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VENDOR HELD STOCK (VHS) IMPLEMENTATION TO IMPROVE AND INNOVATE FUEL MANAGEMENT SYSTEM: CASE STUDY AT PRABUMULIH FIELD - PERTAMINA EP

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Abstract— Management of fuel in PERTAMINA EP has not managed properly. The current system cannot guarantee the availability of fuel. Losses during storage and distribution exceed the allowable tolerance limits. Equipment, facilities, and infrastructure not meet existing standards as result in fuel consumption data at each location is not accurate. The above matter can lead to high operating costs and affect the company's image. For improvements things mentioned above, the first step is to conduct observation and data collection. The data was analyzed and identified what the potential problems. Potential problems are discussed for the problem solving expectations. After knowing the expectations of the solution designed a new concept of the fuel management system. One alternative designed concept is managing fuel by using a Vendor Held Stock system. After the comparison between the old fuel management concept with a new one, select a better concept fuel management and more profitable for the company. By applying good fuel management system, the problems faced in the management of fuel can be overcome.

Keywords: fuel management, fuel losses, the accuracy of usage, vendor held stock

I. INTRODUCTION

PT PERTAMINA EP (PEP) is engaged in managing the upstream oil and gas production through a more manageable exploration and exploitation activities. Adding to that, PEP has been undertaking other supporting businesses, which have been intended to back up the main business directly or indirectly.

Presently, PERTAMINA EP production level for oil is around 120 thousand barrel oil per day (BOPD) and around 1,003 million standard cubic feet per day (MMSCFD) for gas.

PERTAMINA EP Working Areas of 140.000 km² were once largely PT PERTAMINA (Persero)'s Oil and Gas Mining Authority Zone. The working areas are managed through own operation and partnership cooperation, comprise 3 contracts of Joint Operating Body Enhanced Oil Recovery (JOB-EOR) and 33 contracts of Technical Assistant Contract (TAC). Thus geographically, PERTAMINA EP operates in nearly all territory of Indonesia, from Sabang to Merauke.

PERTAMINA EP Working Areas consist of three regions namely Sumatra, Java and Eastern Indonesia Regions. All JOB EOR and TAC operations are managed from Headquarter while own operations are managed by each region respectively.

The operation of those regions comprise 12 Field Areas, namely Rantau, Pangkalan Susu, Lirik, Jambi, Prabumulih and Pendopo in Sumatra, Subang, Jatibarang and Cepu in Java as well as Sangatta, Bunyu and Papua in Eastern Indonesia.

Beside the management of working areas as stated earlier, other business pattern is management through projects, such as gas development project of Pagar Dewa in South Sumatra, Gundih in Central Java and Matindok in Sulawesi.

One of the important departments in PERTAMINA EP is Supply Chain Management Department. This department has responsibility to support operational activity in PERTAMINA EP

PERTAMINA EP Supply Chain Management Vision is to be the excellent sustainment supplier of goods and services for companywide support.

PERTAMINA EP Supply Chain Management Mission is to integrate supply and demand management within and across companies for the benefit of all parties involved in achieving the supply chain's customer service goals.

Nowadays fuel management in the Field Prabumulih PERTAMINA EP are still using conventional methods. If PERTAMINA EP requires fuel, PERTAMINA EP issued PO to PERTAMINA (Persero) to buy fuel. The handover point of fuel happened at Depot PERTAMINA (Persero). All the risks that occur after handover point from the delivery, storage and distribution is belong to PERTAMINA EP responsibility.

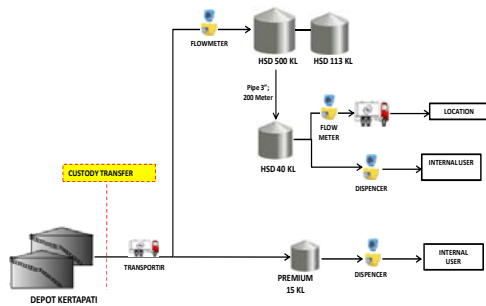


Figure 1. General Flowchart Fuel Supply

II. BUSINESS ISSUE EXPLORATION

Supply Chain Management Department is responsible for the availability of fuel. To avoid a stock out of fuel required minimum stock level or buffer stock. Although the minimum stock level or buffer stock is well managed, but at the time of delivery and distribution are still having problems or intangible risk causes delays to supply such as strikes when the government want to raise fuel prices or other disorders that can make the fuel supply is inhibited.

In a fuel management activities include loading / unloading, transport / distribution, processing, storage and handling, the difference (discrepancies) cannot be avoided. The difference is less known by the term "Losses" is expressed in positive notation. Losses caused by the storage and handling of crude oil and products in tanks store up / Installation / Transit Terminal / Depot / Floating Storage. Handling activities include the amount of crude oil and products that are pumped or distributed from / to Storage tank to another, Transportation (Ship, Tank Truck), and Third Parties

Based on the Guidelines on Handling and Control of Losses of Crude Oil and Products No.A-001/H10200 / 2007-S4. Tolerance limits are allowed for Storage and Handling Losses products is equal 0.3%. Storage and handling of losses tolerance is not a target or operational constraints that must be achieved. the average per month of losses that occurs in the storage tank is 0.6% - 0.7%. losses during distribution is 3.36%. A loss that occurs has exceeded the allowed tolerance. The difference could be caused by human factors, equipment, facilities, and infrastructure

The research question is "What Supply Chain Management improvements and innovations can solve existing problems and create better fuel management system?". The research objectives of the thesis are as follows: a)Security of supply and reduce the risk of delay in delivery of fuel b)Eliminating the risk of losing at the time of delivery and distribution of fuel. c)Operational cost savings.

A. Conceptual Framework

In depth conceptual for supply chain elements would in this research relation to theoretical framework includes Supply Chain Management, Inventory Management, and Vendor Manage Inventory designed in this following framework:

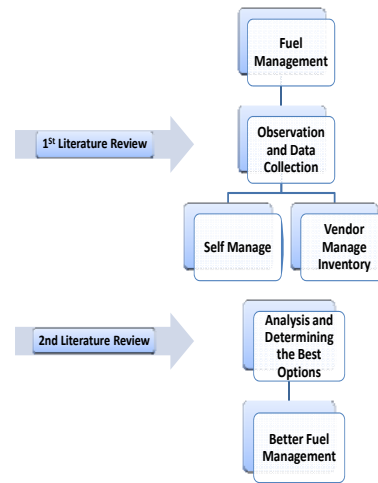


Figure 2. Conceptual Framework

B. Method of Data Collection and Analysis

The data collection for the research was done in two general mechanisms:

1. Data and information from PERTAMINA EP internal database or report such as fuel consumption, fuel transportation, facilities and infrastructure, manpower, and operation time.
2. Verbal discussion through group or personal meeting with different stakeholders. These data would include: a)Expectations from stakeholders. b)Possibility of improvement and innovations. c)Best practices from other company related with fuel management system

C. Analysis of Business Situation

The element would in this research relation to literature review includes supply chain management, inventory management, vendor manage inventory, and lean operating system.

a. Supply Chain Management

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements (levi,2009)

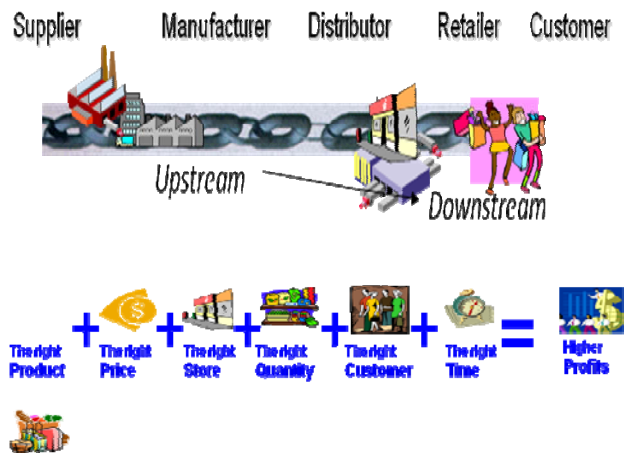


Figure 3. Supply Chain Model

b. Inventory Management

Inventory is a stock of materials used to facilitate production or to satisfy customers demand. Typical inventories include raw material, work in progress, and finished product. (Schroeder, 2008).

Inventory management involves planning, coordinating, and controlling the acquisition, storage, handling, movement, distribution, and possible sale of raw materials, component parts and subassemblies, supplies and tools, replacement parts, and other asset that are needed to meet customer wants and needs.

Inventory can serve several important functions that add flexibility to the operation of a company or firm. The uses of inventory are

1. To provide a stock of goods to meet anticipated demand by customers
2. To separate production and distribution processes. For example, if product demand is high only during summer, a firm may build up stock during the winter and thus avoid the costs of shortages and stock outs in summer.
3. To take advantage of quantity discounts because purchase in larger quantities can substantially reduce the cost of goods.
4. To hedge against inflation and price changes
5. To protect against stock out that can occur due to bad weather, supplier shortages, quality problems, or improper deliveries.
6. To permit operations to continue smoothly with the use of work in process inventory.

Inventory management is an attempt to maintain an adequate supply of goods while minimizing inventory costs. Balancing Inventory and costs could be very hard.

Inventory cost structures incorporate the following four types of costs: item cost, ordering (or setup) cost, carrying (or holding) cost, and stock out cost. (Schroeder, 2008).

c. Vendor Manage Inventory

Vendor-managed inventory (VMI) is becoming a popular concept where the vendor (a consumer goods manufacturer, for example) monitors and

manages inventory for the customer (a grocery store, for example) (Evans, 2007).

This concept is when the supplier takes full responsibility for a group of items needed by customer. In traditional supplier-customer relationship, a customer evaluates its own inventory position and sends a order to a supplier (vendedor) when it has a need for a replenishment order. With VMI, the supplier not only supplies goods, but also provides inventory management services. The supplier-customer agreement usually makes the supplier responsible for maintaining the customer's inventory levels. Here the supplier would monitor inventory levels of the items at the customers site and automatically replenish base on usage. Commonly used items such as fasteners, adhesive, and fuel can be managed using this type of process. VMI requires collaboration between the supplier (vendedor) and the customer (firm) in terms of sharing data as well as access to the firm and its own customers (end customers)

d. Lean Operating System

Manufacturing and service operations that apply the principles of lean enterprise are often called lean operating systems.

Lean enterprise refers to approaches that focus on the elimination of waste in all forms, and smooth, efficient flow of material and information throughout the value chain to obtain faster customer response, higher quality, and lower costs (Evans, 2007).

Lean operating systems have four basic principles such as elimination of waste, increased speed and response, improved quality, and reduced cost. Being a lean organization important because it will becoming more efficient, providing faster customer response all increase value, cost pressures in every industry are driving companies to become more efficient, and therefore, lean operating system are necessary for survival. That is the reason why PERTAMINA EP must become lean organization and it is very important for PERTAMINA EP if want to be a global player.

From the interview results, some points are identified by using coding technique, this technique identifies the point is by looking at common words mentioned by respondents. The results of the coding are grouped as point that are used to developed sub categories and super categories.

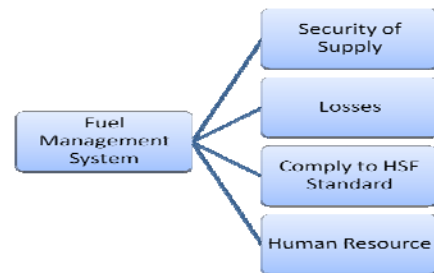


Figure 4. Element of Fuel Management System

Alternative solutions are developed based on the gap between the existing and the proposed fuel management system. In terms of create improvements and innovation in fuel management system, the baseline of the design of system should fulfill stakeholder expectation. After all a fuel management system will be used to help the SCM Department in manage fuel more effective and efficient. The Expectation data gathered from an extensive discussion with the stakeholder is as follow.

1. Guaranty supply of fuel

"If the "right" inventory is carried and delivered at the "right" time, profits are increase through additional sales revenues, and customer service is enhanced. However, it is important to realize that having the wrong inventory or having it at the wrong time can seriously hurt a firm's performance." (Evans,2007).

Organize inventory is not an easy thing. If the inventory is too large then it could result in large inventory costs, but if too few inventories can result in the risk of supply shortages (stock out) which can lead to cessation of operations, delays can result in a profit or even loss of customers. For the primary purpose of the inventory control inventory management is to always be able to serve the needs of materials / goods in an appropriate and low cost. During its development, stock items can be a Non-Stock Item, the material is quite often required but do not need stored in inventory (stockless Policy). Provide through a short-term and long term contract with a third party.

"Vendor Manage Inventory is becoming a popular concept where the vendor monitors and manages inventory for the customer." (Evan,2007)

In the distribution of fuel, there are constraints from both internal and external factors. Internal factors such as improper equipment, facilities, and infrastructure for fuel distribution. While external factors such as road conditions, local people often block the road because they feel PERTAMINA EP has damaged their road.

To maintain the availability of fuel supply in accordance with the requirements (security of supply), need a design and implementation of good management system to maintain the availability of material. It also required the movement of material to the customer system by considering the accuracy of quality, cost, delivery and service. With a good system of material management and distribution, social problems such as local people block the road can be eliminated.

2. Minimize Losses

All parties involved in fuel management process must be able to understand and realize that every deviation is the potential to affect company operational and financial

performance. With the orderly administration and discipline of operational fuel management activities that will help to achieve the target of accountability and auditable in fuel management. By achieving the target of accountability and auditable it is very important for PERTAMINA EP to be global player in oil and gas industry.

Losses that occur already exceed the allowable tolerance. Losses average per month of storage at 0.7%. while the losses are allowed 0.3%. At the time of the distribution of losses that occurred at 3.36% while the losses are allowed the equivalent of 0.5%. If PERTAMINA EP can overcome the losses problem, then there is an opportunity for savings.

3. Comply to HSE standard

"To improve such critical performance measures as time, productivity, flexibility, cost, and quality, new technologies must be developed and integrated into existing goods, services, and operation." (Evan,2007)

Never mind new technologies in equipment, facilities, and infrastructure, PERTAMINA EP still used improper equipment, facilities, and infrastructure in managing fuel. Equipment, facilities, and infrastructure do not meet Health, Safety and Environment (HSE) Standard. An improvement and innovation needed for equipment, facilities, and infrastructure used in manage of fuel must meet Health, Safety and Environment (HSE) Standard. Also required expertise resources to be able in managing the fuel professionally and comply with HSE standards.

Improper equipment, facilities, and infrastructure also can affect accuracy a real time transaction. Most of the activity that goes in a storage area is material handling. It is here that most of the manpower, as well as the equipment, are required in moving goods into and out of storage. Everything possible should be done to assure that the movement will be efficient, and that both manual and mechanized operations are economical and safe. Thereby fulfillment of fuel more efficient and fuel transactions becomes real time. Loses that occurs in the storage, distribution, and operations can be eliminated.

4. Human Resource Development

"Training can help employees develop skills needed to perform their jobs, which directly affects the business. Giving employees opportunities to learn and develop creates a positive work environment, which supports the business strategy by attracting talented employees as well as motivating and retaining current employees." (Noe,2008)

In order to manage fuel properly, it will need human resource that has capability and competence in dealing with fuel. PERTAMINA EP should developed all employee including outsource to create

professionalism human resource. Fuel often misused by person who has not responsibility. Because of that, people development not only about skill but also about attitude and behavior.

III. BUSINESS SOLUTION

The process of purchasing fuel used a direct appointment to PERTAMINA (Persero). Experience which is owned by Pertamina (Persero) in ensuring the availability of fuel and maintain the quality of fuel is the consideration for evaluation of direct appointment process. In addition, it refers to the PTK No. 007 - Revisi-II/PTK/I/2011 on Contract Supply Chain Cooperation Chapter X, Section 4.2.2. item 5. "Procurement of goods by the sum TKDN + BMP reach a minimum 40% (forty percent), which is produced by 1 (one) company with the status of state owned enterprises (SOEs). With the provisions, more than 50% (fifty percent) of state-owned shares are owned by the State. In this case can be direct appointed to the state owned enterprises (SOEs)."

Pertamina (Persero) offered fuel management program to Pertamina EP in order to help overcome the problems being faced by Pertamina EP. The program known as Vendor Held Stock. This program has been running successfully at several companies such as PT. Chevron Pacific Indonesia, PT. Kalimantan Prima Coal, PT. INCO, PT. Petro Kimia Gresik, and so on.

A. Alternative of Business Solution

VHS service system (Vendor Held Stock) is the system where the stock fuel in the consumer storage tank is belongs to PERTAMINA (Persero), and PERTAMINA (Persero) guarantee quality and quantity of fuel. The transaction is amounts of fuel used and has been entered into the user equipment. All the losses that occurred from the delivery, stockpiling, and distribution to the customer equipment is the responsibility of PERTAMINA (Persero).

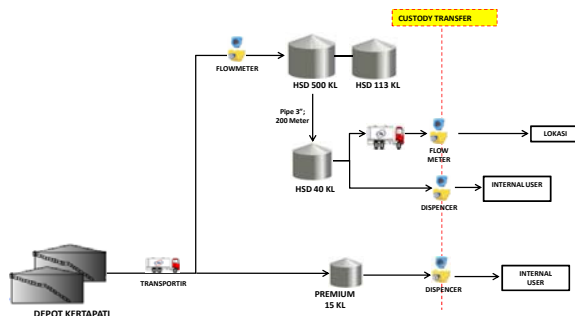


Figure 5. General Flow Chart VHS

PERTAMINA (Persero) Scope of work for VHS inclusive of Procurement of Fuel, Make sure that fuel is always ready at the client's storage site,

Transportation from Pertamina Terminal to client's storage site, Transportation from client's storage site to end user (heavy equipment, machinery, etc), Investment in equipment relating to the supply chain of the operation (Additional Storage Tanks, Road Tankers, Flow-meter, Pumps, etc), Operating under Client's Health, Safety and Environment (HSE) Standard, Manpower requirement to handle the distribution process, System and administration to manage the fuel stock, and Insurance in all aspect of the operation (Manpower, transportation, losses, commercial, etc)

KPI for this service is reability VHS availability of fuel for drilling sites and storage facilities was 99%., Compliance to the requirements of HSE PEP, and accuracy of submission of reports: a report of payment, price reports.

With VHS system, PERTAMINA EP as a client can get the benefit of Security of Supply (Ensured by multiple storage at multiple location), competitively price fuel, PERTAMINA renowned quality and quantity of supply, Zero Losses Program, Minimize Inventory Cost, Minimize overhead Cost, Able to adapt with increase in fuel usage, and Minimize tangible and intangible risk.

As compensation for the application of the VHS, PERTAMINA (Persero) get Handling Fee. The component of the handling fee is divided into two parts. First parts is costs that covering of facilities and equipment, the HSE program, calibration & maintenance, insurance, salaries of employees, operational service truck-tank, administration, and transportation of fuel. Other components of handling fee is Losses

B. Analysis of Business Solution

After do the comparison between existing system (self management) and proposed system (VHS), the cost of fuel management for 5 years if done by self management, it cost \$ 50 billion, whereas when using VHS costs \$ 40 billion. By using a VHS there is a savings of 10 billion. In addition, PERTAMINA EP no needs to spend for carrying/holding cost every month, it will become responsibility of PERTAMINA (Persero). This is already factored into handling. Implementation of the VHS can avoid the potential loss of 450 million Rupiah per day caused by operation stopped because of lack of availability of fuel.

In fuel distribution, in self management have a risk of either internal as well as external factor meanwhile with VHS no need to think about risk of distribution anymore so PERTAMINA EP Can be more focus on core business since had stopped thinking about the risk of fuel distribution

Losses condition right now is over from the tolerance, with VHS Losses already calculated into the handling fee. PERTAMINA EP have opportunity to make savings by eliminated losses.

When used self manage, an investment, improvement and innovation needed for equipment, facilities, and infrastructure used in manage of fuel to meet Health, Safety and Environment (HSE) Standard. All of this requires considerable cost. With VHS, it is

responsibility of PERTAMINA (Persero) to do the improvement and if needed make an investment equipment, facilities, and new infrastructure. This is already factored into handling fee. PERTAMINA EP no needs spend considerable cost for an investment.

Based on that, it is the right decision if PERTAMINA EP immediately implements the VHS.

IV. CONCLUSION AND IMPLEMENTATION PLAN

As conclusion Vendor Held Stock (VHS) implementation become one of the improvement and innovations fuel management system. By implementing VHS will give much benefit to PERTAMINA EP. PERTAMINA EP no longer needs to provide inventory of fuel. It has been managed by PERTAMINA (Persero). VHS ensure the availability of fuel to the location or the site, so PERTAMINA EP can be more focus on core business since had stopped thinking about the risk of fuel distribution. Losses of fuel can be eliminated and minimized so PERTAMINA EP has opportunity to make savings. Accurate data for amount of fuel usage at each location can be obtained. Operational cost can be saved up to 10 billion for five years. The last but not least, company image can be enhancing by implementing Vendor Held Stock (VHS).

For recommendation, from the discussion above, it can be seen that the implementation of VHS provide many benefits for the company. Therefore the implementation of VHS should not only implemented in Prabumulih, but throughout the area / field in the working area of PERTAMINA EP. It is also, the implementation of VHS material is not only applicable to fuel. Need to do some more research on the the implementation of VHS material other than fuel.

Following are the project sheets to implement Vendor Held Stock in fuel management system at Supply Chain Management Department.

The purpose of the implementation plans is to provide a framework of action on which the programs and programs may become reality. The implementation plan based on the goals and objective of the plan and identifies the action required to implement it. The execution will be the prominent part in every business plan improvement or strategy, the business plan improvement execution will need a very strong support, the support is not only SCM Department people in implementing Vendor Held System but also the top management support. Time allocation and strong leadership focus in implementation will be another success key.

Table 1. Timeline VHS Implementation

No	ACTIVITY	TIME FRAME
1	Survey	Feb – March
2	Proposal Presentation	March – April
3	Approval and Contract	April – May
4	Project Socialization	May
5	Procuring Goods	May – July
6	Construction and Renovation	May – August
7	Manpower	July – August
8	Commissioning	August
9	Hand Over Facilities and Fuel	August
10	Socialization VHS Procedure	August
11	VHS Implementation	September
12	Evaluation of VHS	October

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