



HM Revenue
& Customs

Combatting Fuel Duty Fraud

Evaluation of the Accutrace Fuel Marker

September 2016

1. Executive summary

- 1.1. Fuel duty makes an important contribution to the public finances. In 2015-16, it represented 5.2% of total tax revenue, generating £27.7bn¹.
- 1.2. The government is committed to tackling fuel duty fraud. Revenue loss from illicit use of diesel in Great Britain fell from 12% in 2002-03 to less than 1% in 2013-14, and in Northern Ireland the illicit market share reduced from 26% to 8% over the same period.
- 1.3. A new fuel marker, Accutrace², was introduced into UK fuel supplies on 1 April 2015. The Republic of Ireland also introduced the marker from 31 March 2015. The new fuel marker was introduced with the aim of tackling the practice of laundering or stretching non-rebated fuel with laundered fuel and its subsequent use in non-qualifying vehicles. The old markers were known to be susceptible to different laundering techniques which could be undertaken economically by criminal gangs with minimal financial outlay. This action supplements HMRC's ongoing work to fight fuel fraud, including dismantling laundering plants and work with national and international partners.
- 1.4. In November 2015 HMRC published an evaluation report covering the first six months since the introduction of the new marker. This further evaluation report covers the first full year's use of the new marker from 1 April 2015 to 31 March 2016. It sets out the latest available operational data. HMRC and the Irish Revenue Commissioners have been able to test for the presence of the marker since its introduction into the fuel supply chain. Since late July 2015 HMRC has had the capability to test for the presence of the marker at bulk and retail sites as well as in vehicles at the roadside.
- 1.5. In the first twelve months since introduction of the new marker, HMRC has undertaken 49,157 tests. These have resulted in 2,416 detections of illegal use of rebated fuel where officers have found illicit fuel either in the supply chain or in road vehicles. Samples are taken and in some cases these are then sent to the Laboratory of the Government Chemist for further analysis. In 229 cases laundering of the old marker was identified, with only the new marker or the new marker and low levels of the pre-existing markers and dyes present in fuel samples. Samples are not sent for analysis in all cases, for example where an admission of fraud has been made or evidentially it is not required.
- 1.6. Over the period, there has been a reduction in the number and size of laundering plants discovered. This is consistent with an overall shift away from illicit laundering. None of the laundering plants detected in the period were capable of successfully laundering the new marker. No evidence has been found by HMRC or other law enforcement agencies that successful laundering of the new marker has occurred.
- 1.7. HMRC will continue to keep the fuel marker under review and will take further action if required. HMRC will publish updated tax gap figures in the autumn, and will also publish a further report next year setting out operational data for the first two years since the introduction of the new marker.

¹ HM Revenue and Customs Annual Report and Accounts 2015-16 [HMRC annual report and accounts: 2015 to 2016 - Publications - GOV.UK](#)

² References to Accutrace refer to AccutraceTMS10, a marker by the Dow Chemical Company.

2. Background

- 2.1. Fuel duty makes an important contribution to the public finances. In 2015-16, it represented 5.2% of total tax revenue, generating £27.7bn. The government remains committed to tackling fuel duty fraud. Since 2010 the government has reinvested over £1 billion to tackle tax evasion and criminal fraud.
- 2.2. HMRC fights fuel fraud on a wide range of fronts, from special units performing thousands of roadside checks to dismantling laundering plants. In 2015-16 HMRC dismantled 18 laundering plants and seized 2,757,000 litres of fuel from their work tackling fuel fraud. HMRC also works with national and international partners including through regular exchange of information and joint operational activity. However, HMRC is not complacent and recognises there is more to do.
- 2.3. As set out in the 6-month report, a key driver for fuel fraud is the difference in excise duty between road diesel and 'red diesel' intended for certain approved off-road uses, for example in agriculture and the nil duty rate on kerosene used for heating. Fraud can be undertaken in several forms:
 - **straight mis-use**: this is where rebated fuels are knowingly used in road vehicles ('running on red') contrary to the law
 - **'laundering'**: the removal of chemical dyes and covert markers from rebated fuel using, for example, strong acids or alkalis to give the appearance of legitimate road fuel. Users may be complicit or unwitting in this fraud
 - **mixing**: using fuels such as kerosene, or industrial oils to 'extend' fuel; methanol may be added to petrol to achieve the same effect. As well as being illegal, this can have adverse 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 home market.
- 2.4. The impact of fuel fraud can be seen in the tax gap figures. In 2002, when HMRC developed an oils fraud strategy, the tax gap figure was £1.5bn. It is estimated the tax gap for 2013-14 in respect of fuel duty has now fallen to around £100m across the UK, of which it is estimated £50m relates to fraud in Northern Ireland. Therefore although this illegal activity and the tax cost has fallen across the UK, it has remained disproportionately high in Northern Ireland compared to mainland Great Britain.

3. Rebated fuel

- 3.1. In the UK, chemical markers and dyes are added to rebated or exempted fuels. They are added to fuel after production at refineries or approved remote marking premises at a level mandated by HMRC to be able to distinguish between rebated fuels and road fuels for the purpose of combatting fraud.
- 3.2. Criminals look to use and sell rebated fuels as road fuels – either in their unlaundered state, hoping not to be detected, or by seeking to launder the markers and dyes so that consumers and HMRC cannot distinguish between it and genuine road fuels.
- 3.3. All EU member states are required to mark rebated fuels. Since 2002, Solvent Yellow 124 is the prescribed Euromarker. There is currently an exercise underway to identify a new Euromarker. The implementation date is to be confirmed. The EU Marker Directive enables member states to add a national marker or colour in addition to the Euromarker. In the UK, in addition to the Euromarker, rebated fuel continues to contain Coumarin in kerosene or Quinizarin and a red dye in rebated diesel – hence known as ‘red diesel’.
- 3.4. HMRC operations and intelligence clearly identified that the previous mix of markers was being laundered by criminals through relatively straightforward and low cost processes and was particularly prevalent in Northern Ireland. As a result HMRC sought to introduce a new marker that was more resistant to laundering.
- 3.5. In May 2012 a Memorandum of Understanding was signed by the Irish Revenue Commissioners and HMRC on a joint project for the identification of 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 Submission. This included a series of laundering tests undertaken by the State Laboratory in Ireland and the Laboratory of the Government Chemist in the UK to assess each of the markers submitted for resistance to known and expected laundering techniques. The chosen Accutrace marker was introduced on 1 April 2015 in the UK and on 31 March 2015 in the Republic of Ireland.
- 3.6. The new marker is a colourless marker whose chemical properties are similar to that of diesel, rendering it resistant to conventional dye-washing and adsorption laundering methods. It is recognised that all markers will have potential vulnerabilities. The advice of the Laboratory of the Government Chemist is that, while the marker could be susceptible to laundering by vacuum distillation, vacuum distillation is not a viable economic laundering technique in practice because:
 - it is significantly more difficult than current 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 in turn would be difficult to conceal
 - the larger the distillation tank the higher the temperature required as it will be difficult to maintain a high vacuum - the size of the distillation vessel is a determining factor in the viability of distillation
 - vacuum distillation does not achieve complete removal of other UK markers and therefore could only be used as part of a multi-stage laundering process thus adding further to the costs.

- 3.7. No evidence has been found by HMRC and law enforcement agencies in the first 12 months' use of the new marker that successful laundering of Accutrace has occurred. This includes information from the Police Service in Northern Ireland air support who routinely search for excessive heat signatures and signs of fuel laundering activity; they have made no discoveries of criminality of this type. Nonetheless HMRC takes this issue seriously and continues to keep this under close review.

4. Assuring compliance

Large business survey

- 4.1. An exercise was undertaken to verify that the new marker had been successfully introduced into the rebated fuel supply chain. Twenty-one large business customers who are approved to mark heavy oil at their premises were approached to provide, on a voluntary basis, monthly volumes of marker concentrate opening stock, purchases, closing stock and volumes of marked gas oil and kerosene released for consumption. The data covered the full year from 1 April 2015 to 31 March 2016. Twenty customers responded.
- 4.2. The data showed that sufficient volumes of the marker had been purchased to mark rebated fuel at levels in excess of the minimum set by HMRC for the amount of rebated fuel released by them. Over-marking is the norm and is policy for some customers. There was no evidence of under-marking from either the monthly or annual volumes. This does not however guarantee that individual batches were not under-marked as the volumes would not show up unless there was substantial or prolonged under-marking. Only one case of under-marking was detected by Road Fuel Testing Units at a refinery. This was due to an inadvertent systems failure by the company and has now been rectified. Analysis of the data provided by large business customers gives a high level of confidence that Accutrace has been successfully introduced and established in the rebated oil chain.

HMRC operational activity

- 4.3. HMRC also undertook a substantial testing regime designed to confirm that the new marker is correctly present in rebated fuel at the point of bulk supply and also to test that it is being correctly used for qualifying purposes. Testing is carried out right across the UK and at all points in the supply chain to detect potential fraud.
- 4.4. Beginning in January 2016, Roadside Fuel Testing Units sampled marked gas oil and kerosene from refineries, remote marking stations, Registered Dealers in Controlled Oils outlets and some end users. Samples taken at these sites were sent to the Laboratory of the Government Chemist to establish the level to which the new Accutrace marker had penetrated the rebated fuel market.
- 4.5. In total, 484 samples were drawn of which 457 had satisfactory levels of the new marker. On investigation the remaining 27 samples were identified as originating from small distributors (Registered Dealers in Controlled Oils) or end users who held a mixture of marked gas oil or kerosene sourced prior to 1 April 2015 (before the introduction of the new marker) mixed with more recent deliveries of fully marked gas oil or kerosene containing all markers including Accutrace. This explains the lower levels of the new marker. As these stocks are used and new products delivered, these anomalies will no longer occur.

4.6. Table 1 shows the results of the first 12 months of operational activity. Detection of laundering is only one sub-set of HMRC’s overall work to detect fuel fraud. Detections can include all forms of fraud i.e. straight mis-use, mixing, illicit production and smuggling as well as laundering.

Table 1: HMRC operational activity 2015-16

	Total tests carried out	Detections from these	Detection hit rate
Total tests carried out	49,157	2,416	4.9%
<i>Sub categories</i>			
Retail sites tested	3,172	189	6.0%
Commercial vehicles tested	39,438	1,437	3.6%
Other* tests	6,547	790	12.1%

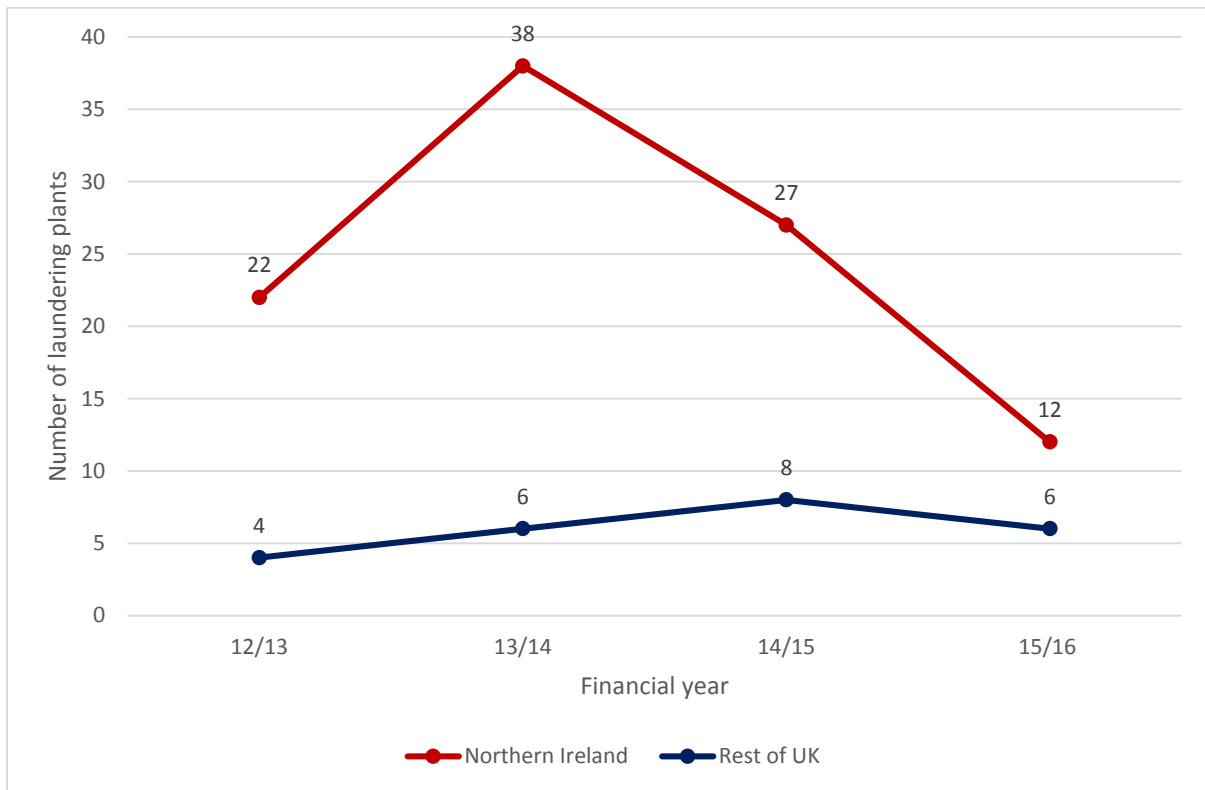
*other tests include a range of cases e.g. bunkering sites, huckster sites and private vehicles³

4.7. Of the 2,416 detections, the Laboratory of the Government Chemist was sent some of the samples for further analysis. Not all samples arising from detections are sent to the Laboratory of the Government Chemist as in certain cases it is not cost effective, an admission of fraud has been made or evidentially it is not required. All samples are retained for 6 months in case of a change of circumstances. The Laboratory of the Government Chemist identified evidence of partial or total laundering of the old markers or dyes in 229 samples. The new marker was present in all 229 samples. In 186 of these, there was evidence of partial laundering of pre-existing markers and dyes. In the other 43 cases, the new marker was the only marker present, indicating complete laundering of pre-existing markers and dyes – and where previously HMRC would have accepted the sample as legitimate.

³ Bunkering sites are bulk storage sites used mostly by hauliers where the fuel is not for general sale to the public, for example marine fuel. 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. Tests on taxis are included in the ‘commercial vehicle’ category (this applies to the data in this and the 6-month report).

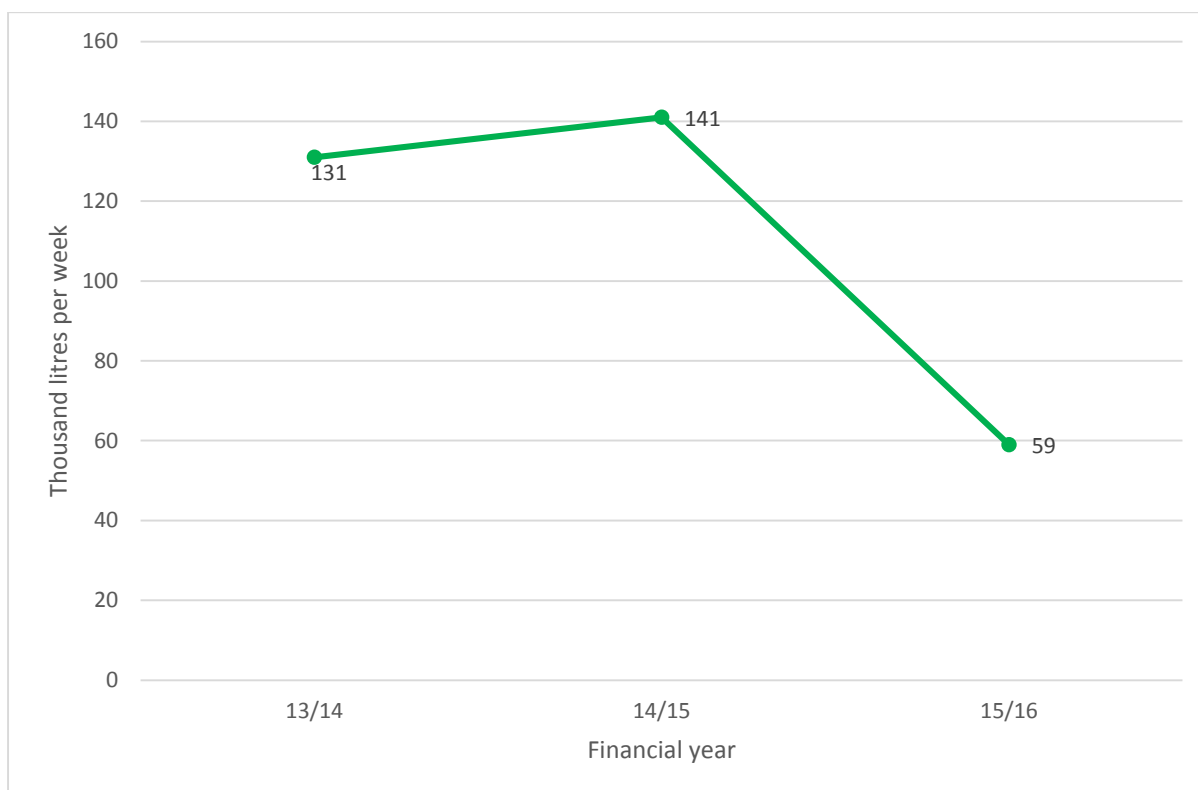
4.8. Over the period, there has been a reduction in the number and size of laundering plants discovered. This is consistent with an overall shift away from illicit laundering. The number of laundering plants detected by HMRC is set out in graph 1 below. All plants detected use 'old style' laundering methods. There is no evidence that laundering by vacuum distillation is being undertaken by criminal gangs.

Graph 1: Laundering plants discovered in Great Britain and Northern Ireland



4.9. The laundering plants that have been detected this year have been noticeably smaller than laundering plants discovered before Accutrace was required to be added to rebated fuels. The average illicit processing capacity of a laundering plant in Northern Ireland is set out below.

Graph 2: The average illicit processing capacity of discovered laundering plants in Northern Ireland



4.10. The incidences of dumping of waste material in Northern Ireland, supplied courtesy of the Northern Ireland Environment Agency, is detailed in table 2. The Northern Ireland Environment Agency have confirmed that their operations and resourcing levels in 2015-16 are the same as in previous years.

Table 2: Fuel waste incidents and quantities collected

Financial year	Fuel laundering waste incident numbers	Tonnes of fuel laundering waste collected
13/14	152	1,237
14/15	103	510
15/16	72	297

4.11. Similar results have also been found in the Republic of Ireland. There have been fewer discoveries of sludge dumps (the waste product from laundering) in recent years. In the nine months April to December 2014, Louth and Monaghan County Councils recovered a combined total of 606 sludge filled intermediate bulk containers (a type of 1,000 litre tank

in which the sludge, a by-product of fuel laundering, is invariably dumped). In the nine month period April to December 2015 this figure dropped to 250, a 59% decrease⁴.

- 4.12. Operational resource usage on tackling fuel fraud, including tests and laundering plant detection, is shown in table 3. Following additional investment in Autumn Statement 2013, the Fraud Investigation Service in HMRC has been increasing resource to tackle oil duty fraud.

Table 3: HMRC staff resources deployed on fuel fraud

Financial year	Staff resources deployed ⁵
12/13	133
13/14	133
14/15	145
15/16	154 ⁶

Republic of Ireland study

- 4.13. Economists in the Statistics and Economic Research Branch of the Office of the Irish Revenue Commissioners conducted a national random sampling programme to quantify the extent to which illicit fuel (laundered rebated diesel) is evidenced among licensed fuel outlets that sell (unmarked) road diesel. The programme took samples of road diesel from a randomly selected group of Auto Fuel Trader Licence holders – mostly forecourts retailers and fuel distributors – and tested each for the presence of the new marker. 231 traders were selected for sampling, which represents 9 per cent of the Auto Fuel Trader Licence holders' population. Of the random sample of 231, 34 cases were unavailable for testing for a number of reasons including the trader not being involved in selling road diesel or having gone out of business. Of the 197 licensed traders sampled, illicit fuel marked with the new marker was not found. The results of the random sampling programme show no evidence of the systematic sale of laundered fuel on a large scale across the Republic of Ireland⁷.
- 4.14. In risk targeted interventions carried out by Irish Revenue enforcement teams, in the twelve months after the introduction of the new marker, a number of detections were made of laundered fuel where Accutrace had remained but the visible markers had been removed. No evidence of attempts to launder Accutrace have been found and all available intelligence suggests that Accutrace has not been successfully laundered.

⁴ Information from the National Random Sampling Programme of Fuel Licence Holders conducted by the Irish Revenue Commissioners which can be found at www.revenue.ie/en/about/publications/national-random-sampling-programme.pdf

⁵ These figures record the end-year staff-in-post position.

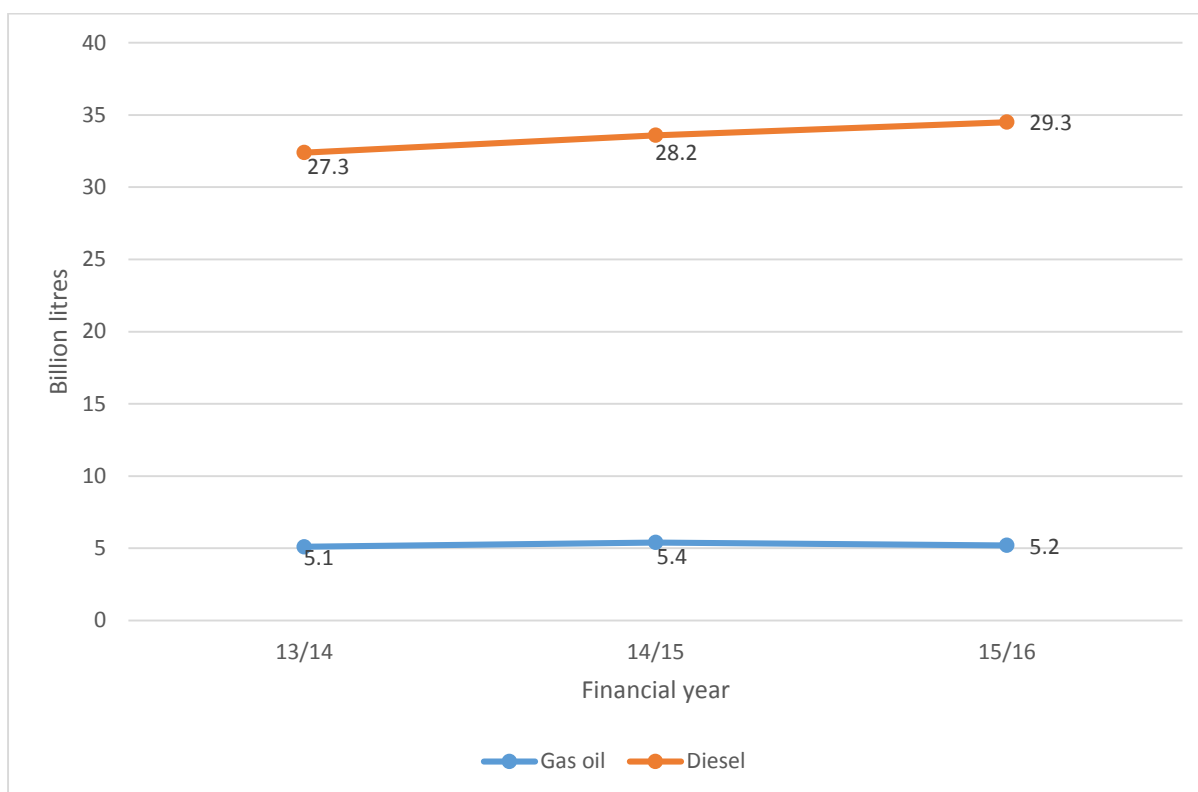
⁶ In addition to the 154 staff in post, there are a further 10 vacancies in this area. HMRC is currently recruiting to fill these vacancies.

⁷ Information from the National Random Sampling Programme of Fuel Licence holders conducted by the Irish Revenue Commissioners which can be found at www.revenue.ie/en/about/publications/national-random-sampling-programme.pdf

Fuel volumes

- 4.15. Graph 3 shows the aggregate volume of fuel released for consumption in the UK. Gas oil refers to rebated non-road heavy oil (known as 'red diesel'). Diesel refers to diesel oil for road vehicles. This is a summary of the data available in the hydrocarbon oils bulletin⁸.

Graph 3: Fuel Quantities Released for Consumption: UK



- 4.16. In the Republic of Ireland clearances of marked gas oil from tax warehouses dropped significantly in 2013 (-2.2%) and 2014 (-9.4%) and were stable (+0.3%) in 2015 despite the strengthening economic recovery that saw road diesel clearances rise in the same year (+9.1%)⁹.
- 4.17. In the UK the volumes released are affected by a wide number of factors so it is not possible to draw firm conclusions. For example, 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. In addition there are a number of other factors that could influence driver behaviour and consequently consumption and receipts. For example, the reduction in pump prices could reduce the

⁸ Hydrocarbon oils bulletin can be found at <https://www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx>

⁹ Information from the National Random Sampling Programme of Fuel Licence holders conducted by the Irish Revenue Commissioners which can be found at www.revenue.ie/en/about/publications/national-random-sampling-programme.pdf

incentive to drive efficiently, or the incentive to 'fill up' before returning to the UK from overseas.

- 4.18. HMRC will continue to keep the fuel marker under review and will take further action if required. HMRC will publish updated tax gap figures in the autumn, and will also publish a further report next year setting out operational data for the first two years since introduction of the new marker.