



## **KENYA PIPELINE COMPANY LIMITED**

### **BRIEF ON PETROLEUM PRODUCTS LOSS VARIANCE**

#### **1. INTRODUCTION**

Product loss is the decrease in product volumes at various stages (*storage, transportation, and loading*) of product handling. These losses are caused by evaporation, difference in accuracy of measurement instruments, and unauthorized activities such as vandalism.

Despite the implementation of advanced technologies and improved industry practices aimed at minimizing losses, the inherent nature of petroleum products inevitably leads to some degree of loss during transportation and handling processes. As a result, product loss is an integral aspect of the petroleum storage and transportation chain.

In the 2023 calendar year, the Kenya Pipeline Company (KPC) reported an average product loss of 0.07%, compared to the internal threshold of 0.10%.

#### **2. TYPES OF PRODUCT LOSSES AND THEIR CAUSES**

Losses are grouped into two types:

- i. Real/Actual and;
- ii. Apparent losses

Real/Actual stock loss is the loss of product through spillage or leakage from pipelines and tanks, evaporation, pilferage or theft, and operational losses from tank draining, decommissioning and truck loading operations.

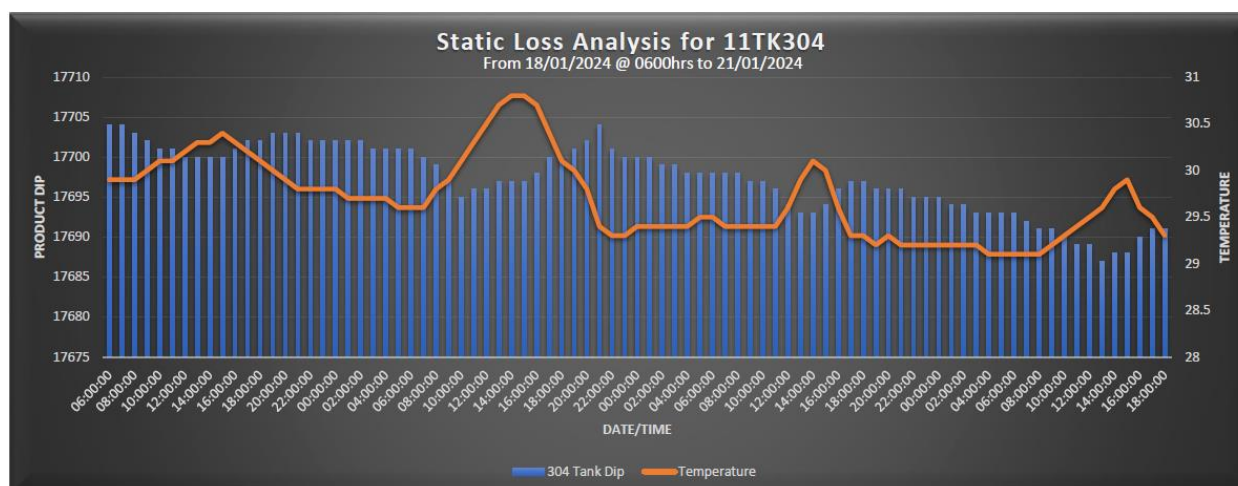
Apparent loss is the loss of volume without an actual escape of the product from the delivery chain. Determining apparent losses can be challenging, as there is 'no physical loss' of petroleum product. It may be caused by factors such as interface sloping, differences in measuring equipment accuracies, or temperature/density measurement errors.

Further, the effect of sloping- which occurs when two product grades mix- the cumulative volume contracts due to difference in molecular sizes. (These can be demonstrated properly in a laboratory experiment.)

Types of product losses and their causes are summarized in the table below.

Causes of Losses	Types of losses
❖ Interface sloping (Product mixing during transport)	Apparent Losses
❖ Measuring Equipment accuracy levels	
❖ Temperature fluctuations**	
❖ Leakages/Spillages	Real Losses
❖ Pilferage & Theft	

\*\* An example of effect of temperature fluctuation on a static products tank is provided here below to demonstrate variations in product level and volume of products over a period of 24-hours. Depending on the time the tank will be operated, the volume recorded will result in either an apparent gain or loss.



Over a period of 42-hours the tank level recorded was a high of 17,704mm and a low of 17,655mm due temperature variation. This translates to an apparent variance of 82M<sup>3</sup>.

### 3. GAIN LOSS COMPARISON GLOBALLY AND LOCALLY IN KENYA

The Transport and Storage Agreement (TSA) that KPC has signed with the Oil Marketing Companies (OMC's) provides for a 0.25% threshold for gain or loss, in accordance with global best practices guided by the accuracy of measurement equipment and applicable technologies. The operational loss performances of some comparable pipeline operators globally level are as shown in table below.

Country	Allowable Gain Loss Variance (%)
Transnet Pipeline South Africa	0.10%

Country	Allowable Gain Loss Variance (%)
Thai Pipeline Thailand	0.15%
Other European Countries (As per the ChannOil Forensic report of 2018/2019)	0.10%

At the local level, the private OMCs' hospitality Depots allowable gain/loss variance are as shown below.

OMC Hospitality Depot	Allowable Gain Loss Variance (%)
1. Ola Energy	0.250
2. Oilcom	0.275
3. NOCK	0.275
4. Lake Oil	0.275
5. Gulf Energy Holding	0.300
6. Petrocity	0.225
7. Vivo Energy	0.150

#### 4. EPRA COMPENSATION FOR PRODUCT LOSS IN PRICE BUILD- UP

EPRA, the regulator, provides for operational loss variance in the price build up as indicated in the Annex II below. OMCs are compensated at the pump price for variances of 0.5% for PMS, 0.3% for DPK and AGO products respectively. *However, for pipeline losses the Regulator adopts the actual numbers as advised monthly by KPC. For the period 2021/2022 and 2022/2023 KPC advised on average a loss variance of 0.06% and 0.04% respectively.*

Product	Pipeline ( $L_p$ )	Depots ( $L_d$ )
Super Petrol	0.25%	0.50%
Regular Petrol	0.25%	0.50%
Kerosene	0.25%	0.30%
Automotive Diesel	0.25%	0.30%

