

A. PROPER FUEL HANDLING AND STORAGE—THEIR RELATION TO ENERGY CONSERVATION

by

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Approximately 95% of energy usage in this country today is derived from petroleum sources. To support the country's needs for energy, three petroleum fuel refineries are in operation. These are: Bataan Refinery at Limay, which is jointly owned by Petrophil Corporation (60%) and Mobil (40%), Caltex Refinery at Bauan, Batangas and Shell Refinery at Tabangao, also at Batangas. BRC's refinery capacity ranges from 100-120 thousand barrels per calendar day, Caltex's is about 70 MBCD, and Shell's is approximately 63 MBCD. All of these refineries produce practically the same product lines, ranging from PG to industrial fuel oil.

The course followed by a typical petroleum product in its journey from the refinery to its enduser is a rather complicated one and product transfer from refineries to the customers involves a system of controls and handling which ensures that product quality does not deteriorate in the process. From the refinery tank, a fuel may be carried by tanker, barge, tank truck, or pipeline to a terminal. From there, it may be transported by truck to a dealer's storage tank or direct to a consumer's tank where the fuel is utilized. It can be readily seen that unless extreme precautions are taken, the product's susceptibility to quality degradation is very imminent. However, if certain basic rules of handling are observed in the field, loss in quality will not occur. Improper handling of fuels in the field can result to two serious problems:

1. contamination with other products
2. contamination with sediment and water.

The first may lead to safety problems, poor ignition and dirty burning; and the second may cause filter and burner fouling.

Contamination of distillate fuel oils with light hydrocarbon such as gasoline is particularly serious. The flash point of the fuel may be lowered below a safe level, and a potentially hazardous situation will exist at any subsequent handling for storage point. Therefore, the flash point should always be checked at each location in the

distribution system. Although gasoline is the most serious contaminant because of safety considerations, contamination with high end-point materials can cause serious quality degradation. Kerosene is extremely sensitive to contamination by higher end point products. This is so because kerosene is designed for use in critical burning equipment such as wick, sleeve, and pot burners. These burners require a sufficiently low end-point fuel to ensure complete vaporization, and only a small amount of a heavy material contaminant can greatly increase carbon-deposit tendency of kerosene. Also, kerosene is normally much lighter in color than other burner fuels, and contamination with heavier fuels will give it an undesirable darker color. High end-point contamination is particularly bad in kerosene.

About the only remedy for contamination, and surely the most foolproof, is complete segregation in product handling systems. If it is absolutely necessary to use common tankage for different products, it is the handler's responsibility to see that the tankage is thoroughly cleaned and inspected before another type of fuel is received.

The more common contamination problem in the field is with water and sediment. This can cause filter and burner fouling, because water and sediment contribute to formation of sludge which has great clogging ability. If large amounts of water are involved, very stable emulsions can form which are extremely troublesome.

With modern tank designs, it is not difficult to rid of water and sediment bottoms. Tank bottoms tend to become foul and dirty but can be cleaned and freed of sediment by flushing and replacement.

Sufficient time should be allowed after receiving the product so that any mixture of fuel and tank bottoms separates before the product is tapped for shipment or use. With a reasonably clean tank and in warm weather, 24 hours is probably ample for this separation.

Tanks are not the original sources of water, but act only as collecting basins. Water can enter the system at many points, specially during transport of oil by water such as ships and barges. For example, most ships carry ballast water when not fully loaded, and it is seldom possible to empty the storage compartments completely of water before taking on cargo. The problem is aggravated during unloading, because some ships have centrifugal discharge pumps, which are good mixers. These may pick up some of this water and mix it with the oil, resulting in a very hazy product which clears very slowly. This situation can contaminate product

lines and tie up storage facilities or it can be a source of customer problems.

One method of minimizing water and sediment contamination is to provide storage tanks with bottom sumps, catch basins, and suitable drain valves. These contaminants should be drained frequently and regularly. To keep products reasonably freed from water and sediment contaminants, these simple rules are recommended:

1. Keep tank water bottoms at the lowest possible level, particularly just prior to the receipt of product.
2. Adopt a regular cleaning procedure for field storage tanks.
3. Permit adequate settling after each product receipt. If possible, use one tank for settling fresh product and a second tank of settled oil from which deliveries are made.
4. Be sure transport equipment is clean.
5. Do not handle distillate (white) products and residual fuels (black) in the same equipment.
6. Check the appearance of products delivered in storage. Report anything unusual regarding the appearance to the supplier immediately.
7. Always move out oldest stock first — “first-in-first-out” (FIFO) basis.
8. Maintain a visual check on product being used.
9. Always strive for *clealiness*. It is next to godliness.

In the final analysis, it could be readily noted how proper handling and storage of fuel products could contribute greatly to conservation. Fuel products whose qualities practically remain unaltered for purposes they are intended while in the process of transfer or handling, could be readily used without generating equipment problems and breakdowns. Careless and improper handling of fuel that result to serious product contamination and quality degradation is indeed wasteful. A contaminated fuel product is inconsistent with fuel efficiency and optimization of usage.

Finally, the biggest setback against fuel conservation is the occurrence of a petroleum fire. Statistics show that the great majority of petroleum fires are caused by leakage or spillage of inflammable materials to which no immediate attention is given. First prevention and control in industrial plants are well-established programs.

Prevention of leakage and spillage of petroleum materials essentially merit due consideration.

<i>Item:</i>	<i>Check</i>	<i>Action/Comment</i>
Whole system	Leakage/spillage	Seal leaks Check/install tank level contend alarm to prevent spillage by overfilling
Tanks and supply lines (heated fuels)	Task heating/line tracing	Ensure correct storage pumping temperatures Check setting/operating of thermostats, thermostat valves Maintain steam traps and condensate return (if applicable)
Tanks and supply lines (heated fuels)	Tank and line insulation	Ensure optimum thickness Ensure good order Ensure weatherproofed (see separate section) Insulate filters
Pumping	Correct sizes pump lines Pumping rate	Circulate only amount of fuel necessary to supply burners at correct pressure/flow
Filters	Clealiness and correct mesh size	Clean regularly (weekly-monthly) Don't <i>over</i> filter
Tanks	Water/sludge formation	Check for accumulated water, drain off to prevent snudge formation.

ENERGY CONSERVATION — BASIC PHILOSOPHIES

A — EFFICIENT USAGE

B — PREVENTION OF WASTAGE

“ENERGY CONSERVATION MEANS DOING BETTER AND NOT DOING WITHOUT.”

TYPES OF FUEL CONTAMINATION

1. CONTAMINATION WITH OTHER PRODUCTS GIVING RISE TO:

- SAFETY PROBLEMS
- POOR IGNITION
- DIRTY BURNING

2. CONTAMINATION WITH SEDIMENT & WATER GIVING RISE TO:

- FILTER CLOGGING
- BURNER FOULING

SIMPLE RULES TO FOLLOW IN KEEPING WATER & SEDIMENT CONTAMINANTS OUT FROM FUEL PRODUCTS

- DRAIN WATER PERIODICALLY
- CLEAN OUT FUEL STORAGE REGULARLY
- ALLOW ADEQUATE SETTLING AFTER RECEIVING
- USE CLEAN TRANSPORT EQUIPMENT
- SEGREGATE HANDLING FACILITIES
- USE PRODUCT ON "FIRST-IN FIRST-OUT" BASIS
- VISUALLY CHECK PRODUCT DAILY
- ALWAYS STRIVE FOR CLEANLINESS

A D D I T I V E S

FOR LIQUIFIED PETROLEUM GAS (LPG)

- ODORANTS

FOR MOTOR GASOLINES

- ANTI-KNOCK AGENTS
- ANTI-OXIDANTS
- METAL DEACTIVATORS
- RUST & CORROSION INHIBITORS
- DE-ICING AND ANTI-STALL AGENTS
- PRE-IGNITION ADDITIVES
- D Y E S

FOR DISTILLATE FUELS (DIESELS)

- FUEL STABILIZERS
- CETANE NUMBER IMPROVERS
- ANTI SMOKE AND ODOR NEUTRALIZERS

FOR RESIDUAL FUELS (BUNKER)

- SLUDGE DISPERSANTS
- HI-TEMP ANTI-CORROSION AGENTS