

# UPDATE ON THE FUEL MARKING PROGRAM IN ZAMBIA



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# PRESENTATION OUTLINE

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1. ERBs legal mandate on product quality
2. Limitations of the analytical methods for quality specifications
3. What is Fuel Marking?
4. Objectives of the fuel marking program
5. Fuel marking legislation
6. Field monitoring and laboratory confirmatory testing
7. Baseline survey results
8. Field sampling and testing results
9. Offences under S.I 69 of 2017
10. Successes scored by the fuel marking program
11. Outlook



## 1.0 ERB LEGAL MANDATE ON PRODUCT QUALITY

- ❑ ERB mandate as enshrined in the Energy Regulation Act No. 12 of 2019
- ❑ Energy Regulation (Petroleum Marking and Monitoring) Regulations SI 69 of 2017.
- ✓ ERB designs standards with regards to the quality, safety and reliability of supply of energy and fuels in conjunction with ZABS and other stakeholders

The ERB has developed the following quality standards:

- ✓ ZS 718: Low Sulphur Gasoil (Diesel) – Specification
- ✓ ZS 395: Unleaded Petrol for Motor Vehicles – Specification;
- ✓ ZS 369: Automotive Gasoil (Diesel Fuel) – Specification
- ✓ ZS 380: Illuminating Kerosene – Specification



- ERB routinely conducts sampling and testing of fuel in the supply chain to guarantee quality fuel in accordance with specifications using analytical test methods at laboratories.



Refinery



Filling Station



GRZ/OMC Depots



## 2.0 LIMITATIONS OF THE ANALYTICAL METHODS FOR QUALITY SPECIFICATIONS



- ✓ Failure to detect adulteration in some quantities;
- ✓ Failure to detect dumping/smuggling;
- ✓ ERB unable to successfully resolve some product quality complaints;



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- ❑ Fuel Marking Technology is a state of the art solution that addresses these limitations and challenges.
  - ❑ Fuel Marking is aimed at enhancing capacity to enforce product specifications.
  - ❑ ***Analytical testing and Fuel Marking compliment each other***



## 3.0 WHAT IS FUEL MARKING (FM)?

- ❑ FM is a process of adding a bio-chemical substance(marker) in liquid form, in prescribed quantities to all **legitimate** fuel sold in the country to act as stamp or “finger print”
- ❑ **Types of markers used:**
- ❑ All legitimate Domestic Diesel and Petrol marked with a unique field and laboratory marker package (ZA-11).
- ❑ All legitimate Kerosene marked with a separate, unique dedicated field and laboratory marker package (ZA-12).
- ❑ All legitimate Mining Fuel marked with a separate unique dedicated laboratory marker package (ZA-14)



- ❑ FM seeks to distinguish the product destined for specific markets within the country e.g. mines, retail, transit etc.
- ❑ The marker has similar chemical properties as the fuel, and **does not change** the colour or quality of the fuel
- ❑ The Marker is added to the fuel at Government and selected Oil Marketing Company (OMC) depots directly into road tankers/rail wagons prior to despatch into the local market
- ❑ FM also involves subsequent field monitoring of the marker concentration levels using appropriate detection equipment.





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Once the fuel is tested, the following is the interpretation of the results:

- ❑ Presence of marker in acceptable concentration means fuel is legitimate;
- ❑ Absence of marker means fuel is illegal;
- ❑ Presence of marker in lower than acceptable concentration means the product has been diluted with illegitimate fuel (smuggled or dumped transit fuel) or other inferior products;
- ❑ Presence of marker in concentration higher than acceptable means product has been illegally marked



## 4.0 OBJECTIVES OF THE FUEL MARKING PROGRAM

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- ❑ To prevent product adulteration and contamination
- ❑ To detect dilution and smuggling
- ❑ To improve the quality of petroleum products.
- ❑ To level the playing field for all
- ❑ To guarantee maximum revenue for the Government



## 5.0 FUEL MARKING LEGISLATION

- ❑ Paradigm shift - ERB as a responsible regulator designed and implemented Fuel Marking Technology (FM) to enhance its mandate on quality
- ❑ ERB commenced Fuel Marking in Zambia on **15th February 2018**.
- ❑ This is following the promulgation of the **“Energy Regulation (Petroleum Marking and Monitoring) Regulations SI 69 of 2017”**.



## 6.0 FIELD MONITORING AND LABORATORY CONFIRMATORY TESTING

- ❑ Field monitoring, sampling and testing is undertaken by ERB Fuel Marking Unit.
- ❑ The field testing involves site visits at filling stations and consumer/commercial sites aimed at ascertaining the levels of marker in the supply chain to ensure compliance with SI 69 of 2017.
- ❑ Field testing involves the use of portable field detectors called LSX 3000 as well as Immuno Assay Columns (IAC) – for detection of adulteration with marked kerosene



- ❑ Confirmatory testing of failed field samples is conducted using Gas Chromatography Mass Spectrometry (GCMS) equipment in the Laboratory - quantitative
- ❑ GCMS analysis is widely considered as “gold standard” in forensic science investigations because it produces court defensible evidence.



## 7.0 BASELINE SURVEY RESULTS

- ❑ Baseline sampling and testing of service stations was conducted in June 2018.
- ❑ Over 280 service stations were sampled and the tests revealed the following:
  - ✓ Approximately 21% illegal activity was detected arising from dilution/adulteration;
  - ✓ 83% of failed or suspect samples were on the North or South borders or on the North - South corridor where transit fuel is mainly being moved and leakages from neighboring countries;
  - ✓ There were high levels of fiscal tax avoidance as evidenced by dilution of domestic products with unmarked products and/or marked adulterant (Kerosene); and
  - ✓ The incremental tax revenue losses due to the illegal activities in the fuel supply chain were estimated to be about USD 81 million per year.



## 8.0 FIELD SAMPLING AND TESTING RESULTS

S/N	Activity/period	Overall percentage compliance
1.	Quarter four, 2019	96.97
2.	Quarter one, 2020	96.40
3.	Quarter two, 2020	96.85
4.	Quarter three, 2020	97.37
5.	Quarter four, 2020	97.68
6.	Quarter one, 2021	99.57
7.	Quarter two, 2021	98.54
8.	Quarter three, 2021	98.45
<b>Average overall compliance</b>		<b>97.73</b>



## 9.0

## OFFENCES AND PENALTIES

- ❑ Marking of a petroleum product without the authority of the Board in accordance with the regulations;
- ❑ Being in possession (in person or premises) of an approved marker without lawful authority;
- ❑ Facilitation of unlawful possession of an approved marker by any person;
- ❑ Sell, distribution, transportation or cause to be sold, distributed, transported an adulterated, unmarked, over marked, non-conforming petroleum products to public;
- ❑ Adulteration or causing adulteration of petroleum products;
- ❑ Dump or cause dumping of petroleum products.





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- ❑ Keeping or maintaining adulterated, unmarked, over marked, non-conforming petroleum products
  - ❑ Cut, break or otherwise interfere with a seal applied to a licenced facility without the authority of the Board or Marking Company;
  - ❑ Being in possession (in person or premises) of non-conforming or adulterated petroleum products (i.e. unmarked, over marked or under marked);
  - ❑ Offloading or removing petroleum products from a facility that has been sealed off without the prior written authorization of the Board.

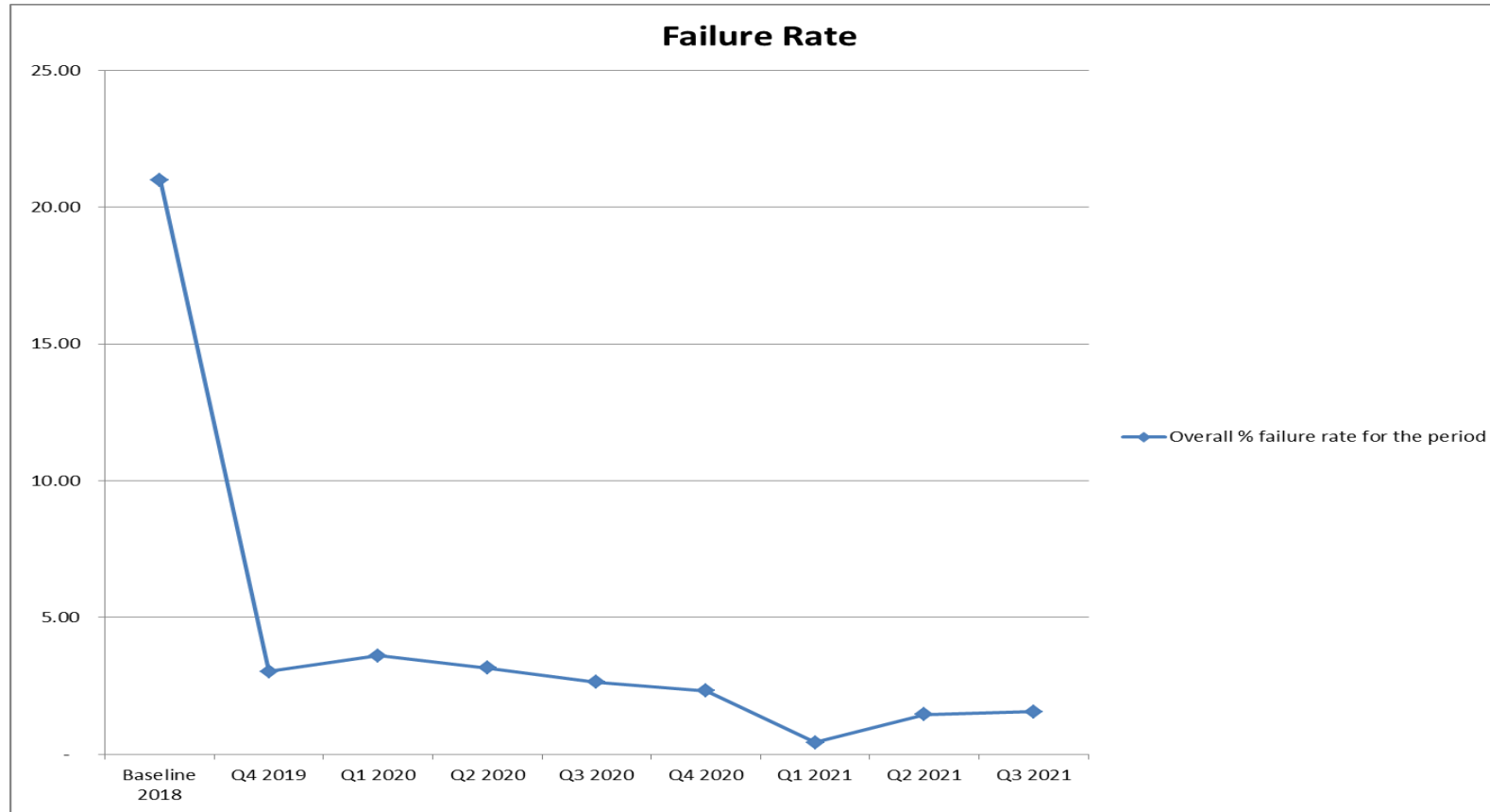


- ❑ The Board shall suspend or revoke the licence of a licensee found in possession of or selling, distributing, transporting non conforming petroleum products
- ❑ A person who commits an offence under these Regulations for which a penalty is not provided is liable, upon conviction, to a fine not exceeding one hundred thousand (100,000) penalty units (K30,000) or to a term of imprisonment for a period not exceeding two (02) years or to both.
- ❑ The Board shall suspend or revoke the licence of a licensee convicted of an offence



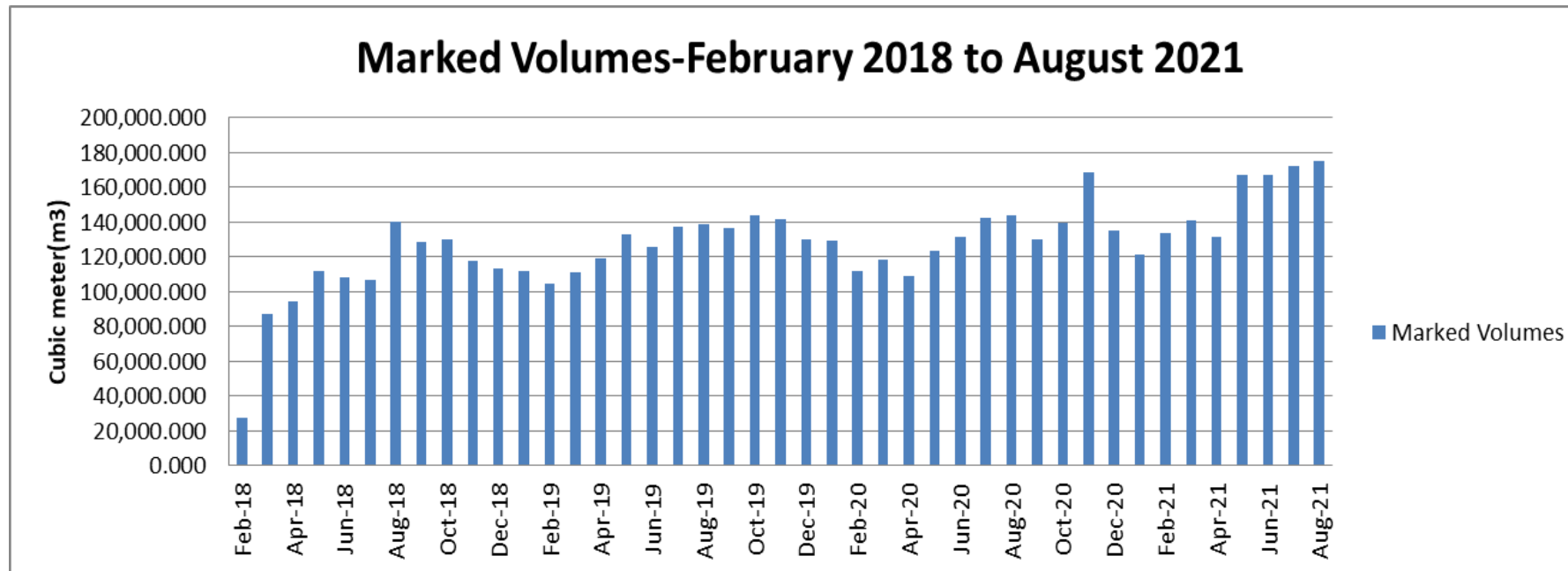
# 10.0 SUCCESSES SCORED BY THE FUEL MARKING PROGRAM

## ❑ (a) Drastic reduction in failure rate



## (b) Increased volumes of fuel marked

- ◆ As at 31<sup>st</sup> August 2021, the total volume of fuel marked countrywide from inception of the program stood at **5,488,738 m<sup>3</sup>**



## (c) Drop in volumes of Kerosene uplifts and consumed

- ❑ Both uplifts and consumption of kerosene show a decline from commencement of fuel marking.
- ❑ This pattern has been confirmed through the near zero failure rates due to kerosene adulteration being detected in the fuel supply chain by the ERB Fuel Marking Unit.



## **(d) Increase in volumes of diesel uplifts and consumed**

- ❑ An immediate increase in diesel uplifted was observed from the commencement of fuel marking in February 2018
- ❑ Currently the uplifts and consumption figures are almost the same



## e) Increased petroleum product quality compliance

Year	Petroleum product quality compliance (%)
2016	93.7
2017	84.5
2018	95.2
2019	97.8
2020	97.6
2021(Q.3)	97.4



## (f) Illegal fuel vending raids

- ❑ ERB facilitates and provides technical support to the Anti-Illegal Fuel Vending Committee consisting of state security and investigating wings and relevant Government Ministries.
- ❑ Since commencement of fuel marking, targeted raids have been conducted on most problematic areas: Lukulu District, Northwestern province, Chirundu, along Ndola-Kapiri road, Chibombo and Lusaka Province.
- ❑ The Task team has recovered about **300,000 liters** of fuel worth about **K4.8 million** since the commencement of fuel marking.
- ❑ **27 people** have been prosecuted, while **6 cases** are still in the courts of law.





## (g) Reduction in revenue losses

- ❑ At 21% failure rate determined at baseline survey in June 2018 – an estimated \$ 81 million per annum tax revenue was being lost.
- ❑ As at Q3 2021 at a failure rate of 1.55%, the estimated tax revenue loss have reduced to about \$6 million per annum based on 2018 consumption volumes.





## 11.0 OUTLOOK

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- ❑ Enforcement of SI 69 to ensure that the quality of fuel being marketed in Zambia is guaranteed and that maximum revenue is realised;
- ❑ Continuous and sustained monitoring, sampling and testing of the fuel supply chain to **exceed** the gains achieved so far and deter would be offenders;
- ❑ Continuous raids by the Anti-Illegal Fuel Vending Task Team to contain illegal fuel vending;
- ❑ Enhancing of fuel marking through digital solutions by using track and tracing technology for all inbound and transit fuel tankers to ensure all possible leakages are eliminated; and.
- ❑ The ERB remains resolute and committed to execute its regulatory functions as mandated by law to guarantee quality petroleum products in the country.



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THANK  
YOU

