly costs are most likely to fluctuate. The ranges are:

Current:	1.480.000 – 1.798.597
A:	1.010.000 – 2.006.676
B:	785.000 – 2.403.900
C:	515.000 – 3.158.416

It can be stated that approximately 97% of the times, the annual total costs will fall in between these ranges. These ranges are calculated by taking the premium as the minimum cost and then take two times the standard deviation. Therefore, it can be seen that the decision depends mainly on the risk the company is willing to take.

The company stated that it needed to know what the probability was that the total yearly costs would exceed $2.5 million. In the first two policies, which are current and A, the probability of exceeding the $2.5 million can be considered as being non existent. For option B, the probability is also very low, the probability is 1.6%. For option C, the probability is higher. The probability of the total yearly costs exceeding the $2.5 million is 7.93%

The choice will depend on the risk profile the company has. Therefore, this recommendation will include this consideration. If the company risk profile is to have the lowest risk possible, it is recommended to keep the current premium and not to change, as this is the option where risk is minimised. If the risk profile is to have more risk and therewith lower average costs over a longer period of time, it is recommended to take policy C, because this is the policy with the lowest average annual cost.

Additional issues

Changing climate/environment

A changing climate or external environment could have an influence on the severity of the damage. This means that the average number and magnitude of damages could change. This will in turn change the outcome of the previous analyses. If the severity or magnitude would go up across the board, it will become increasingly expensive when the company has a high deductible. This means that the total annual cost will go up and that options current and A will become more interesting even if the company is willing to take risk.

Changing deductibles

If the deductibles would be changed, the total costs will increase or decrease as a result. If for example with option C the deductible would be lowered, the total yearly cost would become lower and as a result the standard deviation and therewith the risk factor would decrease. This would in turn make option C much more interesting not only in the low annual total payments, but also when taking risk into consideration. Therefore, if these deductibles would be lowered, the recommendations would change and could point to option C, even when risk is taken into account.

Changing premium

If the differences between the premiums would be made smaller, the attractiveness of the current option would increase, even if the company is willing to take risk. The annual total costs would decrease for all options, but it will have the biggest influence on options current and A, because the largest part of the annual costs are made up of the premium payments. This is less for options B and C, where the deductibles take up relatively more the annual costs. Therefore if the premiums would be brought more inline with each other, option A would become more attractive when taking cost as the sole determinate.