



The State Laboratory  
An tSaotharlann Stáit

Annual Report  
2016





**Custom House**



**Government Buildings**



The State Laboratory  
An tSaotharlann Stáit

**Abbotstown**



**Backweston**



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# INTRODUCTION

## by the State Chemist

I am very pleased to present this Annual Report on the work of the State Laboratory for 2016. It was a year of change for the Laboratory with many highlights.

Having coped with years of cutbacks and the loss of many long-serving staff through retirements, the Laboratory experienced a year of growth in 2016 with many new staff joining the Laboratory. The recruitment of two new chemists and ten laboratory analysts meant that at the end of 2016 almost 30% of the Laboratory's workforce had joined in the previous two years. This placed a significant training burden on existing staff, many of whom were also in new roles. Overall however, the large intake of new staff has had a very positive effect on the Laboratory and is helping it to build for the future and achieve its strategic objectives.

Due to the highly specialised and innovative nature of the work, it is a priority for the Laboratory to develop and retain highly skilled and expert staff in the area of chemical analysis. To do this, the Laboratory must provide a work environment where staff are engaged and motivated and have the opportunities to develop interesting and meaningful careers in chemistry. Therefore the results of the first ever Civil Service Employee Engagement Survey were eagerly awaited and it was encouraging to note, when the results became available mid-year, that the Laboratory had an excellent response rate of 68%.

The survey results indicated that staff have a high level of competence, are highly engaged and resilient and feel positive about their work. The areas for improvement included information sharing, leadership, performance standards, career development and mobility, and social support. In an effort to understand the message, I met with all

the grades individually to seek feedback and practical suggestions for improvements. This feedback was discussed with the Senior Management Team and an action plan was agreed. The feedback was also considered during a Leadership Training program provided to senior and middle managers, which was commenced in late 2016 with a view to strengthening management and leadership capability.



Progress on the agreed actions was monitored on a monthly basis and the implementation of the plan has resulted in an improved culture of information sharing throughout the laboratory, improved induction procedures for new staff and increased mobility and cross-training opportunities within sections. A new Sports and Social Club was formed and the Wellness at Work Team undertook some very well received initiatives during 2016, all of which has led to a more positive work environment and improved staff morale.

In line with its strategic objectives, a number of initiatives were undertaken during 2016 to raise the Laboratory's profile. In conjunction with the Department of Agriculture, Food and the Marine, the Food Safety Authority and the Dublin Public Analyst Laboratory, the State Laboratory organised a 2-day conference in February for staff from National Reference Laboratories, Official Control Laboratories and other stakeholders involved in food safety activities. The conference was addressed by a range of international and national speakers and



# INTRODUCTION

## by the State Chemist



provided an excellent forum for information sharing and networking for the 140 delegates who attended.

The Eurachem Ireland committee, for which the State Laboratory provides the secretariat and current Chair, was also very active during the year with some new members joining. The committee comprises of people interested in analytical chemistry from the public, private and academic sectors and it organised two workshops in 2016. The October workshop on 'Method Development (LC-MS/MS) and Method Validation', held in Backweston with presenters from eight different organisations, was very well attended with over 100 participants.

As a regulatory laboratory providing analytical results to its clients, which in many cases can form the basis for important decisions or court prosecutions, the most important aspect of the State Laboratory's work is the quality of its results. This and its ability to constantly innovate and provide analytical solutions to new challenges, whether in the area of food safety / food fraud, fuel laundering / designer fuels or new psychoactive substances, the Laboratory's focus continues to be on developing its capability and expertise to respond to client needs. The Laboratory's ability to do this was demonstrated and recognised when it was short-listed and subsequently won the award for the Insight and Analysis category at the 2016 Civil Service Excellence and Innovation Awards. This was a great honour for the Laboratory and a great achievement for the staff of the Human Toxicology section. It also highlighted the world class service being delivered to the Coroners Service in line with the Laboratory's vision to provide a world class regulatory scientific service to the State.

Full details of work of the State Laboratory and its achievements in 2016 are presented in this annual report. As always without the commitment and dedication of its staff none of this would have been possible. I would like to sincerely thank all the staff of the Laboratory for their hard work, enthusiasm and support throughout the year.

*Ita Kinahan*

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**Ita Kinahan,**  
**State Chemist**

# OVERVIEW

## OVERVIEW

The State Laboratory is a scheduled office under the aegis of the Department of Public Expenditure and Reform and it is the Government's principal analytical chemistry laboratory. Its high level objective is to provide an accredited, high quality and timely chemical analysis and advisory service to Government Departments and Offices, which supports their policies, regulatory programmes and strategic objectives, particularly in the areas of food and feed safety; revenue collection; fraud prevention; public health and environment protection. It also provides centralised forensic toxicology services to the Coroners and other public sector clients.

In 2016, a total of 12,283 samples were analysed for 502,750 analytes, a 17% increase on the number of analytes tested for in 2015. This increase was mainly due to the increased range and scope of drug screening analysis carried out on post-mortem samples for the Coroners Service. The overall number of samples tested was slightly less than expected due to a reduction in the number of hydrocarbon oil samples submitted by Customs and Excise officers to be tested for fraud purposes.

Analytical chemistry is a continually evolving area and staff of the Laboratory keep abreast of technological changes and take advantage of the opportunities offered by new technology to improve the quality and efficiency of the service provided to our clients. EU and Irish legislation is regularly updated to reflect technological developments and the Laboratory must continually update and improve its methods of analysis. In 2016, new methods of analysis were developed and existing methods were extended so that a total of 155 new tests were introduced, using a variety of analytical techniques.

The Laboratory has an important advisory function, particularly in the Customs and Excise area, and its staff act as the Irish representatives

at EU scientific committees and technical working groups on behalf of Revenue and the Department of Jobs, Enterprise and Innovation (DJEI). Laboratory staff also actively participate and represent Ireland as national experts in international standardization bodies such as Codex Alimentarius, the European Committee for Standardisation (CEN), Eurachem and the Consultative Committee on the Amount of Substance (CCQM).

The Laboratory has been designated as Ireland's main Official Control Laboratory for animal feedingstuffs and as a National Reference Laboratory (NRL) for parameters such as nutritional additives for use in animal feed, veterinary residues in food of animal origin and dioxins and other contaminants in feed and food. Staff collaborate with the EU Reference Laboratory (EURL) in their area of competence, attend NRL network meetings and workshops and disseminate information supplied by the EURL to the competent authority and official national laboratories.

National and international acceptance of results of analysis requires laboratories to have third party peer accreditation of its methods of analysis. The State Laboratory operates in accordance with a documented quality system based on an international standard for competence of testing laboratories (ISO/IEC 17025) and is accredited by the Irish National Accreditation Board as being in compliance with this standard for specific areas of work (INAB Reg. No. 146T). The Laboratory successfully underwent an annual assessment visit by INAB in 2016 and it is currently accredited for 46 test methods covering 448 individual analytes.

This annual report details the implementation of the State Laboratory's Strategy Statement for 2016 and highlights the Laboratory's main activities and achievements under each Strategic Goal.

### Numbers of Samples Tested

	No. of Samples	No. of Analytes Tested For
<b>Food and Feed Safety</b>	<b>3,998</b>	<b>32,395</b>
<b>Revenue Collection and Fraud Prevention</b>	<b>2,182</b>	<b>9,731</b>
<b>Forensic Toxicology Service</b>	<b>5,724</b>	<b>458,016</b>
<b>Public Health and Heritage Protection</b>	<b>118</b>	<b>125</b>
<b>Veterinary Toxicology Service</b>	<b>261</b>	<b>2,483</b>
<b>Overall Totals</b>	<b>12,283</b>	<b>502,750</b>

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 1

### Support National Food and Feed Safety Programmes

#### Strategic Goal 1: Support National Food and Feed Safety Programmes

As Ireland is a major food exporter, monitoring and controlling aspects of food and animal feed safety is a high priority. The State Laboratory assists the Department of Agriculture, Food and the Marine (DAFM) and the Food Safety Authority of Ireland (FSAI) in ensuring the quality and safety of Irish food and food products by monitoring compliance with European and national legislation governing the production, distribution and sale of animal feedstuffs and by testing a wide range of foods for veterinary residues and other contaminants.

#### Animal Feedingstuffs

Animal feed is one of the most important components of the production chain of food of animal origin. In economic terms, animal feed accounts for up to 70% of the total costs of animal production and has an impact on animal health and productivity as well as on food safety and quality. The aim of animal feed controls is to ensure that feedingstuffs are of good quality and do not constitute a hazard to human or animal health. The controls are implemented through risk based inspections and sampling of feedingstuffs at all stages of the feed chain.

The State Laboratory is the principal laboratory responsible for feedingstuffs analysis in Ireland. Samples of feed materials, feed additives, mineral mixtures and compound feeds are routinely tested to ensure that they contain the declared nutrients (protein, fat, starch and minerals), micro-nutrients (trace elements, vitamins), ash, fibre and moisture contents and do not contain elevated levels of toxic components (dioxins, mycotoxins, heavy metals).

Following the purchase of a new ICP-MS instrument in 2015, a new multi-element method of analysis was developed for the simultaneous determination of 15 trace elements, heavy metals and other elements in feed. This method was added to the scope of accreditation and brought into routine use during 2016. An ICP-MS method for iodine was also accredited in 2016.

This new ICP-MS instrument is also suitable for Nanoparticle analysis and staff received training with a view to developing expertise in methods of analysis for detecting nanoparticles in food and feed. Contact was also made with interested stakeholders and universities with a view to progressing this new area of work.

New methods of analysis were also developed and validated for fluorine by ion-selective electrode and for theobromine by HPLC to bring previously outsourced testing in-house. A method was also developed for melamine by LCMS/MS. The Laboratory successfully participated in CEN collaborative trials for both theobromine and melamine in a range of feed samples. It is intended to add the fluorine and theobromine methods to the scope of accreditation in 2017 and the melamine method will be validated during the year.

During 2016, a number of priority samples were submitted for analysis. These included four feed samples which were tested for lead in February as part of an investigation into the deaths of seven cows on a dairy farm. The source of lead contamination was ultimately found to be lead weights on collars worn by the animals which had degraded. The milk from the farm had been disposed of a precautionary measure pending the outcome of the investigation and the Food Safety Authority of Ireland (FSAI) was satisfied that there was no risk to consumers arising from this case.

Other priority samples were tested in September for trace elements and heavy metals as part of an investigation into the sudden deaths of seventeen heifer calves over a period of 48 hours on a dairy farm. The calves had access to three mineral lick buckets and the contents of these were tested but no excessive levels of trace elements or heavy metals which could cause acute toxicity and death were detected.

#### Medicated Feed

Prescribed antibiotics can be given to livestock in the form of medicated feed and the correct dosage rate is important to prevent a build up of



# PROGRESS IN RELATION TO GOALS

## Strategic Goal 1

### Support National Food and Feed Safety Programmes

antibiotic resistance. Feed samples are tested for authorised veterinary medicines and coccidiostats (feed additives used to prevent coccidiosis, a major disease in poultry and other farm animals) to ensure that the correct therapeutic levels are present.

During the production of feed containing coccidiostats, unavoidable carry-over of these compounds can occur from target feed to non-target feed when the same production lines are used, potentially causing harm to the non-target species. The Laboratory tests for carryover levels of 11 coccidiostats in rations destined for non-target species and this method was transferred to a newer, more sensitive LCMS/MS instrument during 2016.

The Laboratory also tests for banned antibiotics which are no longer allowed in livestock production in Europe and the multi-analyte LCMS/MS method used is capable of detecting 14 different antibiotics. During 2016, significant redevelopment and validation work was undertaken to improve the robustness of this accredited method.

New LCMS/MS methods were also developed and validated for the detection of carry-over levels of the authorised antibiotics, chlortetracycline and sulphadiazine in feed, in preparation for a new regulation which will repeal Council Directive 90/167/EEC on medicated feed.

In early 2016, 92 feed samples from a number of feed mills were analysed for sulphadiazine and chlortetracycline to determine the levels of carryover from the manufacturing process into non-target feeds and to check if the feed manufacturers could meet the cross-contamination limits being proposed for the new regulation.

A quantitative LCMS/MS method was developed at short notice to test for clenbuterol (angel dust) in feed in support of a DAFM investigation following a positive result for clenbuterol in a blood sample taken during a routine farm inspection in May. A total of 9 feed samples were tested within a very short turn around time.

#### Food Safety

To ensure that food produced in Ireland is of the highest standard, the FSAI and DAFM work together to implement comprehensive multi-annual control plans to monitor the production of food at all stages of the food chain and ensure compliance with national and international standards of food safety. The State Laboratory has developed a high level of expertise in the chemical analysis of veterinary drug residues and other chemical contaminants such as dioxins and mycotoxins in food.

#### Veterinary Drug Residues

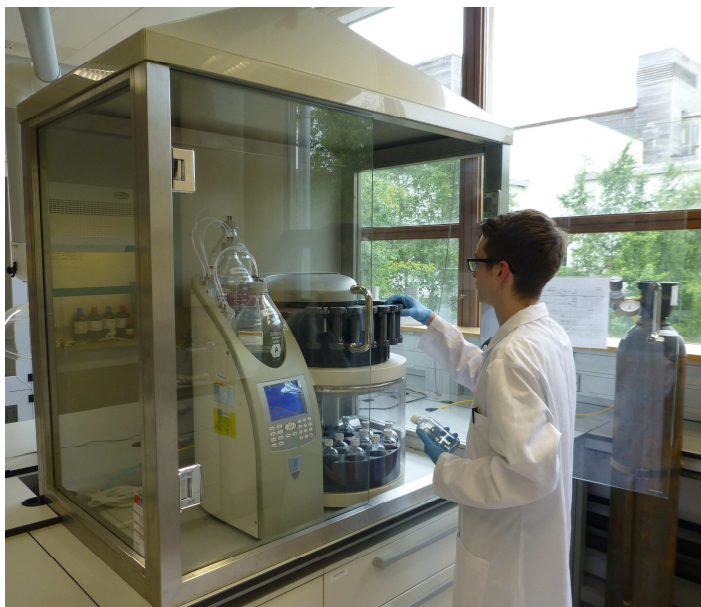
The presence of unauthorised substances, residues of veterinary medicinal products or chemical contaminants in food may pose a risk to public

health. Under EU legislation (Council Directive 96/23/EC), DAFM administers a National Residues Monitoring Plan (NRMP) which is designed to safeguard consumers from harmful residues in food of animal origin. Animal categories and food products covered include bovines, pigs, sheep and goats, horses, deer, poultry, milk, eggs and honey. A total of nine different matrices are tested including blood, serum/plasma, urine, kidney, liver and fat depending on the analytes being tested for.

There was a 5% increase in the number of samples tested for veterinary drug residues in 2016, mainly due to increased testing for banned steroids in serum and liver samples. A positive release scheme in place for equine kidney samples tested for phenylbutazone and other non-steroidal anti-inflammatories (NSAIDs), remained in place for 2016 with 140 samples prioritised and tested within an average turn around time of 5 days. This short turn around time put a significant strain on the Laboratory's resources but it was considered necessary because a positive phenylbutazone result, as happened in May 2014, would damage Ireland's reputation as a major exporter of high quality fresh meat and meat products.

A significant amount of LCMS/MS method development and validation work was completed during 2016 with new methods developed to test for five NSAIDs in milk, plus a procedure to determine diclofenac at the necessary 0.1 ng/g level, which proved particularly challenging. A confirmatory method was also developed for ethynylloestradiol in urine, work which was previously outsourced to the Netherlands and for which complex sample preparation procedures are required to achieve the required sensitivity.

A new method for detecting six corticosteroids in milk was also validated and accredited under Flexible Scope and this will be used from 2017 onwards to bring in-house previously outsourced testing.





# PROGRESS IN RELATION TO GOALS

## Strategic Goal 1

### Support National Food and Feed Safety Programmes

#### Chemical Contaminants – Dioxins, Mycotoxins and Nitrates

Dioxins are highly toxic environmental contaminants which must be excluded from the human and animal food chain as approximately 90% of human exposure to dioxins results from the consumption of contaminated food such as dairy produce, meat and fish.

In addition to testing a wide range of feedingstuffs (including recycled foods used for animal feeding), the State Laboratory tests infant formula samples and foods such as milk and vegetable oils used in the dairy industry. Other matrices tested include fat and liver samples from 4 different animal species under the National Residue Monitoring Plan, and samples of 8 different species of fish and egg samples for the FSAI. Samples of milk are tested for the Environmental Protection Agency and Cork County Council as part of their annual surveys to monitor background levels of dioxins in the environment.

A new food safety risk that emerged in during 2016 was the detection of elevated levels of brominated flame retardants (BFRs) in pork and milk samples in two separate and unrelated incidences. These chemical contaminants were found to be due to farm animals being exposed to BFRs in their environments and following investigations into these incidents, DAFM and FSAI identified an urgent need to develop national capability to perform this testing as currently samples must be sent abroad for analysis. The State Laboratory is well placed to provide this service as the complex analytical techniques and instrumentation required are the same as those already in place for dioxin testing. The Laboratory had been unable to develop this capability to date due to a lack of staff resources but this will be addressed during 2017 and suitable methods of analysis will be developed to test for BFRs and provide the testing service required by DAFM and FSAI.

Mycotoxins are substances naturally produced by moulds and fungi that can be present on a crop in the field or can affect stored grain. Many mycotoxin producing fungi are able to produce more than one type of mycotoxin and several types of fungi can affect a single crop leading to the presence of multiple mycotoxins. Mycotoxins can cause severe symptoms of toxicity at high doses and they enter the food chain via contaminated animal feedingstuffs.

The State Laboratory uses a multi-analyte LCMS/MS method capable of detecting 16 mycotoxins in feed (12 quantitatively, 4 qualitatively) for routine testing of feed samples. Food samples of animal origin are also tested under the National Residue Monitoring Plan with samples of milk and liver tested for aflatoxin M1 and ochratoxin A respectively.

Patulin is a mycotoxin produced by moulds commonly found on rotting apples and the amount of patulin in apple products indicates the quality of the apples used in production. During 2016, a HPLC method was

developed to determine patulin in apple juice which will be used to assist DAFM to monitor the quality of apple juices produced in Ireland.

Ergot alkaloids are mycotoxins produced by fungi that attack a wide variety of grass species and small grains such as rye, barley and wheat, and which adversely affect the health and productivity of livestock. Tropane alkaloids naturally occur in numerous plant families and accidental mixing of these toxic plant parts and seeds with edible feed materials during harvesting or processing will expose livestock to these toxins. During 2016, the Laboratory participated in a CEN collaborative trial of an LCMS/MS method for determining twelve ergot alkaloids and two tropane alkaloids in a range of cereals and animal feed samples.

There is concern at EU level regarding the possible health risks associated with high dietary intakes of nitrates. Since leafy vegetables are the main source of dietary nitrate, maximum levels have been established for nitrate content in lettuce and spinach and samples taken by DAFM are analysed by the State Laboratory on a regular basis.

#### Fertilisers and Liming Materials

The State Laboratory is Ireland's approved laboratory for checking that fertilisers placed on the market comply with EU legislation. Fertilisers and liming materials play an essential role in supporting plant growth and animal production. Fertilisers supply the nutrients required to produce forage and crops, and liming materials ensure that soil pH is optimised to support plant growth. Fertilisers are routinely monitored for the following nutrients: nitrogen, phosphorous, potassium, and sulphur. The minerals magnesium and sodium are also tested for in relevant fertiliser samples.

Liming materials are monitored for particle size, total neutralising value (TNV) and moisture content. This testing is particularly important when new limestone quarries are opened. The European Regulation (EC) 2003/2003 for fertilisers was amended in 2013 to include liming materials. The purpose of the new legislation was to prevent a diversity of national rules in relation to liming materials leading to distortion of the EU internal market. Where limestone samples submitted for new licence applications are to be evaluated under this new legislation, the fineness of the liming materials has to be determined using a wet sieving procedure and also for these samples total calcium, total magnesium and TNV expressed as CaO values have to be determined.

#### National Reference Laboratory Responsibilities

The State Laboratory is a National Reference Laboratory (NRL) in the following areas:

- ◆ residues of veterinary medicinal products (steroids, corticosteroids, non-steroidal anti-inflammatories (NSAIDs), nitroimidazoles and sedatives) in food of animal origin;

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 1

### Support National Food and Feed Safety Programmes

- ◆ additives for use in animal nutrition;
- ◆ dioxins and polychlorinated biphenyls (PCBs) in food and animal feed;
- ◆ mycotoxins in animal feed and food of animal origin; and
- ◆ heavy metals in animal feed.

This requires State Laboratory staff to collaborate with the relevant European Union Reference Laboratories (EURLs) on analytical test methods, oversee the performance of screening methods in official laboratories in their areas of competence, and where necessary provide technical assistance and advice to the official laboratories and DAFM as the Competent Authority.

In February 2016, the State Laboratory was one of the organisers of a two day NRL conference entitled "Food, Health and the Role of National Reference Laboratories" which was attended by 140 delegates and

included representatives from all of Ireland's NRLs, policy makers and academics. The conference was addressed by a range of international and national speakers. The main conclusion from the conference feedback was that there was considerable interest in this event being organised on a biennial basis. In particular, at future events individual NRLs would like more opportunities to present their work to other NRLs working in the same discipline e.g. chemistry or biology.

Overall the conference concluded that there were many strengths to Ireland's NRL network, but also areas for improvement especially in terms of communication and co-operation between laboratories. There was also recognition that NRLs had significant potential to act as a platform for the enhancement of scientific standards and co-operation in Ireland as well as general agreement amongst delegates attending the conference to work towards this goal.

#### Numbers of Samples Tested

##### Food and Feed Safety

Category of Sample	No. of Samples	No. of Analytes Tested For
Animal Feedingstuffs	861	5,281
Veterinary Residues in Food	2,063	12,468
Dioxins in Feed and Food	319	11,585
Mycotoxins in Feed and Food	463	1,992
Nitrate in Vegetables	65	65
Fertilisers / Liming Materials	227	1,004
<b>Totals</b>	<b>3,998</b>	<b>32,395</b>

#### New Methods Developed

##### Food and Feed Safety

Test Method	Analytical Technique	No. of Analytes
Banned antibiotics in animal feed	LCMS/MS	14
Elements, trace elements and heavy metals in organic feed	ICP/MS	15
Theobromine in animal feed	HPLC/UV	1
Fluorine in animal feed	Ion-selective electrode	1
Clenbuterol in animal feed	LCMS/MS	1
Corticosteroids in milk	LCMS/MS	6
Non-steroidal anti-inflammatories in milk	LCMS/MS	6
Ethinylestradiol in urine	LCMS/MS	1
Patulin in apple juice	HPLC/UV	1
<b>Total</b>		<b>46</b>

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 2

### Support Revenue Collection and Fraud Prevention

#### Strategic Goal 2: Support Revenue Collection and Fraud Prevention

The State Laboratory advises the Office of the Revenue Commissioners on the classification of goods and on the application of appropriate excise duties on hydrocarbon oil products and alcoholic beverages and provides an analytical and advisory service in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products.

#### Customs Samples

The number of samples submitted in the Customs area decreased by 26% in 2016 relative to the previous year but this is not necessarily an accurate reflection of the level of work involved due to the wide variety and complexity of cases submitted for tariff classification purposes. All traded goods such as chemicals, foods, medicaments and plastics imported into or exported from the EU must be classified for Customs purposes and each separate product is assigned a particular classification code. State Laboratory staff have a high level of expertise in this area which enables them to advise Revenue on tariff classification of samples that require chemical analysis to support classification decisions.

An important aspect of this work is attendance at meetings of Technical Committees of both the European Union and the World Customs Organisation where issues relating to the interpretation of tariff headings are discussed and decisions made on the classification of products. In 2016, tariff classification advice was provided for 264 samples compared to 335 samples the previous year.

The Laboratory also supported the Department of Jobs, Enterprise and Innovation (DJEI) by providing technical advice on the processing of applications for suspension of Customs Duty. This involved liaising with applicants for duty suspensions and deputising for DJEI staff at relevant meetings. All applications were processed successfully.

The decision of the UK to leave the EU will also have significant implications for the work of the Laboratory, particularly if the UK decides to leave the single market and the EU customs union. Due to the volume of trade between Ireland and the UK, this would result in a large increase in the number of tariff classification opinions requested by Revenue.

#### Excise Samples

The State Laboratory provides an analytical and advisory service to Revenue in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products to assist them in determining the appropriate duties applicable and in prosecuting fraud where attempts are made to evade such duties.

#### Mineral Oil Testing

Rebated (lower-taxed) fuel for off-road use (agriculture/home heating) is marked with dyes or chemical markers so that its use for any other purpose or illegal sale can be identified. A major illicit activity in relation to mineral oil is the laundering of marked fuel to remove these markers. This has been a persistent problem for many years as fuel laundering poses a serious threat to the Exchequer, to legitimate trade and, because of the processes used in laundering, to the environment.

In recent years the Revenue Commissioners have devoted considerable resources to tackling this activity, including, in April 2015, the introduction of a new fuel marker. Following the introduction of Accutrace S10 and the acquisition of portable fuel analysers, a target based national sampling programme was implemented, which involved taking thousands of fuel samples in the second half of 2015 and throughout 2016.

The State Laboratory supported this work by analysing samples of the fuel seized for the presence/absence of oil markers and providing



# PROGRESS IN RELATION TO GOALS

## Strategic Goal 2

### Support Revenue Collection and Fraud Prevention

analytical evidence and expert advice to facilitate court prosecutions. The success of Revenue's actions became evident during 2016 when just one mobile laundry was detected, sludge dumping was considerably reduced and a smaller number of detections of laundered fuel were made. This meant that the number of fuel oil samples submitted for analysis to the Laboratory decreased by 30% compared to the previous year, which enabled the Laboratory to clear much of the backlog of samples that had built up during 2015.

Although the routine turn around times for hydrocarbon oil samples were longer than was desirable in 2016, a feature of the analytical service provided by the Laboratory is the rapid analysis of priority samples in support of live Revenue investigations and enforcement procedures. In 2016, approximately 6% of fuel samples were treated as priority samples and were tested for Accutrace S10 on the day of receipt.

The GCMS method used for determining Accutrace S10 in gas oil was successfully accredited in 2016 and this method will be further developed to include kerosene and petrol matrices during 2017. A new method for the determination of sulphur in diesel, kerosene and petrol samples by energy dispersive XRF was also developed and introduced into routine use for 2016.

Following the petrol contamination / stretching problem that emerged in 2014, petrol samples continued to be submitted for analysis during 2016. These were tested for a range of fuel quality parameters to check for contamination or petrol stretching.



#### Alcohol Testing

For excise purposes, alcoholic beverages are classified as beers, wines, ciders or spirits and duty is based on the alcohol content. Counterfeit spirits are illegally produced alcoholic drinks which are often sold to consumers as legitimate product.

The State Laboratory assists the Office of the Revenue Commissioners to monitor compliance and to combat excise duty fraud and the production and distribution of counterfeit spirits. Most samples are tested for alcohol content and, where required, congener profiling and testing for authenticity indicators is carried out. A small number of samples containing non-potable alcohol are tested for denaturants.

Sample numbers for alcohol testing decreased by 8% in 2016 as there were less potential prosecutions sample submitted compared to 2015.

#### NUMBERS OF SAMPLES TESTED

##### Revenue Collection and Fraud Prevention

Category of Sample	No. of Samples	No. of Analytes Tested For
Customs	275	247
Excise - Mineral Oils	1,530	8,972
Excise - Alcohols	377	512
<b>Totals</b>	<b>2,182</b>	<b>9,731</b>

#### New Methods Developed

##### Revenue Collection and Fraud Prevention

Test Method	Analytical Technique	No. of Analytes
Sulphur in hydrocarbon fuels	ED/XRF	1
<b>Total</b>		<b>1</b>

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 3

### Provide a Forensic Toxicology Service to the State

The State Laboratory provides a forensic toxicology service to assist Coroners and the State Pathologist to investigate the causes of unexpected death by analysing post mortem samples to confirm the presence or absence of ethanol, legal and illegal drugs and other toxic substances. The levels of substances detected are also quantified.

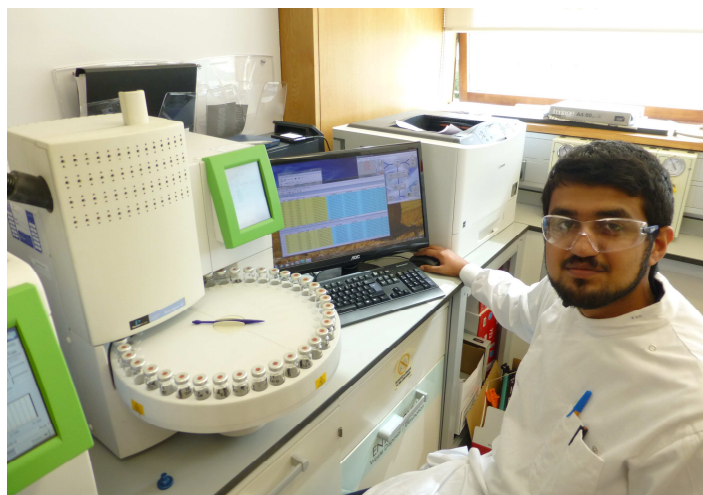
The Laboratory also assists An Garda Síochána with criminal investigations (e.g. death in custody, murder and alleged drug facilitated sexual assault) where there is a need for confirmatory drug analysis on biological samples to form part of the files for the prosecution of individuals. Staff attend and give evidence on their findings in legal proceedings and in Coroners' inquests as required.

Several recent reports have highlighted the marked increase and severity of Ireland's drug abuse problem. Data collated by the Health Research Board over recent years shows a startling upward trend in polydrug use, involving a combination of alcohol, illicit drugs and prescription medication. The drug market is organised, lucrative and constantly evolving as demonstrated by the explosion of designer drugs in recent years.

State Laboratory staff are pro-active about using their wide network of contacts to keep abreast of the latest drugs of abuse in circulation and where possible they extend the scope of the methods of analysis to include these new compounds as soon as reference standards become available. The Laboratory is also represented on the Irish national early warning system which is instrumental in identifying new drugs, monitoring trends and making recommendations that ultimately support national harm reduction initiatives.

All post-mortem samples nationwide are submitted to the State Laboratory for both screening and confirmatory analysis and the Laboratory continues to streamline and expand the service provided to all Coroners. During 2016, the Laboratory developed 84 additional tests to detect / quantify prescribed drugs and drugs of abuse in post-mortem samples. This resulted in a 23% increase in the number of tests performed compared to 2015.

Novel psychoactive substances (NPS), more commonly known as designer drugs, pose a particular analytical challenge because of the rapidly evolving nature of this drug market. Traditionally samples are screened for a defined cohort of prescribed and illicit drugs but now new drug products are easy to access online, often have very similar chemical structures and can be highly toxic in small amounts. Designer drugs are generally 'invisible' in traditional toxicology screens and are not available in commercially purchased databases.



Since early 2015, the State Laboratory has developed and implemented an analytical strategy, using high resolution mass spectrometry (HRLCMS), that allows post mortem toxicology samples to be screened for previously 'invisible' designer drugs outside the laboratory's traditional defined scope of testing. This novel analytical approach is now in routine use with suspect samples being screened for all national and European NPS alerts. This approach also allows for retrospective analysis of data without physical sample reanalysis. This work has supported the Irish Coroner Service in solving many death investigations that previously could not have been satisfactorily concluded.

#### Case Study

In July 2016, post-mortem samples were received in the case of the unexpected death of a middle-aged male with no specific case history provided. HRLCMS urine screening detected a theoretical match for Acetylfentanyl – a synthetic Fentanyl analogue that has been encountered worldwide as an illicit narcotic analgesic since 2013. It is approximately 15 times more potent than morphine and is not licensed for medicinal use.

The presence of Acetylfentanyl was subsequently confirmed and quantified by a newly developed LCMSMS method and at inquest, the Coroner ruled cause of death as Acetylfentanyl toxicity associated with multiple prescribed CNS depressant drugs. This was the first time Acetylfentanyl had been detected or reported in Irish post-mortem samples.

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 3

### Provide a Forensic Toxicology Service to the State



In October 2016, the Laboratory submitted a project, based on this work, entitled "The Invisible Killer: Identifying New Designer Drugs in Post-Mortem Forensic Toxicology" to the Civil Service Excellence Awards and the project won the Insight & Analysis award category.

This reflected the high standard of work routinely performed by the staff of State Laboratory and demonstrated the Laboratory's ability to respond rapidly to changing demands to provide its clients with a world class toxicology service.

#### NUMBERS OF SAMPLES TESTED

##### Forensic Toxicology Service

Category of Sample	No. of Samples	No. of Analytes Tested For
Coroners	5,335	433,653
State Pathologist	345	22,962
Criminal Cases	44	1,401
<b>Totals</b>	<b>5,724</b>	<b>458,016</b>

#### NEW METHODS DEVELOPED

##### Forensic Toxicology Service

Test Method	Analytical Technique	No. of Analytes
Screening method for drugs in urine extended to include additional drugs	LCMS/MS	23
Screening method for drugs in blood extended to include additional drugs	HRLC/MS/MS	37
Confirmatory method for drugs of abuse extended	LCMS/MS	15
Confirmatory method for prescribed drugs extended	LCMS/MS	3
Confirmatory method for acidic drugs extended	LCMS/MS	3
Confirmatory method for low therapeutic range drugs extended	LCMS/MS	3
<b>Total</b>		<b>84</b>

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 4

### Support Public Health and Environment Protection Initiatives

#### Public Health Protection

The State Laboratory assists the Health Products Regulatory Authority (HPRA) to control the use of unlicensed medicines by analysing seized pharmaceutical and herbal products for the presence of pharmaceutically active compounds and scientific staff provide expert testimony in subsequent court prosecutions. The Laboratory also tests a small number of samples from other sources including Customs & Excise officers and the Pharmaceutical Society of Ireland.

The use of the internet to purchase unlicensed medicines continues to be a cause for concern for the HPRA who issued an information leaflet on the 'Dangers of Buying Prescription Medicines Online' in June 2015. There is no guarantee about the safety or quality of medicines purchased online. These products may not be genuine, may not contain the correct active ingredient or may even contain dangerous toxic substances.

During 2016, the analysis of illegal products for zopiclone (a sedative), erectile dysfunction drugs such as sildenafil, tadalafil and vardenafil, which can have potentially serious adverse reactions, phenazepam (a tranquilizer) and a wide range of steroids made up a large proportion of the analysis work performed for the HPRA. Both zopiclone and phenazepam, which were previously uncontrolled but were open to misuse and known to be traded on the illicit market, were brought under the scope of the Misuse of Drugs legislation in 2016. This will assist the law enforcement activities of An Garda Síochána and Revenue Customs to protect public health.

#### Heritage Protection

The State Laboratory provides scientific assistance to the Office of Public Works and a variety of other bodies responsible for the conservation of Ireland's heritage.

In 2016, the cooperation between the State Laboratory and the Conservation Department of the National Gallery (NGI) continued. Analysis was carried out on paint fragments taken from a number of paintings including the Yeats painting "A Flower Girl, Dublin" to determine the elemental composition of the different coloured paints used. XRF analysis was the main technique used for this purpose and Infra Red spectroscopy was used to determine the type of paper present in some painting fragments. XRF analysis was also carried out on paint samples taken from an old sign from the Dental Hospital in Nassau St. for the School of Art History, UCD.

#### NUMBERS OF SAMPLES TESTED

##### Public Health and Heritage Protection

Category of Sample	No. of Samples	No. of Analytes Tested For
Medicinal Products	108	114
Heritage Protection	10	11
<b>Totals</b>	<b>118</b>	<b>125</b>

#### NEW METHODS DEVELOPED

##### Public Health and Heritage Protection

Test Method	Analytical Technique	No. of Analytes
Drugs in medicinal products	HPLC/PDA	2
<b>Total</b>		<b>2</b>

# PROGRESS IN RELATION TO GOALS

## Strategic Goal 5

### Provide a Centralised Veterinary Toxicology Service

#### Veterinary Toxicology Service

The State Laboratory provides a toxicant testing service to DAFM and the National Parks and Wildlife Service (NPWS) to assist investigations into suspected poisonings of birds of prey such as the re-introduced golden eagles, white tailed sea eagles and red kites and other highly vulnerable species (peregrine falcons, buzzards, kestrels and owls) and to investigate cases of suspected farm or companion animal poisonings.

There was a 28% decrease in the number of samples submitted for analysis in 2016. Most of the samples taken from birds contained a variety of rodenticides whereas the samples taken from other animals were found to contain poisons such as paraquat and strychnine. Veterinary drugs such as nitroxylin (an anthelmintic) and meloxicam (a non-steroidal anti-inflammatory), which can be toxic when misused, were also detected. While the use of second generation anticoagulant rodenticides is important for the effective control of rodents on farms and other food premises, they need to be used correctly to prevent other wildlife species being accidentally exposed to these products.

During 2016, the State Laboratory developed a new quantitative method of analysis to accurately determine the levels of 20 of the most commonly found toxicants, excluding paraquat, in samples of avian liver.

This method covers all new second generation anticoagulant rodenticides, as required by the Campaign for Responsible Rodenticide Use (CRRU) which supported this work. A separate method will be developed for paraquat.

#### Veterinary Products

The Laboratory analyses veterinary medicinal products seized for enforcement purposes by DAFM Investigations Division. Sample numbers were up on 2015 and for the first time since 2011, the illegal growth promoter clenbuterol was detected. A number of liquid product samples were submitted as part of a DAFM follow-up investigation into a positive test for clenbuterol in a sample taken at random at a meat plant under the National Residues Monitoring Plan.

In another significant case, a large quantity of antibiotics was seized on a farm without a valid prescription and, on analysis, the samples were found to contain a range of veterinary drugs including dexamethasone, enrofloxacin, marbofloxacin, amoxicillin and other antibiotics. The overuse of antibiotics in farm animals is a serious problem because it can lead to an increase in the levels of antimicrobial resistant bacteria encountered in human medicine.

#### NUMBERS OF SAMPLES TESTED

##### Veterinary Toxicology Service

Category of Sample	No. of Samples	No. of Analytes Tested For
Toxicants in post mortem samples	186	2,405
Veterinary Medicinal Products	76	78
<b>Totals</b>	<b>262</b>	<b>2,483</b>

#### NEW METHODS DEVELOPED

##### Veterinary Toxicology Service

Test Method	Analytical Technique	No. of Analytes
Toxicants in post mortem samples	LCMS/MS	20
Drugs in veterinary products	QToF LCMS	2
<b>Total</b>		<b>22</b>



## State Laboratory Student Placement Programme

The State Laboratory has been involved in facilitating student placements for many years. The work placements/experience are a compulsory part of the students' four year honours degree course and the placements must be completed before the student begins their final year. The placements are confined to students whose degree courses are particularly relevant to the work of the Laboratory.

The Programme provides students with a developmental opportunity to apply skills and knowledge gained during the first three years of their degree course to a working environment. The Programme also offers the students useful insights for their final year of study and prepares them for seeking employment once they have completed their studies. In addition, it gives the students a realistic and positive insight into the modern Public Service and thereby encourages them to view a career as an Analyst or a Chemist in the State Laboratory and other public service laboratories positively.

During their placement, students obtain experience of the work in the Veterinary Toxicology, Human Toxicology, Animal Feedingstuffs, and Contaminants Sections of the Laboratory. They carry out routine analyses, under the supervision of Senior Analysts/Analysts, on food, animal feed, fertilizers, and biological fluids using classical and instrumental techniques. All the analyses are carried out according to the Laboratory's quality and safety policies and, in doing so, the students acquire knowledge of the underlying analytical principles and relevant legislative or other background material.

The colleges and degree courses for 2016 were:

- ◆ Dublin City University – Analytical Science;
- ◆ Limerick Institute of Technology – Pharmaceutical and Forensic Analysis;
- ◆ Dublin Institute of Technology – Forensic and Environmental Analysis;
- ◆ National University of Ireland Maynooth – Pharmaceutical and Biomedical Chemistry

### Johnny Cusack, Student Analyst

#### Veterinary Toxicology Section and Contaminants Section

As part of my honours degree in Chemical Sciences with Medicinal Chemistry I was allowed the opportunity to complete a work placement programme in semester two of year three. The purpose of the work placement programme was to allow students to apply the skills and knowledge gained from their studies in a field that interests them.

My placement was initially within the Veterinary Toxicology section of the State Laboratory. My six month placement here allowed me to get an invaluable insight into the day to day running of a professional analytical laboratory. The time spent here also allowed me to implement many of the techniques and skills I had gained from a number of analytical modules and provided me the opportunity to further develop these techniques and skills.

I was fortunate enough to be offered an extension to my placement which allowed me to spend an additional six weeks in a new section of the lab, the Contaminants Section. The work here differed significantly to that of what I was familiar with in the Veterinary Toxicology Section, the different type of analysis being carried out emphasised how the skills developed in the Veterinary Toxicology Section could be successfully applied to the work in the Contaminants Section.

As a result of my work placement in the Veterinary Toxicology and the Contaminants Sections of the State Laboratory I have developed key

skills which I feel could not be gained in a college environment. These skills will no doubt aid me in my final year of my degree and also in my future career. Being part of both sections allowed me the opportunity to work with expert analytical chemists and observe how they approach and overcome the problems within an advanced analytical laboratory and has inspired me to pursue further study in the area of analytical chemistry.

My expectations and the goal of my work placement programme were greatly exceeded thanks to all staff within the State Laboratory, namely the staff of the Veterinary Toxicology and the Contaminants Sections who provided the support and guidance throughout my placement which were key to the overall success of the placement.



# ADMINISTRATION

## Administration

In 2016, there continued to be an emphasis on recruitment and filling vacancies due to retirements and other staff movements that occurred during the year.

## Shared Services

Shared Services are at heart of the Government's Public Service Reform Plan to maximise new and innovative service delivery channels, to radically reduce costs to drive better value for money and to lead, organise and work in new ways.

The State Laboratory is already a member of the centralised Payroll and HR Shared Services and continued to prepare for the implementation of a Financial Management Shared Services (FMSS) by participating in relevant workshops and working groups.

## Staffing

At the end of December 2016, the Laboratory had 89 Whole Time Equivalent (WTE) staff members. This compares with 83 WTEs at the end of 2015.

Five staff left the Laboratory during 2016. The following staff members retired: Liam Regan (Senior Chemist) and Noreen Monahan (Senior Laboratory Analyst). One Chemist transferred to another Department, another chemist resigned to take up an academic post and a Laboratory Analyst left on secondment to another Department.

Eleven staff joined the Laboratory during 2016. Two Chemists Grade III and ten Laboratory Analysts (one of whom already worked in the Laboratory on a temporary contract) were recruited following open competitions undertaken by the Public Appointments Service.

In 2016, the Laboratory continued with its student placement scheme in association with Dublin City University; Dublin Institute of Technology; Limerick Institute of Technology; and NUI Maynooth. Five students were placed in areas complementary to their academic discipline for a period of six months.

## Sick Leave

In 2016, the Laboratory's Lost Time Rate was 2.9% (an increase on 1.79% in 2015). The average working days lost per full time employee was 6.6. (The Civil Service average was 10.4.)

Gender Breakdown in The State Laboratory		
Grade	Female	Male
State Chemist	1	0
Principal Chemist	2	0
Senior Chemist	6	1
Assistant Principal Officer	1	0
Technical Information Manager	0	1
Chemist Grade II	5	6
Chemist	12	9
Higher Executive Officer	1	1
Senior Laboratory Analyst	8	3
Laboratory Analyst	10	10
Administrative Officer	0	1
Staff Officer	1	1
Clerical Officer	4	3
Laboratory Attendant	0	5
<b>Total</b>	<b>51</b>	<b>41</b>

## Flexible Working Arrangements and Equality of Opportunity

State Laboratory staff can avail of flexible working arrangements including work-sharing, flexitime, parental leave and shorter working year. Staffing shortfalls arising from staff availing of these arrangements have to be absorbed by the Laboratory.

Family Friendly Policies	
Scheme	% of staff availing of scheme in 2016
Worksharing	11%
Parental Leave	7%
Career Breaks	1%
Shorter Working Year	14%

## Governance

### Quality System

The quality of analytical work from the State Laboratory is enhanced through compliance with the quality standard ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories). The State Laboratory operates in accordance with a documented quality system and is currently accredited to ISO/IEC 17025 by the Irish National Accreditation Board (INAB Reg. No. 146T) for 46 test methods covering 448 analytes.

### System of Internal Financial Control

The State Chemist's Statement on Internal Financial Control, which can be found at Appendix I, was submitted to the Office of the Comptroller and Auditor General along with the State Laboratory's 2016 Appropriation Account.

The State Laboratory's Audit Committee met twice in 2016. Internal audits were conducted on Procurement and Inventory procedures and on Computer Systems Controls. A Review of the System of Internal Control was also carried out and progress on implementing corrective actions recommended in the course of previous audits was tracked.

The Comptroller and Auditor General's Office carried out their annual audit of the State Laboratory's 2015 Appropriation Account in March 2016 and no significant issues were raised during the audit.

### Financial Information

The table below summarises the State Laboratory's financial expenditure in 2016, with figures for 2015 provided for comparative purposes.

Gross Expenditure	2015 €000	2016 €000
A1. Salaries, Wages & Allowances	4,948	4,923
A2. Travel and Subsistence	31	30
A3. Training and Development & Incidental Expenses	226	233
A4. Postal & Telecommunications Services	61	56
A5. Apparatus & Chemical Equipment	1,868	2,169
A6. Office Premises Expenses	1,478	1,457
A7. Consultancy Services (Internal Audit)	14	14
<b>Gross Total</b>	<b>8,626</b>	<b>8,882</b>

### Prompt Payments

In 2016, a total of two invoices incurred late payment interest penalties. The total interest and penalties paid amounted to €83.12.

### Freedom of Information

The State Laboratory received three non-personal Freedom of Information requests in 2016. Two requests were completed on time and one request was transferred to another Body.

### Protected Disclosures

No protected disclosures were received by the Laboratory in the reporting period 1 July 2015 to 30 June 2016.

# APPENDIX I

## Statement by the Accounting Officer on Internal Financial Control

### Statement by the Accounting Officer on Internal Financial Control

#### Responsibility for system of Internal Financial Control

As Accounting Officer I acknowledge my responsibility for ensuring that an effective system of internal financial control is maintained and operated by the State Laboratory. This responsibility is exercised in the context of the resources available to me and my other obligations as Head of Office. Also, any system of internal financial control can provide only reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected in a timely manner. Maintaining the system of internal financial controls is a continuous process and the system and its effectiveness are kept under ongoing review.

I have fulfilled my responsibilities in relation to the requirement of the Service Management Agreement between the State Laboratory and the National Shared Service Office for the provision of payroll shared services and human resources shared services.

I rely on a letter of assurance from the Accounting Officer of the Vote for Shared Services that the appropriate controls are exercised in the provision of payroll shared services and human resources shared services to the Laboratory.

#### Financial Control Environment

I confirm that a control environment containing the following elements is in place:

- ◆ financial responsibilities have been assigned at management level with corresponding accountability
- ◆ reporting arrangements have been established at all levels where responsibility for financial management has been assigned
- ◆ formal procedures have been established for reporting significant control failures and ensuring appropriate corrective action
- ◆ there is an audit committee to advise me in discharging my responsibilities for the internal financial control system.

#### Administrative Controls and Management Reporting

I confirm that a framework of administrative procedures and regular management reporting is in place including segregation of duties and a system of delegation and accountability and, in particular, that:

- ◆ there is an appropriate budgeting system with an annual budget which is kept under review by senior management
- ◆ there are regular reviews by senior management of periodic and annual financial reports which indicate financial performance against forecasts
- ◆ a risk management system operates within the State Laboratory
- ◆ there are systems aimed at ensuring the security of the ICT systems
- ◆ there are appropriate capital investment control guidelines and formal project management disciplines
- ◆ The State Laboratory ensures that there is an appropriate focus on good practice in purchasing and that procedures are in place to ensure compliance with all relevant guidelines. The State Laboratory complied with the guidelines with the exception of two contracts to the value of €681,140 which were listed in my annual return in respect of circular 40/2002.
- ◆ These contracts were not competitively procured for the following reasons:
  - ◇ One contract with a value of €32,929 was awarded to a company producing specialised laboratory equipment for which they were the sole supplier.
  - ◇ There was a 10 month delay, while a legal opinion was sought, in awarding one contract with a value of €648,211. This contract was awarded and is managed by the Office of Public Works on behalf of the State Laboratory but payments are made through the Laboratory. The contract was formally signed by OPW, as the Contracting Authority, with a Service Commencement Date of 1 November 2016 and is therefore now compliant.

#### Internal Audit and Audit Committee

I confirm that the State Laboratory has an internal audit function with appropriately trained personnel, which operates in accordance with a written charter which I have approved. Its work is informed by analysis of the financial risks to which the State Laboratory is exposed and its annual internal audit plans, approved by me, are based on this analysis. These plans aim to cover the key controls on a rolling basis over a reasonable period. The internal audit function is reviewed periodically by me and by the Audit Committee. I have put procedures in place to ensure that the reports of the internal audit function are followed up.

*Ita Kinahan*

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Ita Kinahan,  
Accounting Officer, State Laboratory  
21 September 2017

## Meetings and Conferences attended by State Laboratory staff

### Meetings and Conferences attended by State Laboratory staff

The State Laboratory services EU and other international committees at the request of its client Departments. Laboratory personnel also participate in the work of other international expert scientific bodies and conferences. The following list indicates the range of committee work undertaken by State Laboratory personnel and the meetings and conferences attended during 2016.

- ◆ Codex Alimentarius Committee on Methods of Analysis and Sampling (CCMAS) session in Budapest, Hungary
- ◆ Codex Alimentarius CCMAS EU Working Party meeting in Brussels
- ◆ Eurachem General Assembly and Validation Workshop in Ghent, Belgium
  - ◇ Eurachem Method Validation Working Group in Prague
  - ◇ Eurachem Proficiency Testing Working Group in Paris
- ◆ Meeting of the Consultative Committee on Quantity of Material: Metrology in Chemistry (CCQM), BIPM, Sèvres, France
- ◆ Meetings of ISO/CASCO, WG44 on the Revision of ISO 17025 in Geneva
- ◆ International Feed Conference in Geel, Belgium
- ◆ CEN (European Committee for Standardization) Technical Committees
  - ◇ Plenary Meeting of CEN/TC 327 Animal Feedstuffs: Methods of Sampling and Analysis in Brussels
  - ◇ Meeting of CEN/TC 327 WG3 on Feed Additives and Drugs in Prague
  - ◇ Meeting of CEN/TC 327 WG4 on Heavy Metals, Trace Elements and Minerals in Prague,
  - ◇ Two meetings of CEN/TC 327 WG5 on Natural Toxins in Prague and Geel
- ◆ EuroResidue Conference in the Netherlands.
- ◆ Meetings of European Union Reference Laboratories (EURL) and National Reference Laboratories (NRLs) networks
  - ◇ Workshop of the EURL for Feed Additives (EURL-FA) in Brussels
  - ◇ Two workshops of the EURL for Dioxins/PCBs in Feed and Food in Stockholm, Sweden and Freiberg, Germany
  - ◇ Two workshops of the EURLs for Veterinary Drug Residues in RIKILT, Wageningen, The Netherlands and BVL, Berlin
- ◆ The Society of Forensic Toxicology (SOFT) Conference, Dallas, Texas
- ◆ Meeting of the UK & Ireland Forensic Toxicology Network (UKIAFT) in London
- ◆ International Conference on Novel Psychoactive Substances in Budapest, Hungary
- ◆ Meeting of the Reitox Early Warning System Network in Lisbon, Portugal
- ◆ Meeting of the Energy Institute Molecular Spectroscopy Panel in London
- ◆ Customs Laboratories European Network (CLEN) Plenary meeting in Brussels
- ◆ CLEN European Customs Chemists Seminar in Amsterdam
- ◆ Food, Health and the Role of National Reference Laboratories Conference, Dublin
- ◆ Conference on Analytical Sciences (CASi), Dublin
- ◆ Irish Mass Spectrometry Society Conference, Dublin
- ◆ National Data Protection Conference, Dublin
- ◆ Public Sector IT Conference, Dublin
- ◆ Public Sector Reform and Innovation Conference, Dublin

### Attended on behalf of Revenue

- ◆ Meeting of the Scientific Sub-Committee of the World Customs Organisation in Brussels
- ◆ Three meetings of the Customs Code Committee, Tariff and Statistical Nomenclature Section (Agriculture/Chemical Sector) in Brussels
- ◆ Two meetings of the Project Group concerning the Chemical and Food Chapters of the HS/CN in Amsterdam and Brussels
- ◆ Meeting of the Project Group on the Food Chapters of the HS/CN in Brussels
- ◆ Meeting of the Fiscalis Project Group on Denatured Alcohol in Brussels

### Attended on behalf of the Department of Jobs, Enterprise and Innovation

- ◆ Two meetings of the Commission Expert Group on Textile Names and Labelling in Brussels

## APPENDIX III

# Conference & Seminar Presentations by State Laboratory staff

### Conference & Seminar Presentations by State Laboratory staff

- ◆ Presentation entitled "Challenges in Method Validation - A Regulatory Laboratory Perspective" at the Conference on Analytical Sciences (CASI), Dublin
- ◆ Presentation entitled "Elemental Analysis at the State Laboratory" at the Anton Paar Microwave Digestor Users workshop, Dublin
- ◆ Presentation on "Chromatographic Interferences observed in a Method of Analysis for Steroids in Urine" at the EURL workshop in RIKILT, The Netherlands
- ◆ Presentations on "Challenges in Method Validation - A Regulatory Laboratory Perspective", "The Eurachem Method Validation Working Group" and "Troubleshooting Method Development - A Case Study: Diclofenac in Milk" at the Eurachem Method Development Workshop, Dublin
- ◆ Poster presentation on "Analysis of Dioxins and PCBs by High Resolution Gas Chromatography-Mass Spectrometry (HR-GCMS)" at the Conference on Analytical Sciences (CASI) and the Irish Mass Spectrometry Society Conference, Dublin
- ◆ Poster presentation on "Analysis of the Accutrace Fuel Marker in Gas Oil" at the Conference on Analytical Sciences (CASI), Dublin

### Conferences and Workshops organised by State Laboratory staff

- ◆ "Food, Health and the Role of National Reference Laboratories" Conference, Dublin
- ◆ Eurachem Ireland / TrainMiC<sup>®</sup> Workshop Part II, Dublin
- ◆ Eurachem Ireland "Method Development (LC-MS/MS) and Method Validation" Workshop, Dublin

### Publications by State Laboratory staff

The Contaminants Section: *Dioxin/PCB Analysis by High Resolution Gas Chromatography Mass Spectrometry (HRGCMS)*, Irish Chemical News, 2016 Issue 1.

Helen Cantwell: *Navigating the Challenges of Method Validation – with a little help from Eurachem*, Irish Chemical News, 2016, Issue 3.



Participants at the Eurachem Ireland Method Development (LC-MS/MS) and Method Validation Workshop, October 2016

## Irish National Accreditation Board Accredited Tests Summary of Schedule of Accreditation (Edition 22: 22/11/2016) \*

\* For further details, see our schedule of accreditation (Reg. No. 146T) on the INAB website ([www.inab.ie](http://www.inab.ie)).

Matrix	Measurand	Test Method	Method ID
Animal Feedstuffs	Crude Protein	EN ISO 16634-1:2008. Nitrogen content by the Dumas Principle.	LSD A032
Animal Feedstuffs	Crude Oils and Fats	EU Commission Regulation 152/2009 Annex III (H).	LSD A023
Animal Feedstuffs	Crude Oils and Fats	NIR Spectroscopy.	LSD A031
Animal Feedstuffs	Crude Fibre	EU Commission Regulation 152/2009 Annex III (I).	LSD A024
Animal Feedstuffs	Crude Fibre	NIR Spectroscopy Screening Method.	LSD A031
Animal Feedstuffs	Crude Ash	In house method based on EU Commission Regulation 152/2009 Annex III (M).	LSD A026
Animal Feedstuffs	Crude Ash	Gravimetric method using a Microwave Furnace.	LSD A030
Animal Feedstuffs	Ash Insoluble in HCl	EU Commission Regulation 152/2009 Annex III (N).	LSD A034
Animal Feedstuffs	Moisture	EU Commission Regulation 152/2009 Annex III (A).	LSD A027
Animal Feedstuffs	Macro and Trace Elements (8)	I.S. EN 15621:2012. ICP OES with Microwave Digestion.	LSD A060
Animal Feedstuffs	Heavy Metals (6)	ICPMS with Microwave Digestion.	LSD A062
Animal Feedstuffs	Nicarbazin	In House HPLC method with DAD, based on IS EN 15782:2009.	LSD A050
Animal Feedstuffs	Monensin, Narasin and Salinomycin	EN ISO 14183: HPLC with post column derivatisation.	LSD A051
Animal Feedstuffs	Coccidiostats (11)	In house LCMSMS Method.	LSD A052
Animal Feedstuffs	Chlortetracycline	In House HPLC method with DAD	LSD A072
Animal Feedstuffs	Sulphadenazine	In House HPLC method with DAD	LSD A076
Fertilisers	Nitrogen Content	Nitrogen content by the Dumas Principle. In house method based on AOAC official method 993.13.	LSD A036
Animal Feedstuffs	Trace Elements, Heavy Metals and Other Elements (17)	In house method by ICPMS with Microwave Digestion	LSD A067
Animal Feedstuffs	Iodine	In house ICPMS method.	LSD A066
Drugs	Flexible Scope (Analyte and Range) Identification and Quantification of pharmaceutical samples	In house HPLC method with DAD. Complies with relevant requirements of OJEC 2002/657/EC, ICH guideline Q2 (R1), Q2B and Q6A and monographs from British, European and US Pharmacopoeia.	LSD J012
Drugs	Flexible Scope (Analyte and Range) Identification of Pharmaceutical Samples	In house QTOF LCMS method based on the requirements of Commission Decision 2002/657/EC, ICH guideline Q2 (R1), Q6A and monographs from British, European and US Pharmacopoeia.	LSD J044
Milk (Liquid & Powder)	Aflatoxin M1	Based on an EU/STM method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD J025
Animal Feedstuffs	Aflatoxin B1	Based on an EU/STM method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD J024
Liver	Ochratoxin A	In house method using IA column cleanup and RP HPLC with fluorescence detection.	LSD J026

# APPENDIX IV

## Irish National Accreditation Board Accredited Tests Summary of Schedule of Accreditation (Edition 22: 22/11/2016) \*

\* For further details, see our schedule of accreditation (Reg. No. I46T) on the INAB website ([www.inab.ie](http://www.inab.ie)).

Matrix	Measurand	Test Method	Method ID
Lettuce, Spinach and Cabbage	Nitrates	In house based on EN12014-2:1997-04. Anion exchange chromatography following extraction and clean-up.	LSD M062
Food and Feed	Dioxins and Dioxin-like PCBs (35)	In House GC/HRMS method.	LSD V052
Animal Feedstuffs	Mycotoxins (11)	In house Multi Analyte LCMSMS method	LSD J038
Pure starches, Animal feed, Foods, Petfoods	Starch	EU Commission Regulation 152/2009 Annex III (L); polarimetric method (Ewers principle).	LSD R013
Alcoholic Drinks	Alcoholic Strength by Volume	In house using a density meter following distillation.	LSD B010
Gas Oil	C.I. Solvent Yellow 124	In house HPLC method.	LSD H009
Liquid Fuels	Accutrace S10 Fuel Marker	In house GCMS method.	LSD H033
Blood & Urine	Ethanol	In house method. Determination by internal standard quantitation using Headspace GC with FID.	LSD T003
Animal Urine	Flexible Scope (Matrices, Residues and Ranges) Steroids (17)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V031
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Steroids (14)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V046
Poultry Liver	Flexible Scope (Matrices, Residues and Ranges) Steroids (11)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V061
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V038
Eggs	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V049
Honey	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V063
Milk	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V064
Animal Plasma and Milk	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (11, 8)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V039
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (12)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V068
Animal Kidney Fat	Flexible Scope (Matrices, Residues and Ranges) Gestagens (5)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V033
Urine	Flexible Scope (Matrices, Residues and Ranges) Corticosteroids (5)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V058
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Sedatives (8)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V067



### Energy Use Statement

In 2016, the gross energy consumption by the State Laboratory was as follows:

- ◆ Electricity 2,321,712 kWh
- ◆ Gas 3,210,417 kWh
- ◆ **Total 5,532,129 kWh**

The total gross energy consumption value compares with a baseline value (2006-2008) of 7,346,772 kWh and the Laboratory's energy performance indicator (EnPI) is 28.7% better than baseline using total useable floor area (TUFA) as the relevant metric for the Laboratory, but 0.4% worse than the performance indicator for 2015. This small downward trend in gross energy usage in 2016 is likely to be as a result of increases in staff numbers and the introduction of new equipment. An improvement of >6% energy usage will need to be gained if the Laboratory is to meet the target set by the Sustainable Energy Authority of Ireland (SEAI) where Public bodies are tasked to improve their energy efficiency by 33%.

The reduction in energy consumption to date has been achieved by the following measures:

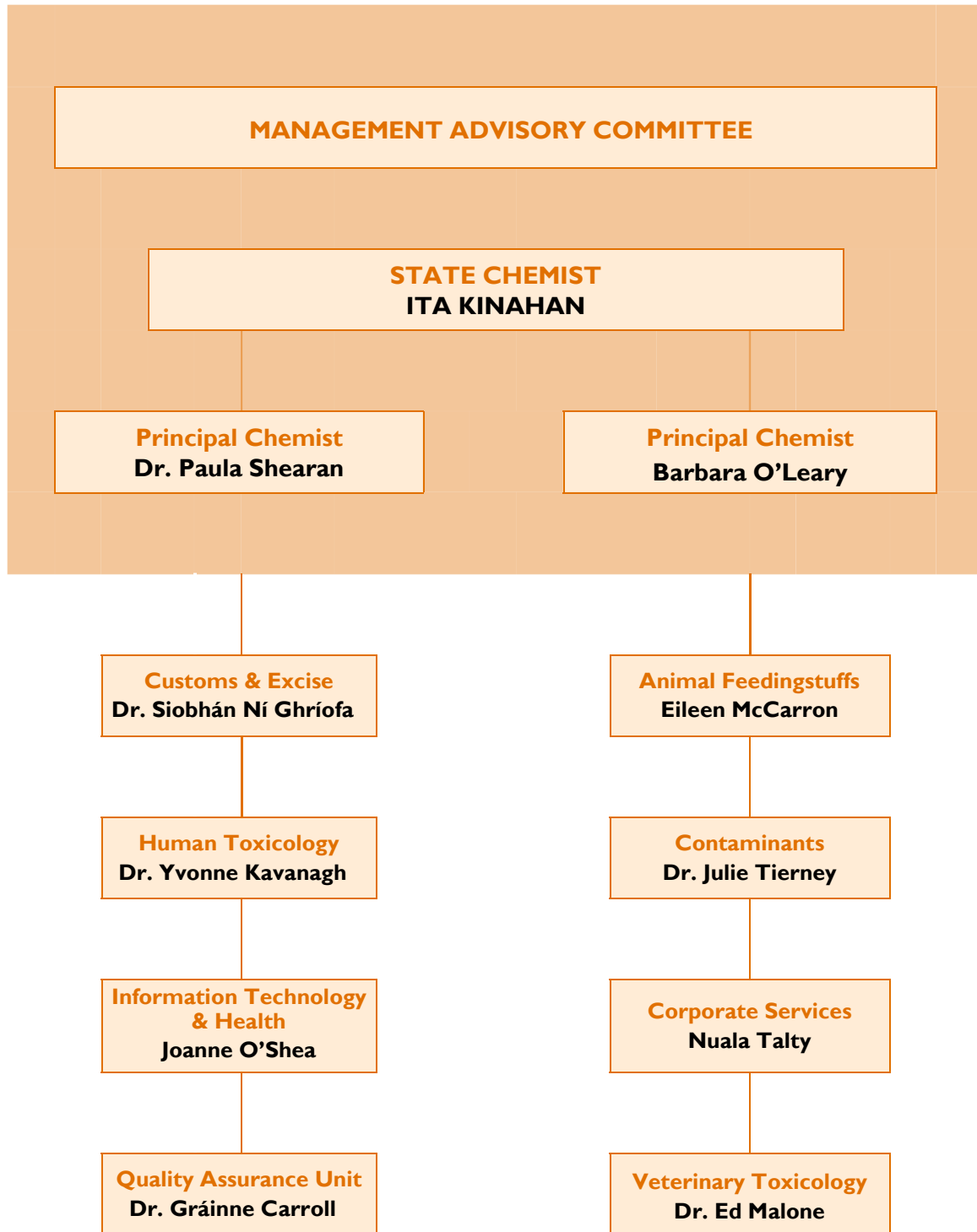
- ◆ reducing the number of air changes per hour in the laboratories to the minimum required to ensure a safe work environment for staff;
- ◆ reducing the flow on air-handling and extraction systems outside of working hours;
- ◆ installing individual switches on fume cupboards to allow users to control their operation more efficiently;
- ◆ incorporating a heat exchanger to recover waste heat from a new air compressor installed in 2015; and
- ◆ engaging staff to reduce unnecessary energy consumption on a day to day basis.



# APPENDIX VI

## Organisation Chart

(as at 31<sup>st</sup> December 2016)



# APPENDIX VII

## Staff List

By Grade (as at 31<sup>st</sup> December 2016)

<b>State Chemist</b>			
Ita Kinahan			
<b>Principal Chemist</b>			
Barbara O'Leary		Dr. Paula Shearan	
<b>Senior Chemist</b>			
Dr. Gráinne Carroll Dr. Yvonne Kavanagh	Dr. Ed Malone Eileen McCarron	Dr. Siobhán Ní Ghríofa Joanne O'Shea	Dr. Julie Tierney
<b>Chemist Grade II</b>			
Dr. Jonathan Carroll Dr. Eleanor Dixon Dr. Pierrick Fevrier	Dr. John Fields Dr. Seán McGowan Eddie McGrath	Audrey Nugent Ruth Reilly Dr. David Savage	Claire Timbs Mairéad Webster
<b>Technical Information Manager Grade II</b>			
Dr. Michael O'Gorman			
<b>Chemist</b>			
Sinéad Bermingham Ann Marie Bragason Dr. Helen Burke David Canny Dr. Helen Cantwell Paula Clarke	Dr. Mark Cronly Michael Doyle Niamh Fitzgerald Joe Fitzsimons Lynda Harman Ray Kelly	Myra Keogh Shonagh Masterson Úna McArdle Dr. Mark McDonald Dr. Amy Nagle Olivia O'Connor	Dr. Colmán Ó Ríordáin John Reilly Patrick Saunders
<b>Senior Laboratory Analyst</b>			
Judith Boyle Sheevaun Cody Angela Cunningham	Laura Flynn Fiona Gallagher Marella Gallagher	Carol Gleeson Bernard Hanratty Tom Harbison	Ciara McDonnell Aengus Ó Briain
<b>Laboratory Analyst</b>			
Patricia Carter Simon Daly Sinéad Dunlop Madeleine Gibbons Johanna Gilligan	Veronica Gubarkova Sean Hyland John Judge Ian Kelleher Vicky MacEoin	Sheila Martin Dr. Fergus Melligan Alan Murphy Conor Noone Colm Reid	Sinéad Ryan Dennis Sheehan Hannah Smith Fiona White Gavan White
<b>Laboratory Attendant</b>			
Simon Chiu Tom Gaule Mark Keane		John Moylan Declan Powell	
<b>Corporate Services</b>			
Nuala Talty - Assistant Principal Pat Fannin - Higher Executive Officer Mary Quine - Higher Executive Officer Phyllis Barry - Staff Officer John Clancy - Staff Officer Damien Duffy - Clerical Officer		Elizabeth Ellard - Clerical Officer Geraldine Gaffney - Clerical Officer Paul Hirtes - Clerical Officer Derek Martin - Clerical Officer Nicola Seery - Clerical Officer Niamh Stafford - Clerical Officer	
<b>ICT</b>			
John Burke - Administrative Officer			