

CHAPTER 1. INTRODUCTION

1.1 Background

Gas Plant Operations (GPO) often have unplanned shutdown due to leaking problem on piping and equipment. As the case in **Bekasap GP**, average downtime per year due to leakage was 10 days in 2010-2013, while in **Petani GP** the average downtime was 9.7 days in 2011-2013. Total Production Loss due to unplanned shutdowns at both GP is estimated 53.8 MMSCF (8.9 MBOE) or equivalent to 0.63 MM USD.

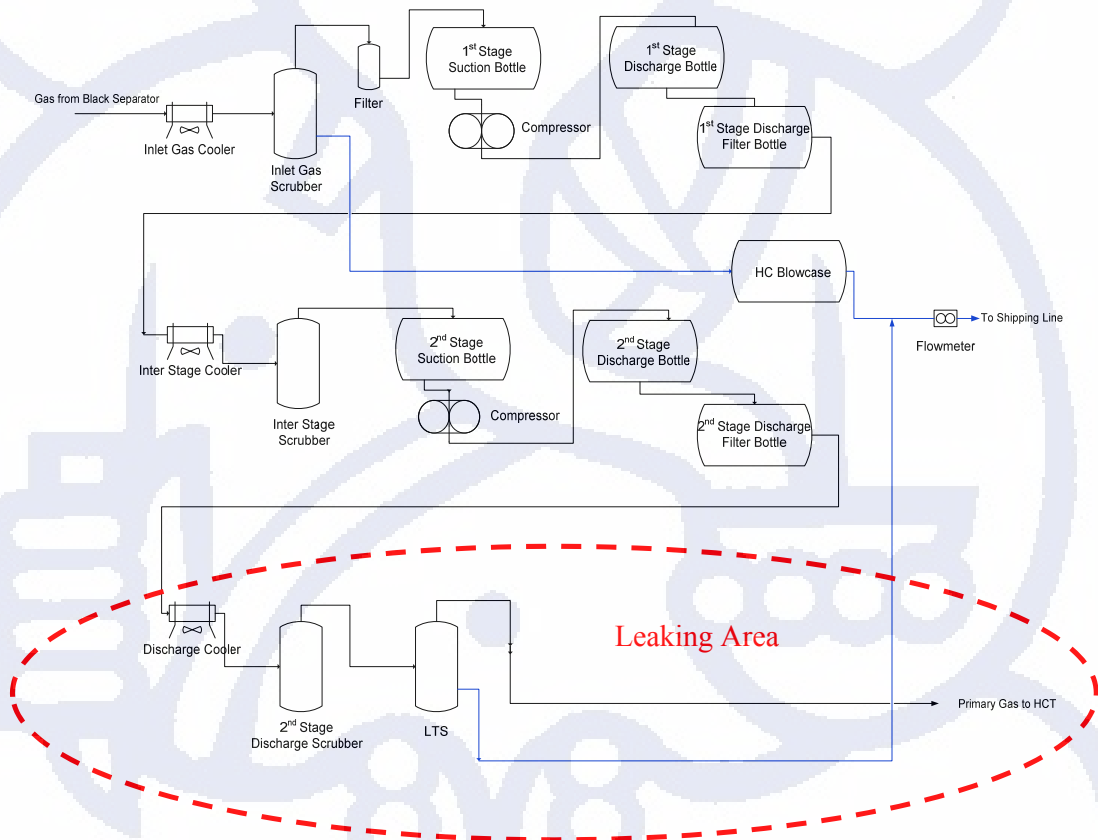


Figure 1.1 Map of Leaking Area

Losses not only in the form of lost production, but also a loss because have to spend and purchase new equipments and piping, dismantle the leaking equipment and piping systems, as well as re-installation and construction of a new equipments.

High unplanned shutdowns due to leaking was caused by vessels and piping corroded by higher H₂S concentration that was 375 ppm incoming at gas outlet of black separator and 150 ppm at gas outgoing to HCT.

In this thesis will look the **right decision analysis as a solution** to GPO management strategy to face operational problems.

1.2 Company Profile

1.2.1 History

Starting its ventures more than eighty years ago in Sumatra, PT Chevron Pacific Indonesia (formerly PT Caltex Pacific Indonesia) is now one of the leading oil and gas companies in Indonesia with a total production around forty percent of the national output.

CPI operates under a production sharing contract with the government of Indonesia represented by BPMIGAS (Executive Agency for Upstream Oil and Gas Business Activities). CPI is also commonly known as a Production Sharing Contractor.

CPI's parent company, Chevron Corporation, is one of the world leading energy companies. With more than 53,000 employees, Chevron subsidiaries conduct business in approximately 180 countries around the world. Chevron operates its business in Indonesia under IndoAsia Business Unit or commonly abbreviated into IBU that covers both operations in Indonesia and the Philippines, in which CPI is one of its business entities.

The platform of CPI's business is The Chevron Way, the universal values that demand the highest level of integrity and achievement of its employees in working with business partners, communities, customers and colleagues. CPI respects and complies with the law, supports universal human rights, protects the environment and benefits the communities where it works.

The company Vision and Values are:

- **Vision:** to be the global energy company most admired for its people, partnership, and performance.
- **Values:** Integrity, Trust, Diversity, Ingenuity, Partnership, Protecting People and the Environment, High Performance

Nearly a Century in Indonesia

The history of CPI started in 1924 when a team of geologists from Standard Oil of California (Socal) landed on the Island of Sumatra. In 1936, Socal and Texaco established CALTEX. In 1963, CPI's predecessor company which operated before and after the proclamation of Independence of the Republic of Indonesia officially became PT Caltex Pacific Indonesia. Socal later changed its name to Chevron and in 2001 Chevron and Texaco officially merged to become ChevronTexaco. In May 2005, ChevronTexaco changed its name to Chevron Corporation and PT Caltex Pacific Indonesia was subsequently named PT Chevron Pacific Indonesia.

World Class Operations

Currently, CPI runs 89 oil and gas field with about 11,000 wells in two production sharing concession or PSC areas totaling around 8,700 square kilometers in Riau. CPI's operation is managed from five offices: Jakarta and Rumbai, Minas, Duri and Dumai in Riau Province. In 2010, CPI employs 4,639 highly skilled personnel stationed in Riau and another small portion is stationed in Jakarta. A number of business partners also support CPI's operations and they employ around 25,000 workers. In 2010, CPI produced nearly 380,000 barrels of oil equivalent per day.

CPI operates three main fields: the Duri, Minas and Bekasap. The Duri field produces crude oil famous by its brand name: Duri Crude. It was discovered in 1941 and started production in 1958. In the 1980's Duri's production was nearly

halted due to its low production rate. But through the marvel of an enhanced oil recovery technology known as steam flooding, steam was injected into Duri's reservoir to miraculously stimulate and multiply Duri Field's production. So much so, that by 2010 the Duri field reached an accumulated production of almost 2.4 billion barrels.

Minas Field is the largest oil field ever discovered in South East Asia. It was discovered in 1944 and started production in 1952. Minas produces a world renowned type of oil called Sumatran Light Crude (SLC). Up to mid 2010, the Minas field has produced over 4.6 billion barrels of oil and continues to produce crude oil through the application of water flooding technology.

Bekasap Areas has many productive fields producing light crude. CPI continues to intensively study the potential of the major Bekasap, Bangko, Kotabatak, Balam and Petani fields and carries out several development programs through the application of advanced exploration and production technologies.

CPI also operates the Dumai Wharves which is home to a tank farm (consolidated gathering station) bearing a storage capacity of six million barrels of oil. Dumai is the last terminal for oil transported from oil wells through pipeline system extending as long as 1,000 kilometers before it is loaded into ocean-going oil tankers.

Heading Into the Future

CPI has been in Indonesia for nearly a hundred years, and expects to stay well into the future. Chevron Corporation will continue to support CPI to invest in its current base business operations in Riau and by acquiring and developing new oil and gas blocks. With the strong support of Chevron, and the Government of Indonesia, CPI will continue to grow and prolong its contribution to Indonesia by exploring and producing oil and gas.

1.2.2 Organizational Structure

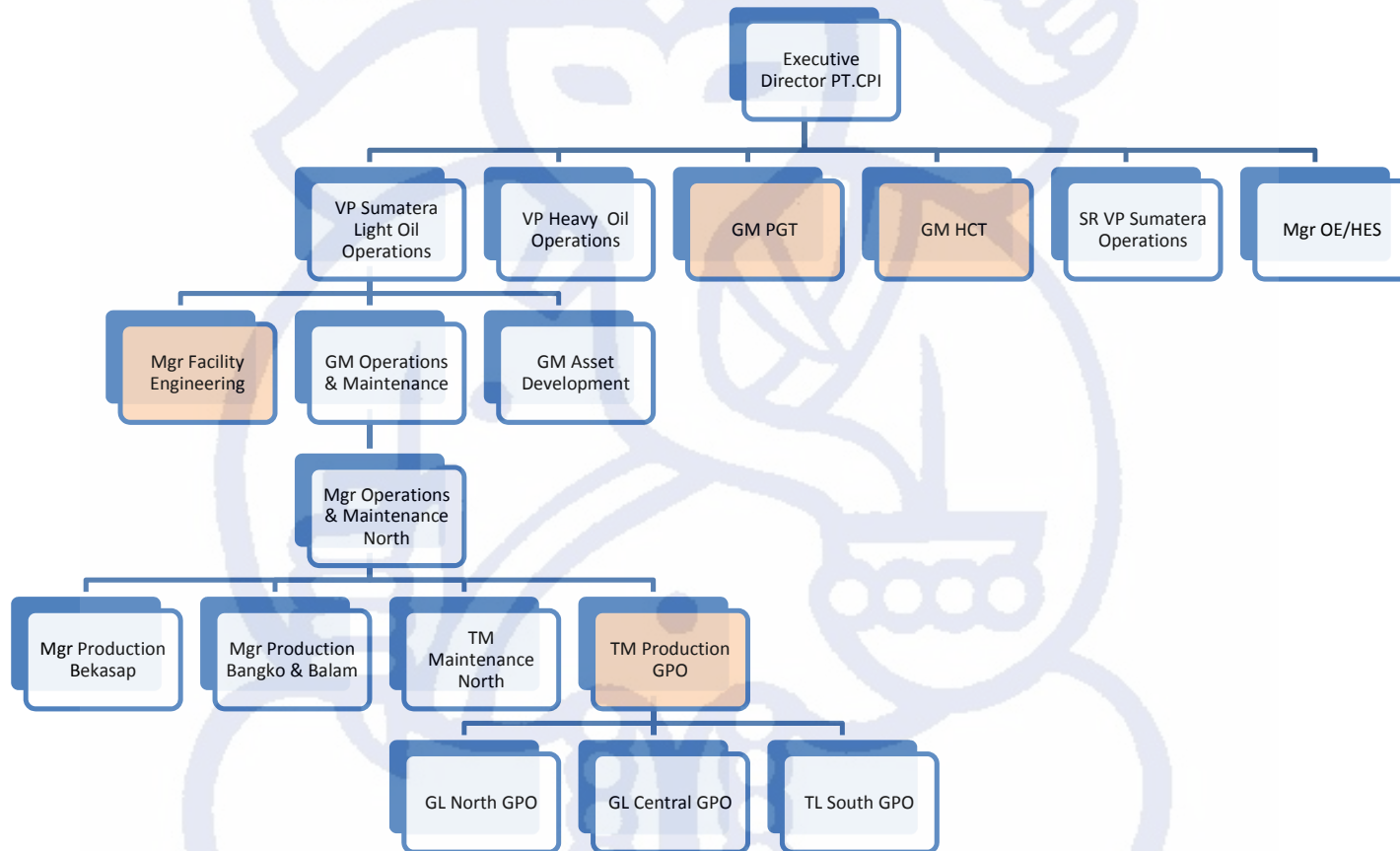


Figure 1.2 Gas Plant Operations Organizational Structure

1.2.3 Scope of Business

PT. CPI in addition to producing oil also produces a gas that comes from oil wells and gas wells. The gas comes from oil wells and gas wells processed in the Gas Plant that flows into Power Generation & Transmission (PGT) through Hydrocarbon Transport (HCT) gas pipeline system.

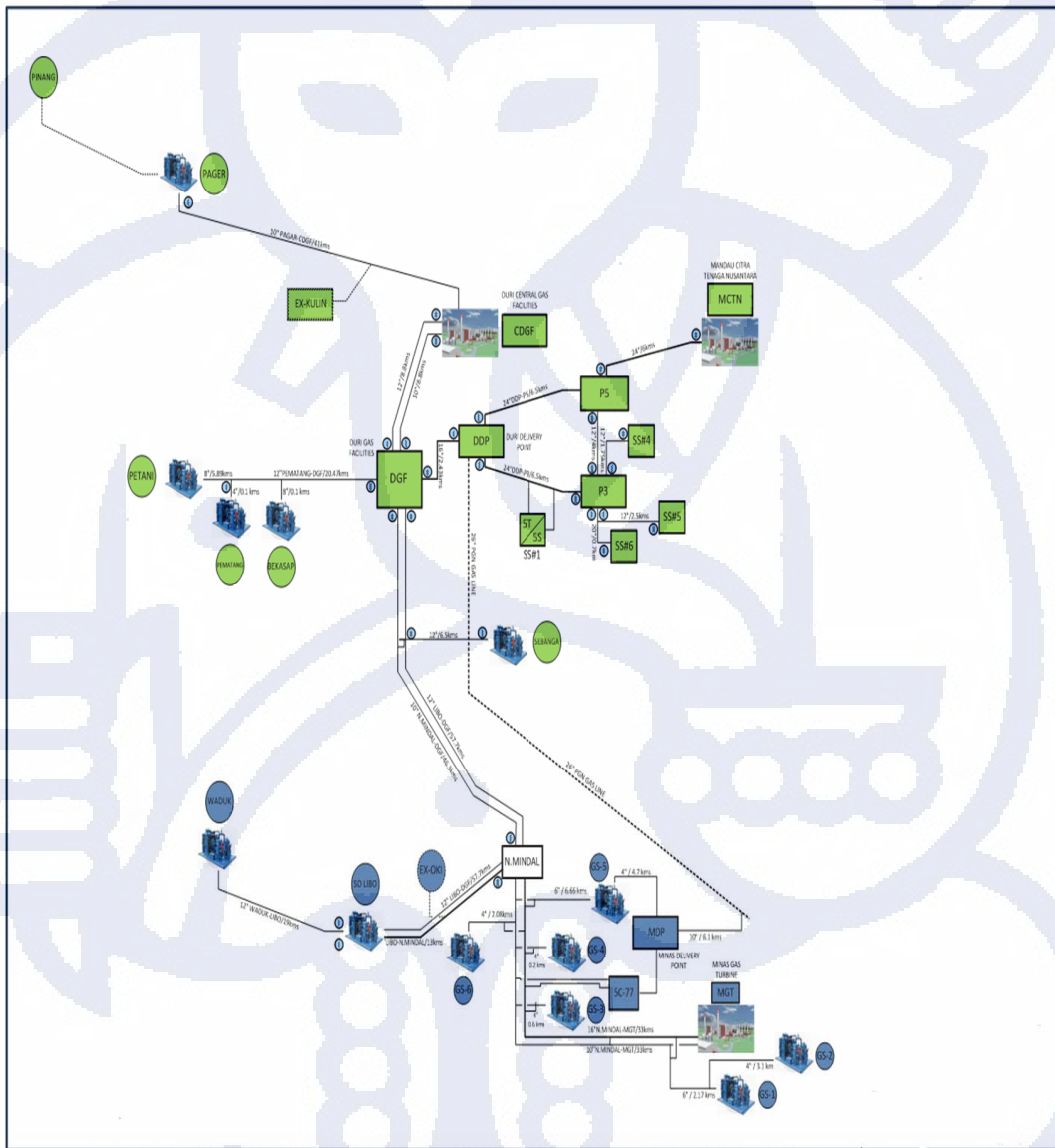


Figure 1.3 HCT Gas Pipeline System

In PGT, gas from the Gas Plant is mixed with gas from suppliers to support the operation of the Steam Turbine Generator. The total gas production of SLN Gas Plant amounted to 41 MMSCFD.

1.3 Business Unit

Gas Plant Operations covers three broad areas namely North (Pager GP), Central (Petani GP, Pematang GP, Bekasap GP, Sebang GP), and South (Libo GP, Waduk GP).

Table 1.1 Gas Production from SLN GP

No	Gas Plant	Gas Production (MMSCFD)	Gross Heating Value (BTU/SCF)	Gas Heat Rate (BBTUD)
1	Waduk	7	1284	8.99
2	Libo	20	987	19.74
3	Sebang	1.25	990	1.24
4	Bekasap	2	1040	2.08
5	Pematang	2.5	990	2.48
6	Petani	7.5	972	7.29
7	Pager	1.5	986	1.48

1.4 Business Issues

In the SLO North operating unit, the gas produced from gas wells have different specifications with the gas that comes from oil wells. **The gas comes from gas wells has lower content of H₂S and lower moisture content rather than gas comes from oil wells.** The combination of higher moisture, higher H₂S, and higher CO₂ content in the gas, had caused corrosion and leaking problem in the Gas Plant processing facilities and HCT pipeline systems.

The impurities that affect the quality of SLN GP gas production is as described in Table 1.2.

Table 1.2 Impurities at Produced Gas from SLN GP

No	Gas Plant	Moisture Content (lb/MMSCF)	H2S Content (ppm)	CO2 Content (% mol)
1	Waduk	20 – 25	25 - 30	15 - 20
2	Libo	40 – 45	35 - 40	32 – 36
3	Sebanga	15	0	0 - 1
4	Bekasap	60 - 70	125 - 175	30 – 35
5	Pematang	20 – 25	0	0 – 1
6	Petani	20 – 25	2 - 5	1 – 3
7	Pager	20 – 25	0	1 – 3

Current gas quality specification from the Gas Plants is only based on **25 lb/MMSCF water content** specification and no other limitation on the other parameters. For comparison, the gas quality specifications of purchased gas from 3rd party are as shown at Table 1.3.

Table 1.3 Gas Quality Specifications of Purchased Gas from 3rd Party

Gross Heating Value	950 - 1,250 Btu/SCF
Maximum Hydrocarbon Dewpoint	70°F @ 350 Psig (prior to commencement of Natural Gas Sales under SP Sale) 55°F @ 420 Psig (after commencement of Natural Gas Sales under SP Sale)
Maximum CO ₂ Content	5.0 MOL%
Maximum N ₂ Content	5.0 MOL%
Maximum H ₂ S Content	8 PPMV
Maximum H ₂ O Content	15 lbs/1000 MSCF
Maximum Sulfur Content	30 PPMW
Maximum Solid Particulates	30 PPMW
Maximum Lead Content	1 PPMW
Maximum Vanadium Content	0.5 PPMW
Maximum Sodium plus Potassium Content	1 PPMW
Maximum Calcium Content	2 PPMW
Maximum Magnesium Content	2 PPMW
Maximum Temperature at CPI Delivery Point	105° Fahrenheit

PGT and HCT have asked Gas Plant Operations is not only able to increase the quantity of gas through gas wells development (opening the new gas wells), but also **can improve the quality of gas produced**, with specifications approaching the quality of gas purchased from suppliers.

Business issues facing by Gas Plant Operations are as following:

- Unplanned shutdown due to leaking piping and equipment
- High H₂S and CO₂ content in the gas produced by Gas Plant
- Safety concern due to very high H₂S content (400 ppm) at the incoming Gas Plant
- Aging facility of most of Dehydration Units
- Gas business strategy has more concern to gas quantity rather than quality