HM Revenue & Customs

Combatting Fuel Duty Fraud

Evaluation of the Accutrace Fuel Marker

December 2017

1. Executive summary

1.1. Fuel duty makes an important contribution to the public finances. In 2016-17, it was the fifth largest source of tax revenue, generating £27.9bn or 4.9% of total tax revenue.

1.2. We developed our first oils anti-fraud strategy in 2002, when fuel duty fraud involving illicit diesel cost the UK around £1.6bn in lost revenue. Since then, we have continually refreshed the strategy to meet new challenges. As a result, we have significantly reduced the tax gap. Latest estimates for 2015-16 indicate that the tax gap has fallen to less than £100m across the UK, of which around £50m relates to Northern Ireland.

1.3. In spite of the significant and sustained reduction in fuel duty fraud, we identified that criminals were using relatively straightforward and low cost processes to launder the existing mix of fuel markers, which are added to identify rebated fuels.

1.4. In response, the UK introduced a new fuel marker (Accutrace)[1] on 1 April 2015 which is highly resistant to conventional laundering methods. The Republic of Ireland also introduced the same marker from 31 March 2015. We produced evaluation reports six months and one year after the introduction of the new marker[2]. This report covers the two year period since the marker was introduced.

1.5. During that period, our specialist mobile road fuel testing units carried out almost 95,000 tests, finding illicit fuel in around 4,500 instances. In all cases where further laboratory analysis showed laundering or partial laundering of the old markers or dyes, the new marker was still present. In around 16% of these cases, it was the only marker present and without it, we would not have been able to identify that the fuel had been laundered.

1.6. We saw a sustained reduction in the number and size of laundering plants which use conventional methods to launder the other pre-existing markers and dyes from rebated fuel, as well as a reduction in the incidence and quantity of associated waste material dumped in Northern Ireland. This is consistent with an overall shift away from illicit laundering.

1.7. In the first two years since the introduction of the new marker, HMRC and other law enforcement agencies found no evidence that fraudsters had laundered the new marker. All the evidence indicated that the new marker was being effective in helping drive down fuel laundering. We continue to monitor the performance of the marker, and the effectiveness of our actions in combatting fuel duty fraud will continue to be reflected in HMRC's published tax gap data.

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[1] References to Accutrace refer to Accutrace™S10, a marker produced by the Dow Chemical Company

[2] Combatting Fuel Duty Fraud, Evaluation of the Accutrace™ S10 Fuel Marker October 2015 and Combatting Fuel Duty Fraud, Evaluation of the Accutrace Fuel Marker September 2016 were deposited in the House of Commons Library and are available at http://www.parliament.uk/depositedpapers

2. Introduction

2.1. On 1 April 2015, the UK introduced a new fuel marker (Accutrace) to help combat the evasion of fuel duty. This evaluation report covers the first two years of the marker's operation. It outlines the policy context, describes how the marker contributes to HMRC's work to combat fuel duty fraud, and the operational and supporting evidence for the extent of fuel laundering since its introduction.

Fuel duty fraud

2.2. Fuel duty makes an important contribution to the public finances. In 2016-17, it was the fifth largest source of tax revenue, generating £27.9bn or 4.9% of total tax revenue.[3]

2.3. All motor and heating fuel, whether imported or home produced is liable to fuel duty. The rate of duty is dependent on both the type of fuel and how the fuel is used. The difference in these rates of duty is a key driver for fuel fraud. Table 1 below shows some of the different types of fuel and the current rates of fuel duty.

Table 1 Fuel Type and Rates of duty at 01.10.17

Fuel type	Duty (pence per litre)
Diesel ('gas oil') and petrol used as road fuel are subject to the **full rate of duty**	57.95
Gas oil used for certain approved uses (such as heating, mobile machinery and stationary engines) is subject to a **lower 'rebated rate'** of duty	11.14
Kerosene used for heating is **fully rebated**	Nil

2.4. Rebated gas oil cannot legally be used as a road fuel unless in 'excepted vehicles', such as unlicensed vehicles used exclusively on private property and vehicles that are not intended for use on the road (for example agricultural tractors or fork lifts). It is commonly known as 'red diesel' because of the red dye that is added to distinguish it from road fuel.

2.5. There are several types of fuel fraud:

- **Straight misuse**: this is where marked rebated fuels are knowingly used in road vehicles. Where red diesel is used this is known as "running on red".
- **Laundering**: where the chemical dyes and covert markers are removed from rebated fuel to give it the appearance of legitimate road fuel. Users of the fuel may be either complicit in or unaware of the fraud.
- **Mixing**: using kerosene or industrial fuel oils to 'extend' diesel used as road fuel. Methanol may be added to petrol to achieve the same effect. As well as being illegal, this can have harmful effects on vehicle engines.
- **Illicit production**: where, for example, a biofuel producer fails to register with HMRC and does not account for duty.
- **Smuggling**: the trafficking of cheaper fuels from the EU or third countries outside of the EU for illicit sale in the UK.

[3] HMRC Tax and NIC Receipts: information and analysis (September 2017)
https://www.gov.uk/government/statistics/hmrc-tax-and-nics-receipts-for-the-uk

Impact of fuel duty fraud on tax revenue

2.6. The impact of fuel duty fraud can be seen in HMRC's published tax gap estimates. The tax gap estimates the difference between the amount of tax theoretically due and the amount collected. In 2002, when we developed the oils anti-fraud strategy, the estimated UK tax gap for diesel was around £1.6bn. Our most recent published estimate shows that in 2015-16 the tax gap for fuel duty and associated VAT in respect of diesel had fallen to less than £100m across the UK, of which around £50m related to Northern Ireland. This illustrates that tax losses have fallen significantly across the UK, and that the level of non-compliance remains higher in Northern Ireland (NI) compared to Great Britain (GB). Table 2 shows HMRC's recent estimates of the illicit market share for diesel in GB and NI[4].

Table 2 Diesel: Illicit market share and tax gap - central estimates

	2002-03	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
GB %	12%	5%	2%	1%	<1%	<1%	<1%	<1%
GB £m	1500	850	400	150	<50	<50	<50	<50
NI%	26%	6%	12%	13%	11%	8%	8%	8%
NI £m	100	30	70	80	70	50	50	50

[4] HMRC's estimates of the oils tax gap are published in Section 3.3 of Measuring Tax Gaps https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/655097/HMRC-measuring-tax-gaps-2017.pdf

3. Marking of UK rebated fuel

3.1. The requirement for chemical markers and dyes to be added to rebated fuels is a key part of our approach to countering fuel fraud. Before fuel can qualify for rebated rates of duty, UK legislation requires markers to be added at a specified concentration. This allows HMRC to distinguish between rebated fuels and road fuels for the purpose of combatting fraud. The markers are added after production at refineries or approved remote marking premises.

3.2. EU law requires Member States to mark rebated fuels with a "Common Fiscal Marker" (the 'Euromarker'). The UK therefore marks both rebated gas oil and kerosene with the Euromarker (currently Solvent Yellow 124). While the UK remains a member of the EU, we will continue to deliver on our existing commitments and be bound by the existing EU rules.

3.3. Member States may also require the addition of a national marker or colour as well as the Euromarker. The UK's longstanding policy has been to require further markers to be added to rebated fuels:

- **Rebated Gas oil (Diesel)** is marked with Quinizarin, and with a red dye called Solvent Red 24, hence it is known as 'red diesel'; and
- **Kerosene used for heating** is marked with Coumarin.

Introduction of a new marker

3.4. Although HMRC's published tax gap figures show that HMRC's strategy has resulted in a significant and sustained reduction in fuel fraud, HMRC's operational activity and intelligence identified that criminals were successfully laundering the existing mix of markers, using relatively straightforward and low cost processes. This was particularly prevalent in Northern Ireland, as shown by the disproportionately high levels of illicit activity compared with Great Britain. As a result, we sought to introduce a new marker that was more resistant to laundering for use alongside the existing markers.

3.5. In May 2012, HMRC and the Irish Revenue Commissioners signed a Memorandum of Understanding on a joint project to identify a new fuel marker. Ten submissions covering twenty-two markers proceeded to the evaluation stage. Each of the ten submissions was assessed and scored based on the Award Criteria as specified in the Invitation to Make Submissions. This included tests undertaken by the State Laboratory in Ireland and in the UK by LGC Ltd under the direction of the Government Chemist to assess resistance to known and expected laundering techniques. The chosen marker (Accutrace) was introduced on 1 April 2015 in the UK and on 31 March 2015 in the Republic of Ireland.

The new marker

3.6. Accutrace is a colourless marker whose chemical properties are similar to that of diesel, rendering it resistant to conventional dye washing and adsorption laundering methods.

3.7. It is recognised that all markers will have potential vulnerabilities. Scientific advice provided to HMRC by LCG Ltd is that although the marker could be susceptible to laundering by distillation, distillation is an extremely challenging technique in practice. This is because:

- It is significantly more difficult to implement than conventional techniques used to launder fuel, as it requires specialist knowledge and equipment, especially if operated on a large scale.
- It requires high-energy input, which is difficult to conceal.
- The size of the distillation vessel is a determining factor in the viability of distillation. The larger the distillation tank the higher the temperature required as it is difficult to maintain a high vacuum (if used).
- Distillation does not achieve absolute removal of other UK markers and therefore could only be used as part of a multi-stage laundering process, thus adding to the costs.

Rebated fuel - supply chain control

3.8. In our 12 month evaluation report, we explained the survey and sampling exercises undertaken by HMRC to ensure the industry had correctly introduced Accutrace into the rebated fuel supply chain. Since then, we have continued to assure compliance with the marking requirements through a combination of:

- A risk-based approach focused on ensuring that businesses have appropriate controls in place to mark fuels correctly and auditing these controls.
- Sampling and testing of rebated fuel at marking premises in response to identified risks.

As a result of our ongoing assurance activity, we remain confident that Accutrace is established within the legitimate rebated fuel supply chain.

4. Combatting fuel laundering and other types of fuel fraud

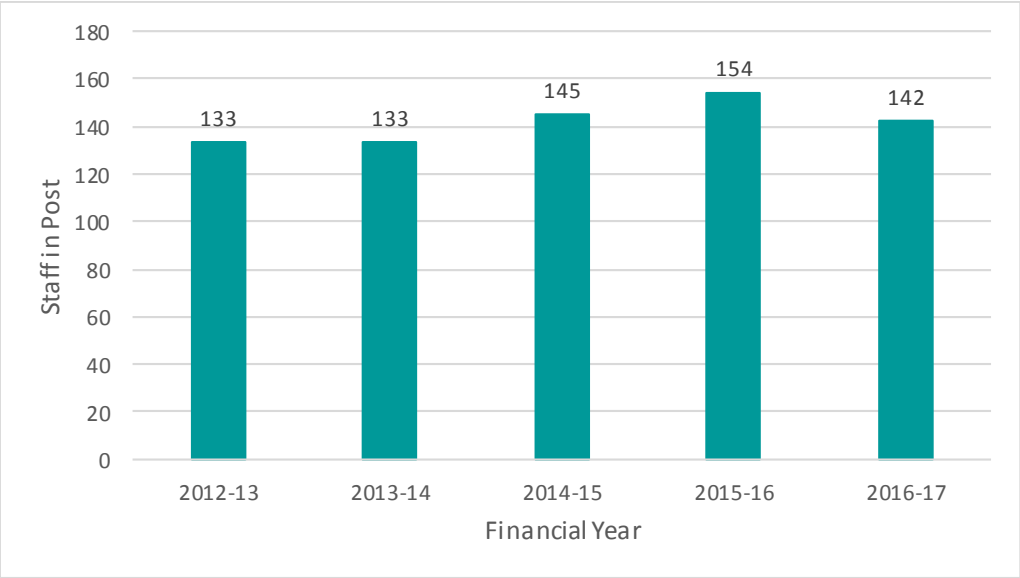
HMRC's approach to fuel fraud

4.1. We launched our oils anti-fraud strategy in 2002 - a dynamic strategy that has evolved in response to changing risks and emerging threats, as fraudsters adapt to new controls introduced. The requirement to mark rebated fuels with chemical markers and dyes is part of a multi-faceted approach, the elements of which include:

- enhanced control of the supply of rebated fuels through the UK's Registered Dealers in Controlled Oils regime;
- sharing of intelligence with other enforcement agencies and collaborative working with the Irish Revenue; and
- targeted detection and investigation work by specialist HMRC staff.

4.2. The government remains committed to tackling fuel duty fraud and in Autumn Statement 2013 invested in the expansion of Road Fuel Testing Unit (RFTU) capacity in NI and GB, plus extra resource for fuel fraud work within HMRC's Fraud Investigation Service. Chart 1 shows HMRC staff deployed in its Road Fuel Testing Units.

Chart 1: HMRC staff resources deployed in its Road Fuel Testing Units[5]



HMRC Road Fuel Testing Units – Operational Results

4.3. HMRC tests for illicit fuel throughout the supply chain, including at wholesalers, retail premises, illegal pop up sites and at the roadside in the tanks of commercial and private diesel vehicles. Our specialist mobile road fuel testing units use a number of tests to determine the presence of markers and dyes in rebated fuels fraudulently used as road fuels. In the first two years since Accutrace was introduced, we detected no cases where it had been successfully laundered from rebated fuel.

[5] Figures show staff in post at each year end and do not include vacancies being carried by HMRC. There were 21 vacancies at the end of 2016-17.

4.4. Table 3 below shows the results of HMRC's tests in the UK in the first two years since the introduction of Accutrace. As the testing regime is designed to address all types of illicit activity the detections include all forms of fraud i.e. misuse of rebated fuels, mixing, smuggling, illicit production, as well as the fuel laundering that the new marker is intended to address. HMRC seized over 2.6m litres of fuel in 2016-17 from its work tackling fuel fraud.

Table 3: HMRC operational activity 2015-16 and 2016-17

	Total tests carried out		Detections from these tests		Detection hit rate	
	2015-16	**2016-17**	**2015-16**	**2016-17**	**2015-16**	**2016-17**
Total tests carried out	49,157	45,637	2,416	2,041	4.9%	4.5%
Sub categories						
Retail site tests	3,172	2,680	189	125	6.0%	4.7%
Commercial vehicles tested	39,438	37,849	1,437	1,197	3.6%	3.2%
Other* tests	6,547	5,108	790	719	12.1%	14.1%

*other tests include a range of cases e.g. bunkering sites[6], huckster sites[7] and private vehicles[8]

4.5. We are taking an increasingly data-driven, risk-based approach to tackling all non-compliance, placing greater emphasis on upstream interventions where we can deliver a greater deterrent and enforcement impact. The tests are resource intensive, and the number of tests performed by HMRC RFTU staff can fluctuate depending on the complexity of the operation and nature of the sites targeted. This varies from year to year as we regularly review our operational priorities and strategic approach.

4.6. Individuals and businesses found to be illicitly using rebated fuels as road fuels face a range of sanctions including: the seizure of their vehicle; civil penalties; vehicle storage costs and unpaid duty; permanent forfeiture of the vehicle and/or criminal proceedings.

4.7. We also use the findings of our testing programme to identify others in the supply chain involved in using or supplying rebated fuels as road fuels, and to inform our risk-based compliance approach.

Results of analysis of formal samples

4.8. Where preliminary tests indicate the presence of illicit fuel, HMRC RFTU officers will draw formal samples, including a sample for possible testing by analysts under the direction of the Government Chemist. Not all samples are sent for laboratory analysis as it is not always cost effective, or because an admission of fraud has been made, or for other reasons it is not required evidentially. All samples are retained for 6 months in case of a change of circumstances.

[6] Bunkering sites are bulk storage sites used mostly by hauliers where the fuel is not for general sale to the public.

[7] Huckster sites are pop-up petrol stations that sell only diesel and/or marked gas oil in drums; they are not licensed to sell petrol nor are they Registered Dealers in Controlled Oils.

[8] Tests on taxis are included in the 'commercial vehicle' category.

Case study 1 - Testing at Retail Sites

In October 2016, officers from HMRC's Birmingham Road Fuel Testing Unit identified illicit fuel during a roadside inspection of a private vehicle. Subsequent enquiries traced the fuel back to the retail site where it had been purchased, and HMRC's tests showed that road fuel on sale at the service station contained Accutrace. Laboratory testing of the formal sample taken by HMRC confirmed that Accutrace was present and that the fuel contained laundered red diesel and laundered kerosene. HMRC seized 9000 litres of illicit fuel from the retail site.

Case Study 2 - Testing Commercial Vehicles

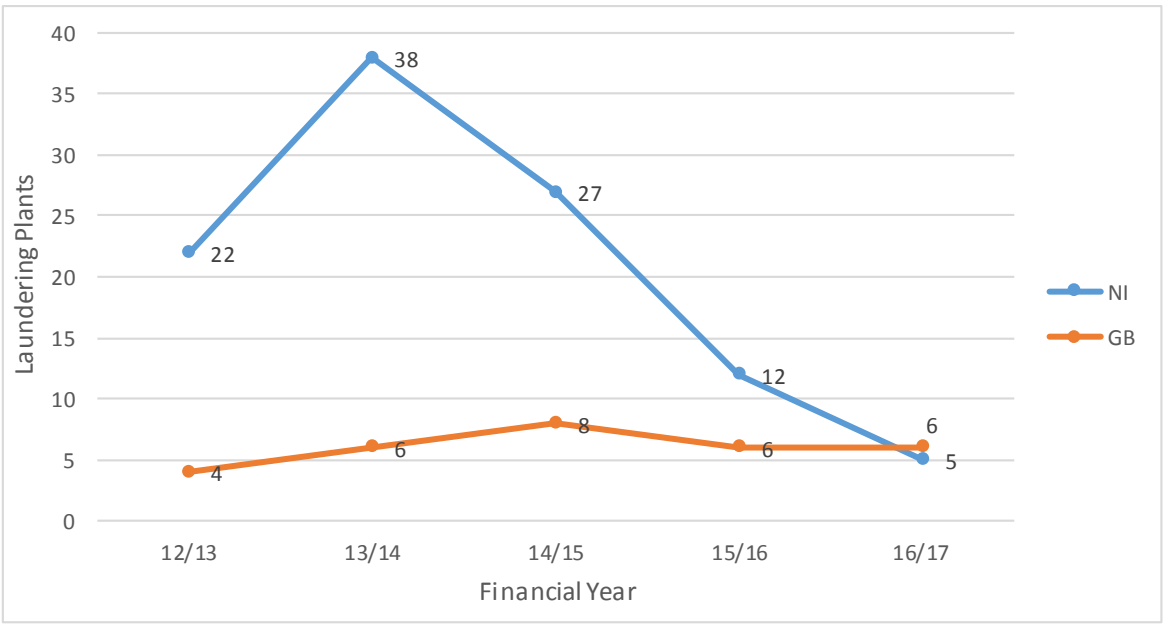
Following an earlier seizure of an HGV which HMRC roadside testing had found to be using laundered fuel, in September 2016 officers from HMRC's Belfast Road Fuel Testing Unit conducted a follow-up visit to a road haulage business. HMRC tests showed two HGVs to be running on laundered fuel which contained Accutrace. The vehicles were seized and the haulier paid £3000 to have the vehicles restored. When HMRC tests in January 2017 found that another HGV operated by the haulier contained Accutrace, the vehicle was seized and not restored.

4.9. In the first two years of the new marker, laboratory analysis identified that the old markers or dyes had been either partially or completely laundered in 429 of the samples received by LGC Ltd for analysis. The new marker was present in all of these samples. In 68 of these cases (16%), Accutrace was the only marker present, indicating that all the other markers and dyes had been successfully laundered. Without the addition of the new marker, we would not have been able to detect that these samples were laundered fuel. None of the samples submitted for analysis showed any evidence that the fraudsters had been able to successfully launder the new marker.

Impact of Accutrace on the number and size of laundering plants

4.10. In the first two years since the introduction of the new marker, HMRC or other law enforcement agencies found no evidence that fraudsters had laundered the new marker. There was also been a sustained reduction in the number and size of conventional laundering plants discovered by HMRC. This is consistent with an overall shift away from illicit laundering. The number of conventional laundering plants detected by HMRC is set out in Chart 2 below.

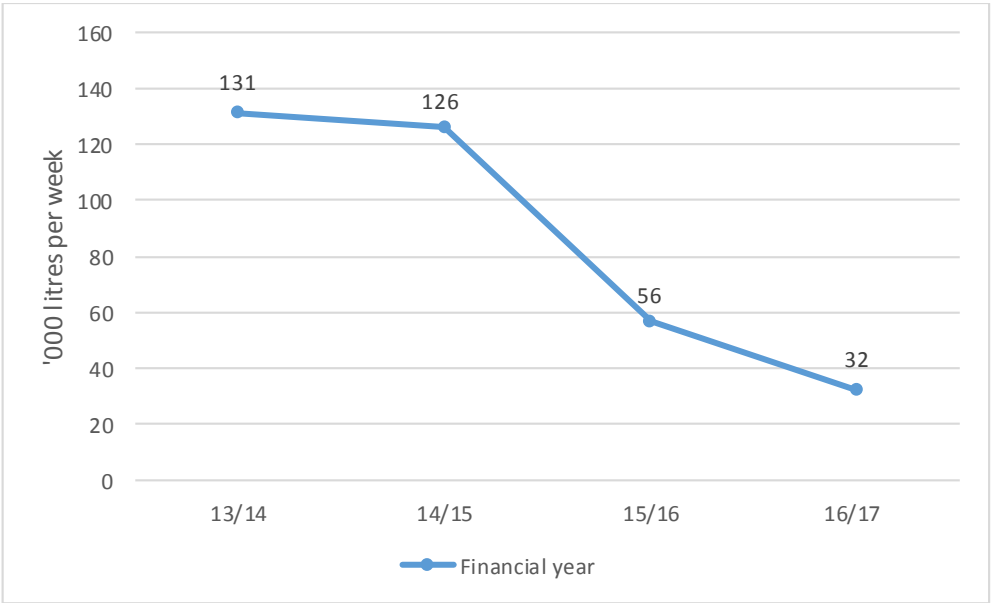
Chart 2: Conventional laundering plants discovered in Great Britain and Northern Ireland



4.11. There was a similar reduction in the number of conventional laundering plants discovered in the Republic of Ireland where just one fuel laundry was detected in 2016 and none were detected in in 2015.[9]

4.12. In addition to a reduction in the number of laundering plants detected by HMRC, there was a noticeable reduction in the processing capacity of the laundering plants detected. The average estimated processing capacity of an illicit laundering plant in Northern Ireland is set out below.

Chart 3: The average estimated processing capacity of laundering plants in Northern Ireland[10]



[9] Irish Revenue Commissioners Annual Reports 2015 (Table 20) and 2016 (Table 23)
http://www.revenue.ie/en/corporate/press-office/annual-report/index.aspx
[10] Figures for 14/15 and 15/16 are revised following corrections to HMRC data.

Case study 3 – laundering plant in Great Britain

In July 2016, seven men were arrested and four tonnes of toxic waste removed, after two fuel laundering plants were discovered in Essex.

As part of a multi-agency investigation more than 50 officers from HMRC and the Environment Agency, carried out simultaneous searches of three business and six residential addresses in south Essex and Kent.

Between them, the two laundering plants had the potential to produce three million litres of illicit fuel a year, evading an estimated £1.4 million in revenue.

The laundering plants were dismantled and 36,000 litres of suspected laundered fuel seized, along with four fuel tankers, two vans and £28,000 cash.

The plants were only capable of laundering old style markers and dyes, and HMRC tests found that the fuel contained Accutrace.

HMRC investigations at suspected customers of the laundering plant resulted in the seizure of a further 27,450 litres of laundered fuel and the seizure of 6 HGV vehicles.

Case study 4 – laundering plant in Northern Ireland

In October 2016, officers from HMRC's Belfast Road Fuel Testing Unit discovered a fuel laundering plant following a search of rural sheds in the Newry area. The plant had the potential to produce over four million litres of illicit fuel a year worth around £2.5million in lost revenue.

The laundering plant was dismantled and 2,450 litres of suspected laundered fuel seized. Four tonnes of toxic waste were also removed.

The plant was only capable of laundering old style markers and dyes, and HMRC tests found that the fuel contained Accutrace.

Republic of Ireland operational results

4.13. In risk-targeted interventions carried out by Irish Revenue enforcement teams in the 2 years after the introduction of the new marker, a small number of detections were made of laundered fuel where the visible markers had been removed but Accutrace had remained. As in the UK, these interventions revealed no evidence of attempts to launder Accutrace.

4.14. In January 2016, the Irish Revenue Commissioners conducted a national random sampling programme with a view to quantifying the extent to which illicit fuel (i.e. laundered road diesel) is evidenced among licensed fuel outlets. The programme entailed taking samples of road diesel from a randomly selected group of Auto Fuel Trader Licence holders (mostly forecourt retailers and fuel distributors) and testing each for the presence of Accutrace. In January 2017 the exercise was repeated with another randomly selected sample of licenced fuel outlets. In both years the results found no evidence of Accutrace in any of the traders' samples. Revenue economists concluded that the results demonstrate that

systematic selling of laundered fuel through retail outlets is negligible and close to being eliminated. [11]

[11] The Oil Market in Ireland – An Update 2017. http://www.revenue.ie/en/corporate/documents/research/oil-market-2017.pdf

5. Other indicators of laundering activity

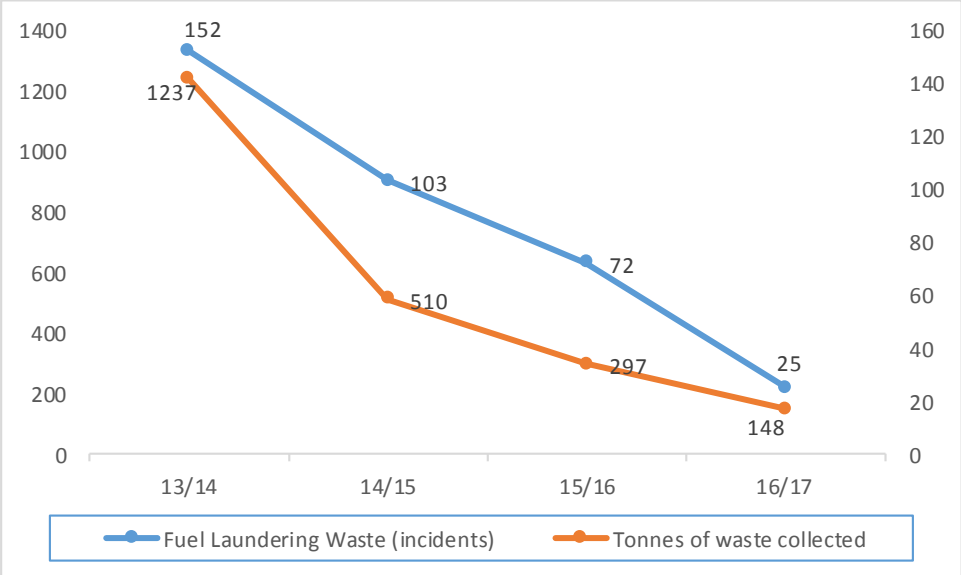
5.1. In addition to operational data, HMRC monitors a number of other proxy indicators to show the extent of fuel laundering.

Fuel laundering waste dumping

5.2. The number of fuel fraud waste incidents and the quantity of sludge collected is an indicator of fuel laundering activity. In order to produce fully-laundered fuel, fraudsters would need to remove the other pre-existing markers as well as Accutrace. The conventional laundering techniques used to remove these old markers produce chemical sludge as a by-product in addition to the laundered fuel. Typically, fraudsters dump this toxic sludge in intermediate bulk containers (a type of 1,000 litre tank) with the clean-up and disposal costs being paid for by the taxpayer. There has been a sustained reduction in the incidence and quantity of waste material dumped in Northern Ireland as shown in Chart 4.

5.3. Similar results have also been found in the Republic of Ireland where sludge dumping has also considerably reduced [12].

Chart 4: Fuel Waste Incidents in Northern Ireland[13]



Energy input

5.4. As described in para 3.7, vacuum distillation requires high energy input. The Police Service of Northern Ireland air support routinely search for excessive heat signatures and other signs of fuel laundering activity. In the 24 months since Accutrace was introduced, they made no discoveries of criminality of this type.

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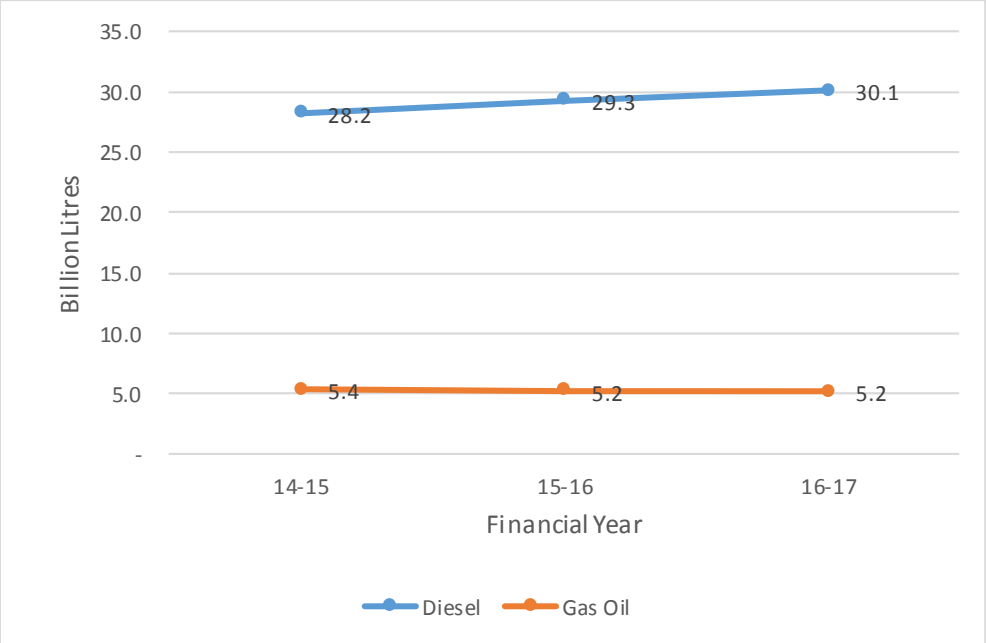
[12] Irish Revenue Commissioners Annual Report 2016 p41 http://www.revenue.ie/en/corporate/press-office/annual-report/2016/ar-2016.pdf

[13] Source : Northern Ireland Environment Agency

Volume of fuel released for consumption

5.5. Fuel laundering is just one of a range of factors impacting on fuel consumption and so it is not possible to draw firm conclusions on the extent of laundering from volumes of fuel released for consumption. Chart 5 shows the aggregate volume of fuel released for consumption in the UK. Diesel consumption has been on a long term upward trend and it would therefore be reasonable to expect legitimate diesel sales to continue increasing, regardless of any impact the new marker may have on illegal activity. A number of other factors, including changes in pump prices, could influence behaviour and consequently consumption and receipts.

Chart 5: Fuel Quantities Released for Consumption: UK[14]



5.6. In the Republic of Ireland, diesel clearances (volumes) rose 7 per cent in 2016 (compared to 2015). A study by the Irish Revenue authorities has concluded that it is reasonable to assume a substantial proportion of the increase in diesel clearances is likely due to the continued successful implementation of Revenue's compliance strategy in oils (which includes the new fuel marker)[15]. The study reported that clearances of marked gas oil increased by 3 per cent in 2016 after being stable in 2015, suggesting legitimate growth in demand is driving the increase.[16]

[14] Source HMRC Hydrocarbon Oils Bulletin May 2017.
https://www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx
"Gas oil" refers to rebated non-road heavy oil i.e. 'red diesel'. "Diesel" refers to diesel oil for road vehicles.

[15] In addition to the new fuel marker, the Republic of Ireland's strategy includes the tightening of the fuel licensing regime, introduction of a supply chain reporting and monitoring system and strengthening of powers to refuse or revoke licences.

[16] The Oil Market in Ireland – An Update 2017. http://www.revenue.ie/en/corporate/documents/research/oil-market-2017.pdf

6. Conclusion

6.1. All the evidence from the first two years of the new marker indicates that Accutrace has been effective and helping to drive down fuel laundering. We will continue to monitor the performance of the fuel marker and any emerging intelligence very closely and will take any further action as required. The effectiveness of our actions in combatting fuel duty fraud will continue to be reflected in HMRC's published tax gap data.