



Compagnie Pétrolière et Gazière, INC.

REQUEST FOR PROPOSAL

RFP #: SR – S1.H3

TITLE: OIL AND GAS EXPLORATION AND PRODUCTION – PHASE 3

CLOSING DATE AND TIME: MARCH 4. 2024 @ 5:00 PM

Oil & Gas Exploration and Production – Phase 3: SR – S1.H3

Background and Purpose

By responding to this Request for Proposal (RFP), the Proposer agrees that s/he has read and understood all documents within this RFP package.

Submission Details

Responders to this RFP should supply:

- A business report up to 6 pages (not including cover page or table of contents), including any supporting plots and tables.
- The commented code used to produce the results.

The report should address **all points described in the “Objective” section** below.

The report should be returned in the following way:

- Electronic - Moodle submission on AA503 website.

Objective

Compagnie Pétrolière et Gazière, INC. (hereafter the “Company”), acting by and through its department of *Price Analysis* is seeking proposals for analytics services. The biggest risk for oil companies is drilling dry holes. Millions of dollars as well as many hours of time are lost when you drill a dry hole.

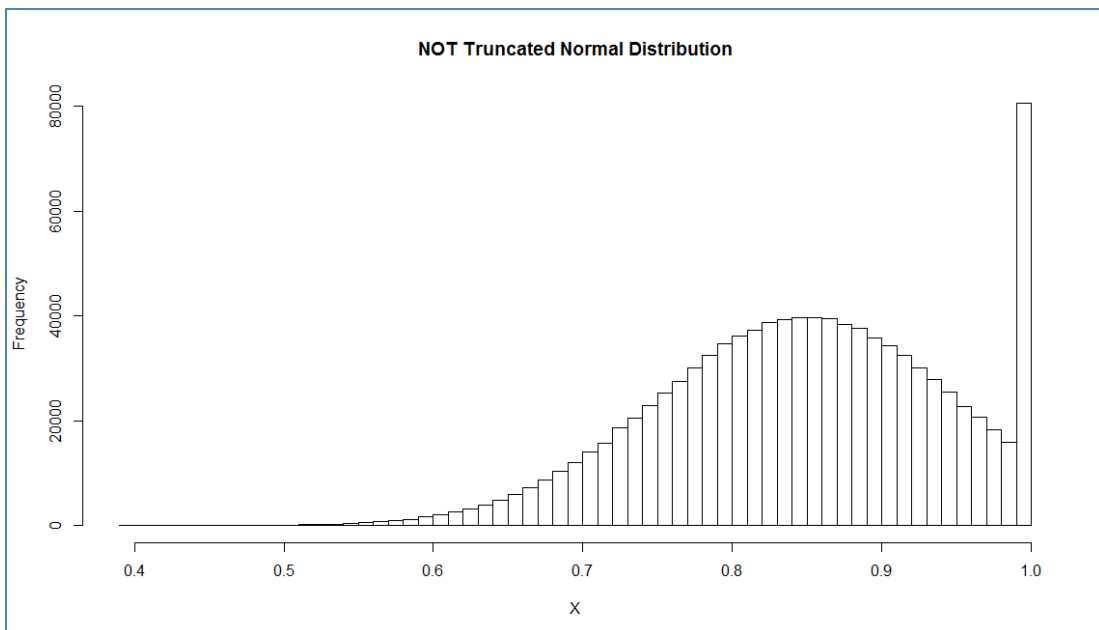
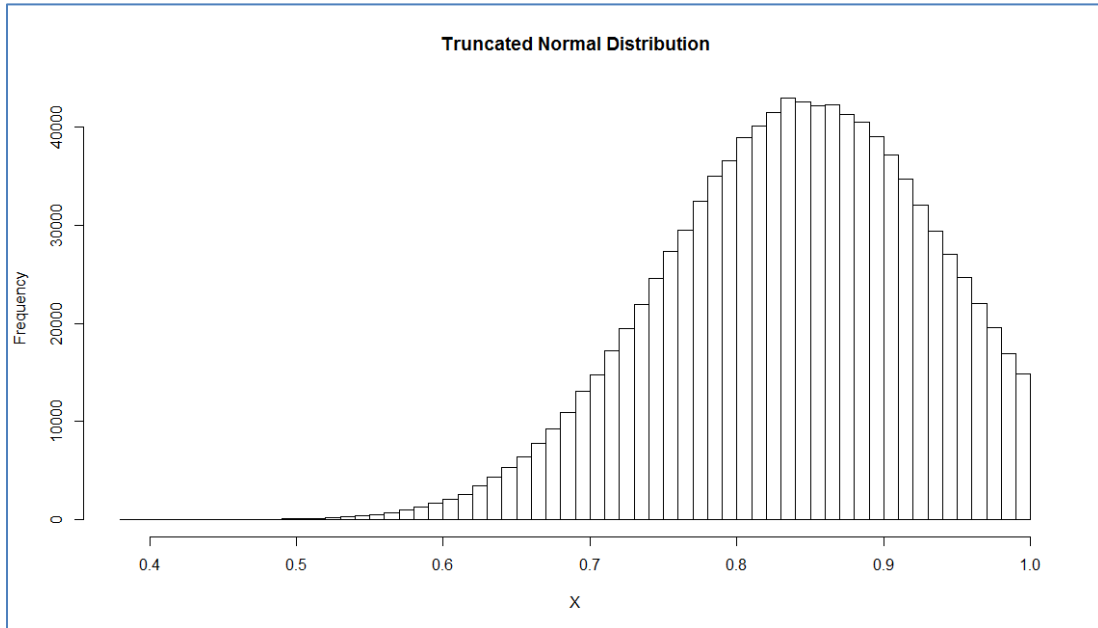
If you know the probability of a producing well (randomly drawn from a combination of truncated Normal distributions in the project RFP), then you can simulate the number of producing wells using a combination of a Uniform distribution for the count and a Bernoulli distribution for whether the well is producing (wet) or dry. The output from a Bernoulli distribution (Binomial distribution with $n = 1$) is either a 1 or 0. The input to this distribution is the probability you get a 1. Once you calculate the probability a well is wet, you can calculate whether the well is producing from the Bernoulli distribution.

You should provide a business report that includes the following:

- Run a simulation for the number of wells in the project that includes whether the well is producing or dry.
- Provide a histogram of the distribution of the proportion of wells that is producing – you will need to know how many wells are dry and how many are wet for each simulation to calculate this.
 - Calculate the 5% VaR from this distribution.
 - Calculate the 5% CVaR from this distribution.
 - Interpret these values.
- One of the hardest things to simulate is the truncated Normal distribution – a Normal distribution with one or both of the tails truncated at a value. The reason this is a hard distribution to simulate from is because you cannot simply just take all values outside of the bounds of the truncation and set them to the truncated value. This leaves large collections of

observations in the tail (SEE CHARTS BELOW). You will need to correctly simulate from a truncated Normal distribution to obtain the probabilities for the producing well.

- Provide your histograms for the probability of hydrocarbons and probability of reservoir (the two pieces that are truncated Normal).



Once the previous pieces of the RFP are complete, the combined results (Phase 1, 2, and 3) can form the whole understanding of the net present value across the entire project. You can refer to previous reports in this final report.

Here are the goals from the analysis:

- Simulate the distribution of Net Present Value from the entire project (all of the wells).
- Calculate the expected return from the scenario, as well as measures of risk – such as Value at Risk and Expected Shortfall.

Make a recommendation on whether the company should invest in the scenario described based on your above numbers.

Data Provided

The following set of data is provided for the proposal:

- The data set **ANALYSIS_DATA** contains the following two sets of information:
 - Estimated drilling costs for Crude Oil, Natural Gas, and Dry Wells. These costs are collected from 1960 – 2007. The geometric annual change on these costs has been calculated.
 - Oil price projections from 2025 – 2050. There are estimates of the high, low, and actual price of oil (reference price).