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Arran Chemicals Limited

Athlone, Co. Roscommon.

Site Operational Report 2019

Report Reference Number: 4750-19-02
Version: 1
Date of Issue: 30-09-2019

Operational Report

Description of Existing Premises & Plant

1. Introduction

Arran Chemical Company commenced manufacturing on-site in Monksland Industrial Estate in 1988, with the number of employees currently standing at 100 staff consisting of Production, R & D, Supply chain, Accounts, Engineering and HSE staff. Arran operates a small batch-mode multi-purpose chemical synthesis plant for the contract manufacture of products for pharmaceutical intermediates, fragrance and flavouring, contact lens sector, and other specialised chemical and industrial applications. Arran also offers services such as contract research, laboratory synthesis, process development, chemical and bioprocess scale-up. Arran operations are accredited to ISO 9001:2015 and ISO 14001:2015 standards. Arran is also a member of the Responsible Care programme, which provides a useful framework to support conformance with environmental, health and safety standards. Arran operations are accredited to ISO 9001:2015 and ISO 14001:2015 standards. Arran is also a member of the Responsible Care programme, which provides a useful framework to support conformance with environmental, health and safety standards. Arran has operated under EPA Licence since 1996. A second revision of the licence (P0110-02) was issued in 2007.

2. Description of Existing Operations

Arran first commenced operation as an R & D and pilot production facility in Galway but relocated to Monksland to facilitate more commercial production. The strategic location of Arran is in line with the Westmeath County Development Plan 2014-2020 which aims to promote and sustain development of high value, knowledge based industrial activities. The three-acre site facilities include range from laboratory and kilo laboratory for process development and prototype manufacture, to pilot plant (with stainless steel, Hastelloy and glass lined vessels of volume up to 1,000 L) and to manufacture plant (with stainless steel, Hastelloy and glass lined vessels of volume up to 8,000 L). A range of filters and centrifuges are available for product isolation and distillation technologies are widely deployed to enhanced product purity and quality. A total of 88 m³ of manufacturing vessel capacity is available with a potential to produce approximately 1,500 - 2,000 batches of product per calendar quarter. Arran operates a three by eight-hour shift over a week with staff operating as per Table 1 below:

Table 1

Department or Position	Numbers	Shift
Management	5	Day
Administration	5	Day
Manufacturing Supervisors & Operators	35	3 shift cycle
Pilot Plant & kilo	15	2 & 3 shift cycle
R&D Laboratory	5	Day
QC Laboratory	15	2 shift cycle
Environmental & Warehouse	10	2 shift cycle
Engineering & Maintenance	10	Day
Total	100	

3. Process Flow

Process Overview:

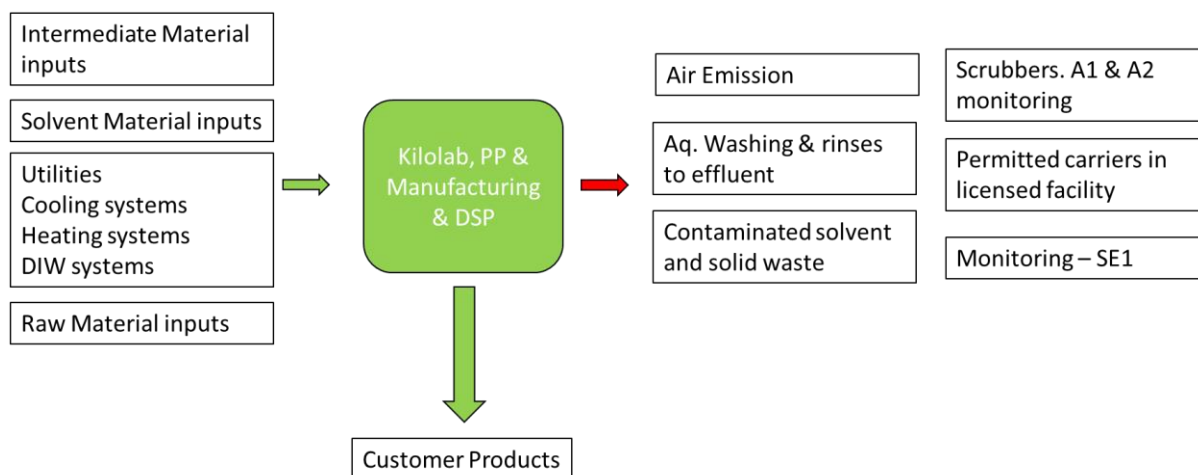


Figure 1

Chemical and biochemical (enzymes) are received on site and are passed by QC after the $\sqrt{n+1}$ sample testing is completed. The materials are labelled approved and are sent to a designated warehouse for storage. The materials are then processed through kilo, pilot or production depending on the scale requirements of the product. The materials are converted from A \rightarrow B using a myriad of classic chemistry and/or enzyme chemistry. In performing the chemical reaction, wastes including air emission, organic and aqueous are generated. The overall process is summarised in Figure 2. The output of the reaction is the preparation of the product.

As part of ongoing process efficiency drives to make processes more environmentally friendly, Arran also deploys enzyme chemistry. It is well recognised that enzyme processes offer attractive attributes to chemical processes due to the reactions typically being performed in water, at room temperature and at atmospheric pressure. In addition, process yields are increased and less waste generated.

Arran process optimise processes to maximise yields, minimise process variability, and control waste and air emission. The following bullet point's summaries highlighted controls:

- Enzyme chemistry is deployed to perform reactions in water at ambient temperature and thereby minimise VOC emission
- Primary and secondary chilling on condensers: Cooling water and -15°C Glycol Cooling
- Circulator Chiller to -40 °C for specific reactions
- Cryogenic knock out pot for DCM processes
- Carbon scrubbing for DCM processes
- Processes optimised for yield and minimisation of waste
- Solvent recycle done as much as possible to minimise waste
- Pd Catalysts recycled

4. Existing Process Operations

- [Process 1: Kilo Laboratory & Prototype Manufacture](#)

The Kilo lab phase is an important foundation phase to ensure that manufacturing is a smoother, more efficient process. Kilo lab facilities are specifically designed and equipped for reactions and calorimetry and specialised analytical skills support new product research and process development. Services include new product synthesis, process development leading to laboratory, pilot plant and full-scale production. Analytical equipment includes;

- Parallel Reaction System for Reactions and Calorimetry
- Jacketed Reactor Vessels 10-20 L for better temperature control
- Short path distillation (thin film) KDL
- Rotary evaporators 20 L scale
- Standard temperature range -50 °C to 200 °C



The key objective is to provide for as much flexibility and agility as possible to manage a dynamic portfolio of potential products while meeting environmental, health and safety, product quality, and business requirements.

- [Process 2: Pilot Plant](#)

Pre commercial production system to provide critical information for the potential scale up of a product that bridges the gap between bench chemistry and commercial manufacturing. Arran's Multi-purpose Pilot Plant includes:

- 7 Reactor Vessels ranging from 100 L – 1000 L in size
- Glass Lined Steel, Hastelloy, Stainless Steel vessels
- Temperature Capacity Range -50 °C to 200 °C
- Centrifuge and tray dryer
- Packed column fractional Distillation



Table 2 summarises the pilot reactor sizes.

Table 2

Reactor	Type	Capacity (L)
PR101	Glass Lined	500
PR102	Hastelloy	250
PR103	Stainless Steel	280
PR104	Glass Lined	300
PR105	Glass Lined	120
PR106	Stainless Steel	650
PR107	Stainless Steel	1400
PR108	Glass Lined	50L (TBE Only)

- Process 3: Manufacturing Plant

Multi-purpose Manufacturing Plant

- 15 Reactor Vessels ranging from 2,200L – 8,000L in size
- Glass Lined Steel, Hastelloy, Stainless Steel vessels
- Solids & Liquids Handling
- Temperature Range -50°C to 200°C
- Distillation and Solvent Recovery
- Distillation and Solvent Recovery



Table 3 summarises the reactor sizes.

Reactor	Type	Capacity (L)	Reactor	Type	Capacity (L)
R113	Stainless Steel	6000	R105	Hastelloy	2000
R104	Stainless Steel	5000	R106	Glass Lined	6000
R101	Stainless Steel	4000	R109	Glass Lined	4600
R110	Stainless Steel	4000	R103	Glass Lined	2000
R111	Stainless Steel	4000	R107	Glass Lined	2000
R112	Stainless Steel	4000	R108	Glass Lined	2200
R102	Stainless Steel	2000			

Reactor	Type	Capacity (L)
R114	Stainless Steel	6000
R115	Glass Lined	6000
R116	Stainless Steel	8000
R117	Glass Lined	8000

Table 3

A range of filters and centrifuges are available for product isolation and distillation technologies are widely deployed to enhanced product purity and quality. A total of 88m³ of manufacturing vessel capacity is available to our clients and approximately 1,500 – 2,000 batches of product are executed per calendar quarter.

5. Environmental Emissions and Abatement Systems

Emissions to Sewer and Surface Water: The two key emissions that occur as a result of facility activities are emissions to sewer and emissions to air. Emissions to sewer are in agreement with Irish Water and a revised agreement of parameters and emission limit values are attached as Appendix 1 on this report. There are currently no emissions to water from operation of the facility and there are no emissions granted under licence P0110-02. Storm water emissions are to reference point No: SW1. There is a requirement in the licence for weekly monitoring for conductivity, pH and COD. These emissions are to the Local Authority Surface Water drainage network. The emissions to sewer are at reference point number SE1. Emissions at this point are tested on:

Table 4

Parameter	Frequency
Temperature, Dissolved Oxygen	Daily
Flow, pH	Continuous
COD	Weekly
BOD, Suspended Solids, Sulphates, Chlorides, Total Dissolved Solids	Monthly
Sulphites, Phenols, Phosphorus, Heavy Metals, Detergents, Organic Solvents	Quarterly
Toxicity	Annually

The diagram below shows surface water collected from open yard and car park areas discharging to local authority surface water drains and network of process drains diverted to bunded effluent balancing tanks. A detailed diagram is included in Appendix 2 of this report.

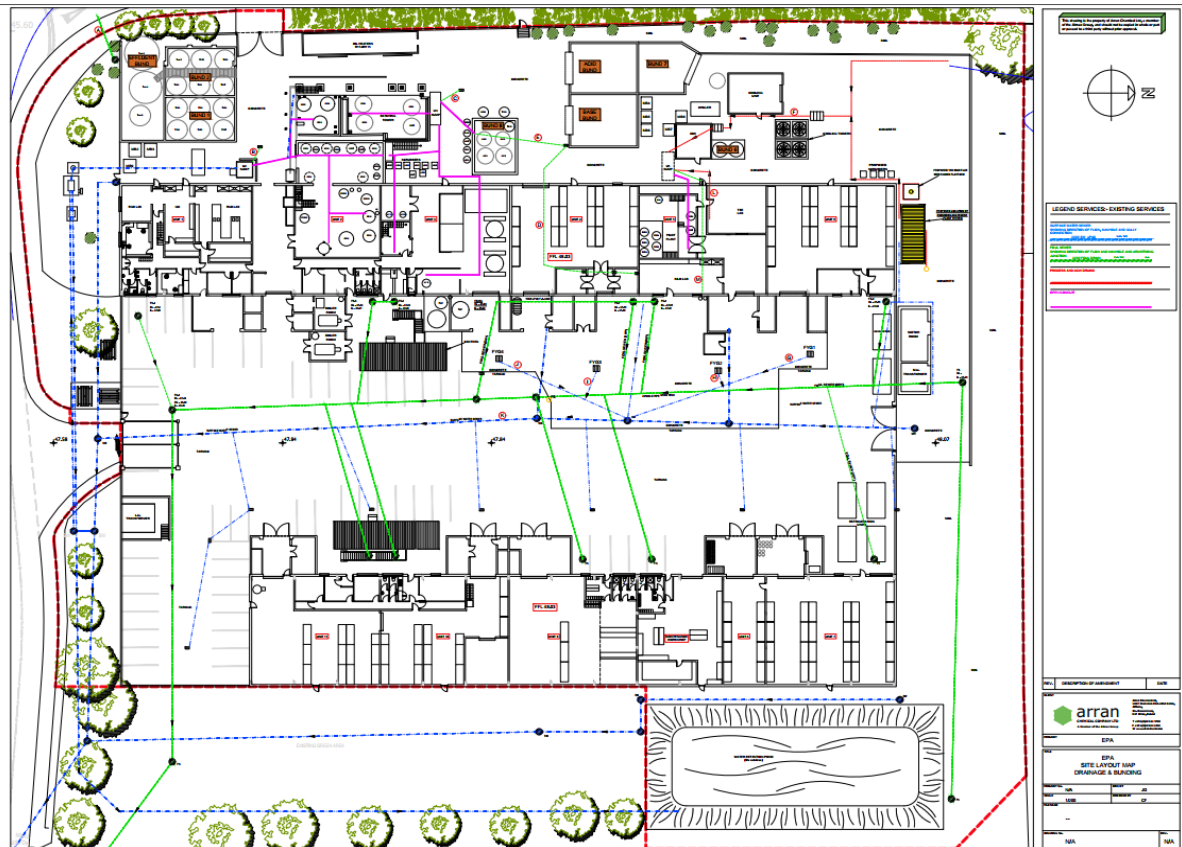


Figure 2

All liquid chemicals are stored in bunded areas which has been subject to testing under IE Licence P0110-02. A requirement of the licence is that all bunds are tested every 3 years and results submitted as part of the facility's AER. In addition to this as part of the Arran accredited Environmental Management System all bunding and associated pipe works are visually inspected weekly to minimise the potential of any small leaks. Also, there are spill kits and procedures located at strategic points around the facility to ensure that any small spills can be dealt with in a prescribed manner. In the event of a large fire or abnormal event the Emergency Response Procedure outlines measures to be taken to mitigate against any environmental contamination. Measures include diversion of all firewater to the Fire Water Retention Pond. A copy of the ERP is included in Appendix 3 of this report.

Emissions to Air:

The other key emissions to environment during operation are emissions to air. Currently the facility has four licensed air emission points, BE1, BE2, A1 and A2. BE2 is no longer in operation so no monitoring is required in agreement with the Agency. Both A1 and A2 are required to test for TA Luft organics on a monthly basis and Total Organic Carbon on a continuous basis. All monitoring reports are submitted to the EPA via Eden on an ongoing basis. A detailed description of the operation and abatement system is outlined below.

Air Emissions Process Flow

The processes conducted at the Arran facility produces volatile organic compounds (VOC) which are evolved during chemical processes and these are primarily controlled through use of condensers within the reactor

overhead systems. Any remaining VOCs proceed through the abatement system, comprising of three principle technologies: gas-liquid absorption through a two-stage scrubbing system, thermal oxidisation within a controlled combustion chamber and gas solid adsorption using activated carbon beds. These processes are detailed in the attached Process Flow Diagram (PFD), figure 1, which is annotated using numbers to accompany this process description. The PFD should be used along with this process description to understand how Arran are protecting the environment from the VOCs which are produced in each reactor.

A1 Scrubber System – Zone 1

Process Vent header 1 (stream 1) proceeds directly into a two-stage venturi-caustic scrubber system. The A1 scrubber system is made up of two stages: the first, is the entrance of the gas stream into the scrubber which is designed to accelerate the flow through a venturi “throat”. As the stream is passed through the throat it is sprayed with the scrubbing liquor; the particles begin to agglomerate due to the shearing caused by the acceleration and deceleration. This helps to remove the heavier particles as they are absorbed by the scrubber liquor. The second stage of the scrubber system is a packed column of a specified height in which the contact time with the scrubber liquor is designed to remove the soluble compounds of the gaseous stream. The gas stream is drawn through the scrubber system and the remaining light, non-soluble VOC gaseous mixture leaves the scrubber outlet (stream 2) via a demister in which any liquor droplets are captured. The scrubbed air stream (stream 2) then passes towards the regenerative thermal oxidiser (RTO).

A1 Scrubber to Regenerative Thermal Oxidiser- Zone 1 to 2

Stream 10 then joins stream 2 with the possibility of providing more VOCs from the A2 scrubber system. Both the flow meter and LEL monitor are downstream of this junction to ensure that the flow the RTO is receiving is the flow which is measured. The RTO process and control design begin at from stream 3 onward and are covered in the next section.

Drains will be located at the low points of the vent pipework to collect any water that may condense in the lines. The drains points are equipped with sight glasses to show when liquid is present and draining will be a manual operation.

Regenerative Thermal Oxidiser- Zone 2

The RTO is controlled through a bespoke vendor control system package (PLC). The RTO consists of 4 areas: the inlets, the ceramic beds, the combustion chamber and the outlets. Stream 3 is mixed with a fresh air stream as required to achieve minimum flowrate for correct RTO Performance, determined by the RTO control PLC. The inlet stream enters the RTO, via one of three inlet valves depending on which bed is active. The inlet stream will proceed through the first bed and enters the chamber in which the burner causes oxidisation of the stream at above 860°C with a residence time of minimum one second. The hot stream then exits the chamber through an alternative bed and heat is absorbed by the ceramic material as the stream exits the RTO via the outlets. The treated gas stream (stream 4) is released to atmosphere through the A1 stack and its composition is constantly monitored.

The RTO inlet and outlet beds are switched by the RTO control PLC during normal operation to provide preheating of the feed stream and prevent spot heating within the beds for a thermally efficient system.

The RTO control PLC also performs safety functions through automatically shutting down the RTO when potentially unsafe conditions are detected e.g. loss of natural gas supply or exceedance of safe limits in the gas stream (stream 3) to the RTO caused by significant chemical process upset. To protect the RTO in these circumstances

gas stream feed (stream 3) to the RTO is prevented and this gas stream is instead vented to atmosphere via an emergency vent route (stream 9) to the A2 Stack. The occurrence and duration of any emergency vent activations will be monitored.

A2 Abatement System - Zone 3

The A2 scrubber system is designed as the same operation as the A1 scrubber system but is designated to deal with chemicals which could damage the RTO. This provides an alternative route which takes the gaseous stream (stream 8) through carbon adsorption beds. The carbon adsorption are set up in pseudo-parallel, which allows a sequence of carbon beds to operate in both series for operation and parallel for maintenance. The treated gas stream (stream 11) is released to atmosphere through the A2 stack and its composition is constantly monitored. In the event that the A1 scrubber system is undergoing maintenance, the A2 scrubber system can instead be used for this duty with carbon beds bypassed (stream 7) and the scrubbed gas stream sent to the RTO. The A2 stack is also designed for use as an emergency vent route (stream 9), see previous section.

The proposed Regenerative Thermal Oxidiser (RTO) will be installed at the northern boundary of the site. The RTO was developed to optimise usage of energy during the treatment of Volatile Organic Compounds prior to release to air. A thermal oxidiser heats the VOC's to a certain temperature until they are oxidised. The oxidation process breaks down the harmful particulates into carbon dioxide and water. Thermal oxidisers are very effective and an RTO allows for the heat to be recuperated and reused within the operating system which increases efficiency of the system. Thermal efficiency can easily reach as high as 95%.

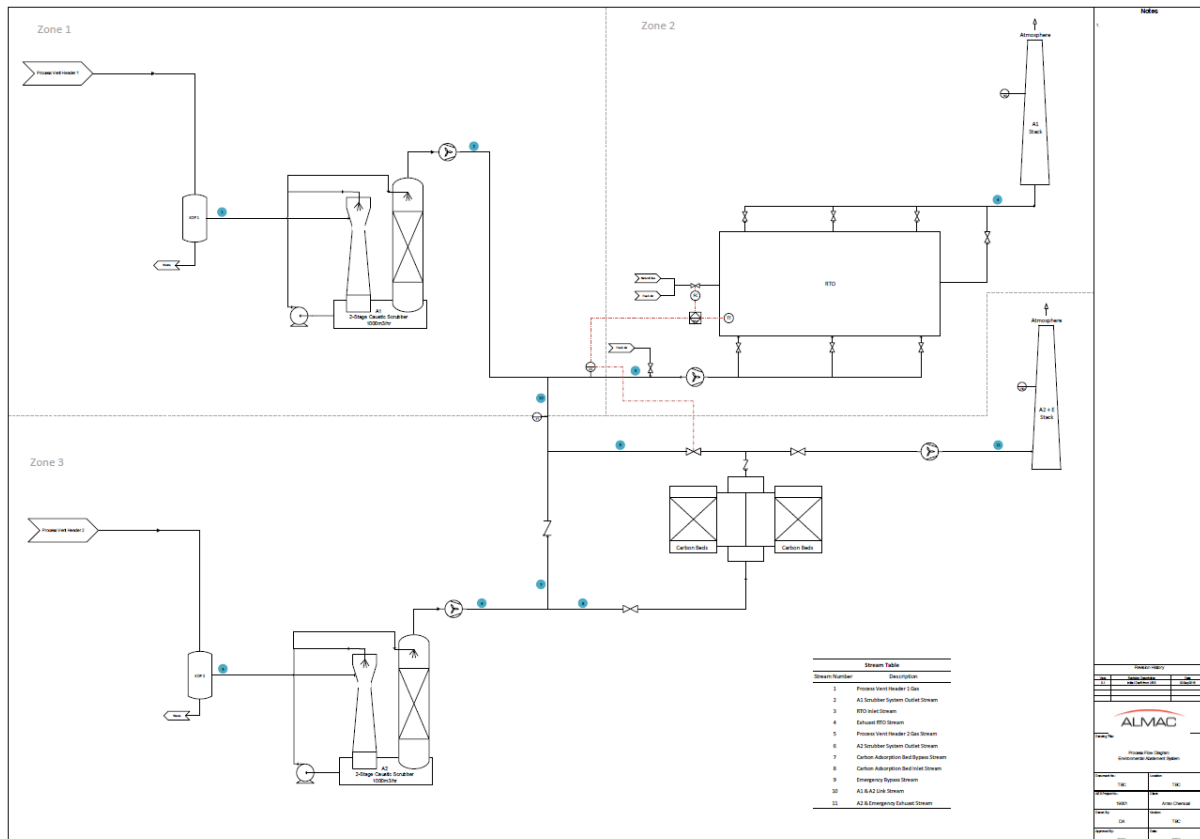


Figure 3 – Process Flow Diagram

Noise Emissions:

Arran have been operating under the current licence since 2007 and there is an annual requirement to monitor noise at two locations. The facility is located in an industrial estate adjacent to other large pharmaceuticals, the Monksland Wastewater Treatment Facility and the R362 road. Development in this location is in line with the Roscommon and Westmeath County Development Plan. The most recent Noise Assessment carried out in September 2019 concluded that Arran Chemicals Ltd was compliant with Condition 12 of IE Licence P0110-02 for both day and night measurements. A copy of this report can be reviewed in Appendix 4.

Odour Emissions:

There have been 3 complaints in 2019 against Arran from members of the public. On subsequent visits from EPA staff Arran were found not to be in breach of Condition 5.1 of the facility's Licence P0110-02 at the time of the assessment. Condition 5.2 of the licence states that;

"No emissions, including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the installation boundary or any other legitimate uses of the environment beyond the installation boundary."

As a result of these complaints Arran has installed Airborne10 Odour Removal Technology. These measures were taken to reduce any potential odours that may arise from the operations.

Airborne 10 is the proprietary name for surfactant induced absorption technology (S.I.A.T.). A biodegradable absorption technology that greatly increases the absorbency of water. When the solution is turned into tiny droplets by atomisation, the non-selective scrubbing agent is highly effective and both the solution and the gas are biodegradable so can be easily dealt with by the bacteria found in the local environment.

The system is not operational at all times but is a mitigation option at times where corrective action is required or when odours are detected during routine patrols.

6. Storage Conditions, location and transport procedures for materials onsite.

Arran is accredited to ISO 14001 and has implemented strict control procedures for the receipt, movement and storage of hazardous materials onsite. All delivery personnel are supervised by a member of Arran staff and are made aware of the loading/unloading procedures onsite which include restricting these activities on hardstand bunded areas in the event of a spill. All Arran staff who are authorised to receive deliveries are trained in loading/unloading procedures as well as Spills Emergency Response procedures.

Bulk chemical storage takes the form of a tank farm and an open chemical storage area for IBCs/drums at the rear of Units 1 to 6. The area is covered by reinforced concrete bunding and the gradient is such that liquids are directed towards one of the three sumps on site serving the backyard areas. The main sump adjacent to the tank farm has a capacity of approximately 3,000 litres. The sump operates on a high-level switch and pumps to the effluent tank when the level of liquid rises sufficiently. Any surface water or liquid which enters these sumps is ultimately pumped via the main sump into the standby effluent tank for balancing and containment. Two effluent tanks run as duty and standby, one filling while one discharging to Monksland Waste Water Treatment Plant. There are two (27

& 30m³) effluent tanks in place for contingency use. Only dry hazardous materials are stored in Units 7-11 and all incompatible materials are kept separate as per the Guidance for Storage of Hazardous Materials.

The firewater retention pond is located to the north eastern area of the site, behind units 7-8. The site is serviced by mains water, and electricity. There are a number of bunded fuel tanks on site used for the servicing of each unit.



Figure 4 Waste and Material Storage Areas.

A summary of storage areas on site are summarised below:

Location	Capacity	Material Stored
Unit 4 Warehouse	108 Pallet spaces	Flammable solvent Raw Materials
Unit 6 Warehouse	200 Pallet spaces	In-process solvent materials
Unit 7 Warehouse	162 Pallet spaces	In-process intermediate solid materials
Unit 8 Warehouse	54 Pallets spaces	Solid waste material
Unit 10 Warehouse	72 Pallets spaces	Solid raw materials
Unit 11 Warehouse	72 Pallets spaces	Final product & product packaging
Acid Bund	48 Pallets spaces	Acidic raw & in-process materials
Base Bund	48 Pallets spaces	Basic raw & in-process materials
Road Rack Bund	33 Pallet spaces	In-process solvent materials
IBC Bund 7	30 IBC space	Waste materials storage
Effluent Tanks	197 m ³	Trade Effluent
Mixed Solvent Tanks in Bund 1	96 m ³	Aqueous solvent waste

Solvent Tanks in Bund 1	54 m ³	Waste solvent for recovery
Aqueous Tanks in Bund 2	100m ³	Aqueous waste
In-process material tanks in Bund 5	58m ³	In-process Solvent tanks
In-process material tanks in Bund 8	58 m ³	Aqueous in-process material

7. Alternatives Considered

The addition of the Regenerative Thermal Oxidiser will serve to optimise energy efficiency onsite whilst optimally destroying air pollutants and odorous emissions from processes onsite. The purpose of the installation is to reduce emissions to atmosphere. After investigation and proposals by Biopharma Engineering into Best Available Technology, Thermal oxidation was considered the most appropriate method.

Alternatives to this installation would not be in adherence with Best Available Techniques for the industry. Furthermore, because pharmaceutical manufacture using these processes is based on complex techniques and interactions the only way to ensure environmental compliance is the installation of the most appropriate end of pipe technology.

With consideration to the location of the facility within an industrial estate, the proximity of other licenced sites and the combined monitoring requirements of all the facility's that will give a comprehensive overview of the condition of the location it is considered that the location and type of technology being installed are the most suitable for the facility going forward.

List of Appendices:

Appendix 1 – Irish Water Discharge Agreement

Appendix 2 – Drainage and Bund Map

Appendix 3 – Emergency Response Procedure

Appendix 4 – Noise survey 2019

Mr Cyril Furey,
EHS Manager
Arran Chemical Company Ltd,
Monksland Industrial Estate,
Athlone,
Co Roscommon,
Reg No: PO110-02

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Ref: - Proposal to amend conditions relating to emissions to sewer via Technical Amendment.

17 April 2019

Dear Mr Furey,

I refer to your proposal to amend conditions relating to emissions to sewer set out in EPA Licence Reg. No. P0110-02 via Technical Amendment. Irish Water is satisfied to support your Technical Amendment request to the EPA subject to the amendments of *Schedule B.3 Emissions to Sewer and Schedule C .3.2 Monitoring of Emissions to Sewer* of P0110-02 as outlined below;

Schedule B.3

Emission Point Reference No.: SE1
Name of Receiving Sewer: Irish Water sewer
Location: IW sewer in Monksland Industrial Estate
Volume to be emitted: Maximum in any one hour: 5.5 m³
Maximum in any one day: 100 m³
Average in any one day (on monthly basis): 80 m³

Parameter	Emission Limit Value	
	mg/l	kg/day
pH	7-11 pH Units	
Temperature	35 ° C	
Biochemical Oxygen Demand	5,000	240
Chemical Oxygen Demand	10,000	600
Suspended Solids	500	30
Sulphates (as SO ₄)	1,500	90
Sulphites (as SO ₃)	200	12
Chlorides (as Cl)	3,750	225
Phenols (as C ₆ H ₅ OH)	15	0.9
Total Phosphorus (as P)	10	0.6

Total Dissolved Solids	7,500	450
Detergents (as Lauryl Sulphate)	10	0.6
Total Heavy Metals	5	0.3
Cadmium (Cd)	1	0.06
Chromium (Cr)	0.5	0.03
Copper (Cu)	0.5	0.03
Lead (Pb)	0.05	0.003
Mercury (Hg)	0.05	0.003
Nickel (Ni)	0.5	0.03
Silver (Ag)	0.05	0.003
Zinc (Zn)	1	0.06
Molybdenum	0.5	0.03

Schedule C.3.2 Monitoring of Emissions to Sewer

Parameter	Monitoring Frequency	Analysis Method/Technique
Flow	Continuous	On-line flow meter with recorder
Temperature	Daily (when discharged) ^{Note 2}	Temperature probe
pH	Continuous	pH electrode/meter and recorder
Chemical Oxygen Demand	Weekly ^{Note 1}	Standard Method
Biochemical Oxygen Demand	Monthly ^{Note 1}	Standard Method
BOD/COD Ratio	Monthly	-
Dissolved Oxygen	Daily (when discharged) ^{Note 2}	Dissolved Oxygen meter
Suspended Solids	Monthly ^{Note 1}	Gravimetric
Sulphates (as SO ₄)	Monthly ^{Note 1}	Standard Method
Sulphites (as SO ₃)	Quarterly ^{Note 1}	Standard Method
Chlorides (Cl)	Monthly ^{Note 1}	Standard Method
Phenols (as C ₆ H ₅ OH)	Quarterly ^{Note 1}	Standard Method
Total Dissolved Solids	Monthly ^{Note 1}	Standard Method
Total Phosphorus (as P)	Quarterly ^{Note 1}	Standard Method
Orthophosphate	Quarterly ^{Note 1}	Standard Method
Full Metal Suite	Quarterly ^{Note 1}	Atomic Absorption/ICP
Detergents (as Lauryl Sulphate)	Quarterly ^{Note 1}	Standard Method
Organic Solvents ^{Note 3}	Quarterly ^{Note 1}	Gas Chromatography
Respirometry	Annually ^{Note 1}	Standard Method
Toxicity	As Required	Standard Method

Note 1: All samples shall be collected on a 24 hour flow proportional composite sampling basis.

Note 2: Sample to be obtained by discrete sampling.

Note 3: Screening for priority pollutant list substances (such as US EPA volatile and/or semi-volatile compounds). This analysis shall include those organic solvents

Irish water shall only support the amendments as outlined above.

If you have any further queries, please do not hesitate to contact Irish Water.

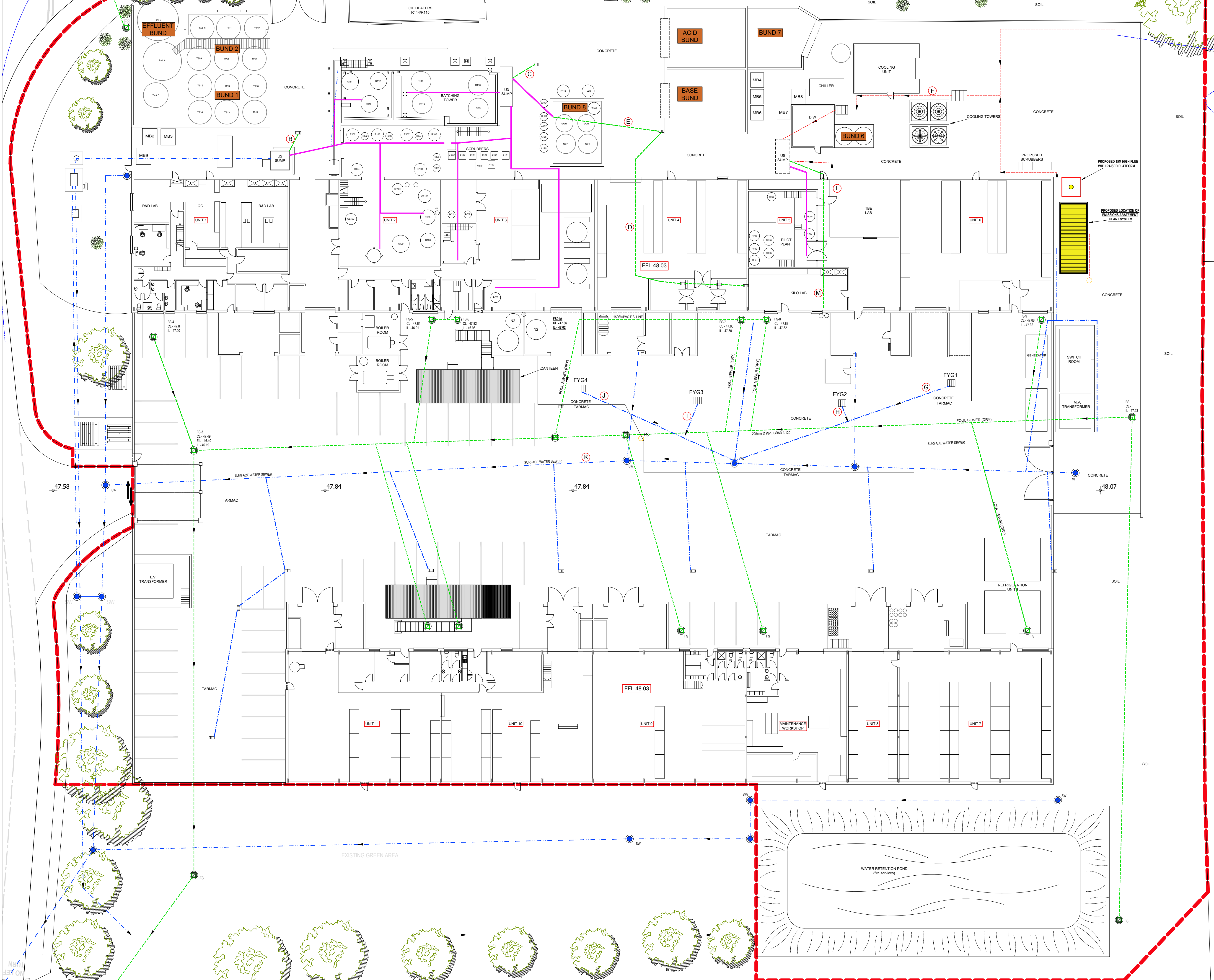
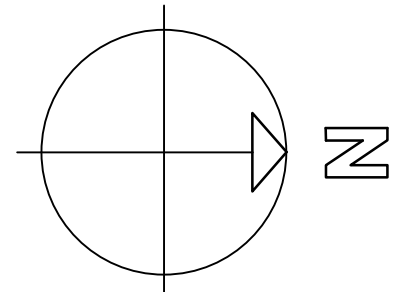
Yours sincerely



Ronan Connolly,
Licensing Manager
Wastewater Source Control

45.60

This drawing is the property of Arran Chemical Ltd, a member of the Almac Group, and should not be copied in whole or part or passed to a third party without prior approval.



LEGEND SERVICES:- EXISTING SERVICES

SURFACE WATER SEWER
SHOWING DIRECTION OF FLOW, MANHOLE AND GULLY CONNECTION
2250 SW UPVC 150mm dia
S.W. 140

FOUL SEWER
SHOWING DIRECTION OF FLOW AND MANHOLE AND ARMSTRONG JUNCTION
2250 FOUL DRAIN 150mm dia
F.S. 148

PROCESS AND ACW DRAINS
150mm dia
A.J.

OPEN CONDUIT
150mm dia
A.J.

REV.	DESCRIPTION OF AMENDMENT	DATE

CLIENT

arran
CHEMICAL COMPANY LTD
A Member of the Almac Group

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PROJECT EPA

TITLE EPA SITE LAYOUT MAP DRAINAGE & BUNDING

PROJECT No. N/A	DRN BY JG
SCALE 1/200	CHECKED BY CF

FILENAME	---
DRAWING No. N/A	REV. N/A

Emergency Response Procedure

Rev No: 9

Procedure: EP 7

1. **PURPOSE**

This procedure clearly sets out duties for key personnel in the event of an emergency and makes provision for normal safety requirements and environmental protection. This procedure is designed to provide employees, Supervisors and Management with the training required to deal with emergency situations and drills in an effective coordinated manner.

2. **SCOPE**

To ensure efficient and effective response to any emergency on the site by defining the actions and responsibilities necessary and the occurrences which warrant such action. The plan is intended to prevent or minimise any damage or danger to employees, the general public, the environment or the plant. This procedure addresses potential emergency situations, drills, and false alarms. This procedure also identifies the roles and responsibilities of key personnel and the arrangements for contact & communications, both in planning for and in managing major emergencies

Likely Emergency situations:

- Large uncontained fire within or outside factory premises or on immediately adjoining property
- Explosion or Ignition of hazardous material
- Significant Toxic Release
- Fatality due to an on-site event
- Significant Off-Site impact
- An incident, other than a chemical spillage, which may be a threat to the environment
- Personal injury, not related to above, following a fall, collision or other incident.
- Break-in by intruders leading to theft, damage or hazardous operating conditions.
- Overfill of a receiving vessel or bund of a hazardous material
- Any scenario likely to result in significant production downtime or product loss or which could adversely affect the company's reputation in any way.

3. **RESPONSIBILITIES**

The Emergency controller will be the Production Supervisor on shift, who will coordinate and supervise action within the plant, in accordance with procedures laid down (SOP 1 Fire Evacuation & SOP 3 Spillage Procedure) and any drills carried out. The emergency controller may call for back-up assistance from one of the following; Managing Director, Production Manager, Technical Manager or Environmental Manager. EL-13 is a check list for the Emergency Controller and copies are available in the emergency equipment holding cabinet in unit 1.

The Assistant controller will be a designated person on each shift, normally the lead operator, who will be responsible, subject to direction from the emergency controller, for evacuation of personnel to assembly points in accordance with

Emergency Response Procedure

Rev No: 9

Procedure: EP 7

procedures and drills. EL-14 is a checklist for the Assistant Controller and copies are available in the emergency equipment holding cabinet in unit 1.

All Staff members are charged with the responsibility to quickly and effectively assist the Emergency Controller and Assistant controller to deal with the emergency. This will require as a minimum that each employee making the workplace safe before evacuating, to actively assist the evacuation headcount, being alert to requests from the emergency Controller.

4. PROCEDURES

Action Outside Normal Working Hours:

Outside normal working hours, back-up advice is available on call. A list of emergency telephone numbers is available at a number of locations on the premises and an EPA notice board containing all relevant information is located on the front gate.

Key Emergency Points & Supplies:

Main Assembly point: The main assembly point is located at the front of the premises close to the entrance of the courtyard. This assembly point is for all personnel and visitors. The assembly point is divided in to four separate sections, A, B, C and D to simplify roll call duties in an emergency situation. Different groups should assemble at separate points as indicated. Communication on this arrangement is delivered to personnel at induction and subsequent procedure training.

Breathing Apparatus:

The self-contained breathing apparatus is located outside the engineering office in the hallway unit 1 in a marked cabinet. If evacuation of personnel from the danger area using breathing apparatus is required, this will be done by those persons specially trained for this task. A training log of all those trained is maintained at the holding point for SCBA.

SABRE BA Escape Hoods are located on the Condenser Floor for use to evacuate the Production Areas.

Emergency Kit:

The emergency kit is located in the hallway unit 1 in a marked cabinet in a suitably marked container easily accessible to emergency personnel. It contains the items listed in Appendix 3. In addition a defibrillator together with a list of trained personnel and a fully stocked portable first aid kit are located within 2m of the emergency kit.

Emergency file:

Located in 'Athlone Fire Brigade' office, containing list of telephone numbers, copy of Emergency Response Procedure, site drawing showing water supplies and locations and an extract from the Master Substance List.

Emergency Response Procedure

Rev No: 9

Procedure: EP 7

After every review an updated copy of this procedure is forwarded to the Athlone Fire Brigade Office.

Evacuation Drills:

Drills are carried out at regular intervals to determine the effectiveness of the fire alarm system and evacuation efficiency. Evacuation drills are logged in the Emergency Incident Record EL-24.

Master Substance List: A Master Substance List has been drawn up as part of the REACH Management System. An extract from this list with UN numbers, quantities and storage locations of substances is kept in the Emergency file and in the Emergency Kit.

- **Raw Material SDS – Reception Office**
- **Product SDS – Reception Office**
- **General SDS – Library**
- **Master Substance (REACH) List – Emergency Kit**

Emergency First Aid Kits:

A large portable first aid kit is available at reception. There are fixed large first aid kits located around the site. Lists of trained first aid personnel are posted throughout the site and first aid markers are indicated on employees clocking station card.

Emergency Procedures for On-site incident:

1. Any person noticing a Fire/Smoke/Spillage or any other incident which may be a threat to personnel, the plant or the environment, shall activate the alarm at the nearest break-glass unit and report the fire/incident to their supervisor or department head. Personnel are trained on the correct procedure at site induction/orientation training.
2. The *Emergency Controller* will determine where the alarm has been activated and assess the severity of the incident. If necessary the *Emergency Controller* should call the emergency services. Two trained persons can be instructed to don the fire tunics in Unit 9 locker room and the BA sets in case they are required to assist in the evacuation of staff or the Emergency Services.
3. The emergency services call will be answered by the main emergency control centre which is located in Dublin. The Arran *Emergency Controller* should give the name and address of Arran, phone no., state the type of incident, e.g. chemical fire or chemical incident and an estimate of the severity.
The *Emergency Controller* should ensure that he informs them that the Athlone Fire Brigade is required.

The presence of the Gardai may also be requested when warranted as listed;

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-
- Loss of life (Compulsory)
 - Serious life threatening injury has occurred
 - Smoke or fumes affecting traffic on local roads,
 - Evacuation of neighbouring premises or homes required
 - Breaches of security, theft or violence involved

4. **Evacuation Procedure**

On hearing the fire alarm start evacuation process. In so far as is safe to do so, all persons shall make their work safe and any materials at risk of propagating the incident should be removed from the danger area. Machines should be stopped or shut-down as appropriate and power turned off in so far as is practicable in accordance with training and drills.

Evacuate the premises and go directly to the assembly point at the Front Gate. The assembly point is divided in to four separate sections, A, B, C and D to simplify roll call duties in an emergency situation.

5. On hearing the firm alarm, the *Assistant Controller / Receptionist* shall supervise the evacuation of personnel to the assembly point. Three log books (white – visitors sign in log, green - truck drivers sign in log, and blue – staff sign out log), 2 racks of clock cards marked “IN” (are easily removed from the wall) and the emergency kit are taken to the assembly point, by the *Receptionist* during normal business hours and by the *Assistant Controller* outside business hours.
6. All Staff should ensure that they co-operate to ensure the evacuation procedure is carried out efficiently and accurately. Staff are required to remain alert during an evacuation for requests of assistance from the Emergency Controller or Assistant Controller or other instructions.
7. Employees shall be accounted for by means of the clock cards in the “IN” racks less those signed out in the staff sign out book. All visitors and contractors on-site can be identified from the 'Visitors' logbook and drivers from truck-drivers logbook. Any un-accounted for personnel should be communicated to the Fire Chief or *Emergency Controller* immediately.
8. Once the Emergency Service arrives on site the *Fire Brigade Incident Controller* will take charge following an update from the Arran Emergency Controller.
9. **Injured Persons:**
Casualties, whose injuries appear to be such that being moved would worsen their injury, should only be moved if in immediate danger.
Casualties should be removed to a safe area* and given First Aid treatment as appropriate. Medical assistance or the ambulance service should be summoned immediately if there are significant injuries or the scope or extent of injury is not known.
Casualties with minor injuries will be treated on-site by trained First-Aiders, or sent to the Doctor at Athlone Town Surgery.

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*NOTE: Fire brigade personnel are trained in rescue techniques and are specially equipped for the lifting and transport of badly injured persons. 'Search and Rescue' is the responsibility of trained Fire brigade personnel.

10. Injured Persons Leaving the site Injured Staff Checklist EL-25
The Incident Controller can use "Injured Persons Record" to record vital information with regard to any staff or visitor/contractor sent to hospital or a Doctor's Medical Surgery. Injured persons should whenever possible or practical be accompanied by another member of staff when sent off site for medical assessment or treatment. This is for practical reasons to provide assistance or support until a family relative or next of kin arrives. The Incident Controller should request another member of staff to accompany them or call Management to provide assistance. If the accompanying person cannot be accompanied in an ambulance, they should follow in a car. The checklist is completed to record the details of when, where and how they can be contacted for updates. Arran Staff Next of Kin contact details are available in a sealed envelope in the Emergency Kit.
11. If necessary, consult the compilation of safety data sheets (kept at Reception) for particular fire fighting procedures or details of protective clothing and make these available to emergency services on their arrival. In storage areas, refer to overall directions for each storage bay or classification.
12. Transport of materials of a hazardous nature from the plant is carried out by 'Hazchem'-trained drivers from an 'Approved Freight Agents' list. Arran Chemical Co. Ltd. co-operates with Local Authorities and Emergency Services in all matters relating to transport of materials to and from the site and this co-operation is extended on a voluntary basis in other cases as applicable.

Environmental considerations:

13. In the case of a spillage or incident that is thought to be a threat to the environment, the following procedures should be adhered to :

Containment:

- a. Use all means possible to prevent chemicals or contaminated water from entering the environment. Initial actions should start with containment in the Backyard, Tankfarm tanks, Effluent tanks & bunds.
- b. Divert firewater to Fire Water Retention Pond by switching valve at control panel to the right of the main gate towards Reception.
- c. If flammable or toxic material is directed towards the FWR pond, consider the likelihood of vapours arising from the pond, and the necessity of foaming the pond itself to minimise atmospheric losses and risk of fire. Contact Alkermes about the situation as may need to extend a safe zone on their site.

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A spillage station is located in 'Unit 3' containing materials for use in containing/soaking up contents of such a spillage. Alkermes will have additional spillage supplies if there is a major spillage – Contact Alkermes Security?

Breathing Apparatus & Chemical suits may be required to deal with a spillage using staff trained in their operation. The Chemical Suit is stored in Unit 9 locker room along with three Fire Tunics (S, M &L), Flash Hoods & Fire Gloves

16. Following any spillage or incident, which is thought to be a threat to the environment, a formal notification must be made to the Environmental Protection Agency in accordance with condition 11.1 of the company's IPPC licence No.P0110-02

EF-05, Environmental Incident Notification, should be completed and faxed to the EPA as soon as practicable after the incident. Prior to sending EF-05, the EPA should be contacted by telephone which is manned by an answering machine outside of normal working hours. A message should be left giving details as per EF-05.

Reference: IPPC Licence, Condition 11, Notification, Records and Reports
EF-05 Environmental Incident Notification

Safety and Health

17. Following any incident which is considered to have caused an injury to an employee which is deemed to be immediately reportable, a formal notification must be made to the Health and Safety Authority in accordance with the Safety and Health at Work Act 2005

The HSA should also be contacted by telephone. A message should be left giving full details if outside normal working hours.

A full report should be sent as soon as practicable to the HSA

Reference: Safety, Health and Welfare at Work Act 2005

Stand-Down / All Clear :

When it is clear that the incident has been handled safely and that it is safe to return, the *Emergency Controller* or *Assistant Controller* may give approval for personnel to return to their work stations.

In certain cases it may be necessary to call in the Electrician before the all clear can be given.

The Emergency Controller may organize workgroups to inspect the premises to assess the extent of any damage and check control and containment systems. All plant and equipment should be inspected and tested, if necessary, prior to a startup. If the incident

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did not affect any of equipment the Emergency Controller may decide to give the go ahead to resume normal operations.

The *Emergency Controller* should delegate a person to inform the neighbours and the Police, if necessary, that the all clear has been given.

Incident Report

Following an incident an Emergency Incident Report should be completed by the *Emergency Controller* and circulated to Management, who will review the report and determine if Regulatory Authorities need to be contacted. An internal review may be required to determine lessons learnt and corrective & preventative actions.

Training

All employees should be re-trained in the Procedure annually and each time the Procedure is revised.

Review of Emergency Response Procedure:

Carried out at regular intervals and when changes in site arrangements will require procedural change,, working through Production, safety and environmental personnel and in consultation with outside emergency services and other appropriate third parties.

Referenced procedures

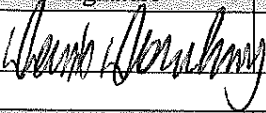
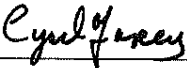

SOP1 Fire Procedure
SOP3 Spillage Procedure
SOP70 Fire Water Retention Pond Procedure
EF-05 Environmental Incident Notification
EL-13 Emergency Controller Checklist
EL-14 Assistant Controller Checklist
EL-24 Emergency Incident Record
EL-25 Emergency Incident Injured Persons Record
EP-20 Accident Prevention Procedure
IPPC Licence No. P-0110-02
Safety, Health and Welfare at Work Act 2005
S-05 Incident Report Form

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Revision HISTORY

Previous Revision Number	Document Change Request		
EP 13 Rev 4	New Procedure format.		
Approval			
Issued by			
Name	Signature	Department	Date
Denis Dowling		H&S Officer	16 Aug 18
Approved by			
Name	Signature	Department	Date
Cyril Furey		EHS Manager	16 Aug 2018
EHS Approved by			
Name	Signature	Title	Date
Martin McCabe		Site Manager	20 Aug 2018

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Emergency Procedure Appendix 1

Emergency Services Contact Phone numbers :

<u>Service</u>	<u>Name / Details</u>	<u>Phone No.</u>
Fire Brigade	“Ask for Athlone Fire Brigade”	999 / 112
Ambulance	Arran Eircode N37 DN24	999 / 112
Doctor	Dr. John Rice Surgery MIDOC	090 6472595 1850 302 702
Hospital	Portiuncula, Ballinasloe.	090 9648200
	Midland Hospital, Tullamore.	057 9321501
Garda (Athlone)	090 6492600 / 6492609	999 / 112
Electrician	Frank Dempsey	(087) 2351830
Transformer Failure	Brendan Geoghegan	(087) 6799531
ESB (Day & Night)	Supply Failure / Emergencies	1850 372999
GAS (smell or leak)	For all gas suppliers	1850 20 50 50
EPA OEE Office	Out of hours Answer machine	094 9048400
HSA Offices	Workplace Contact Unit	01 617000

Arran Staff Contact details for Next of Kin in Emergency Kit Bag in Old Reception

Emergency Phone	(086) 2500729
Arran Supervisor's Phone	(086) 0408356

Waste Shipment Contacts

Veolia Environ Services	24 hour Emergency Service	021- 459331
DEE Environmental	Emergency Service	041-6856900
Indaver	24 hour Emergency Service	01 2804534
Monksland Treatment Plant	Caretaker (Joe O Grady)	(087) 8148922

Emergency Response Procedure

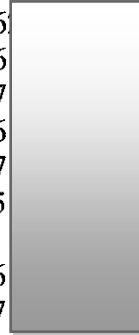
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Emergency Procedure Appendix 1

Arran Staff Contact numbers :

<u>Name</u>		<u>Phone No.</u>
Martin McCabe	Site Manager	086
Peter Cairns	Technical Manager	086
Cyril Furey	E H S Manager	087
Rhona Fitzgerald	Admin Manager	086
Philip Killeen	Plant Engineer	087
Emer Nooney	Process Engineer	085
Shane Naughton	Environmental	086
Karen Fahey	PhD Chemist	087



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Emergency Procedure Appendix 2

Emergency Response Plans Spreadsheet

Locations of plans:

- Administration office
- Supervisors Office
- Pilot Plant Office
- Engineering Office
- Warehouse Office
- Environmental Supervisors Office
- Safety Officers Office
- Emergency Plans & Drawings
- Management Offices
 - Martin
 - Cyril
 - Peter
 - Rhona
 - Andrew

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Emergency Procedure Appendix 3

Emergency Equipment Type & Location

Respiratory Protective Equipment	
Breathing Apparatus	Old Reception Press
SABRE escape sets	Unit 2 at Electric Panel Unit 5 in Bay area
Air Hoods & Filters	PPE Room Unit 3
Full Face Masks & Filters	PPE Room Unit 3
Chemical & Splash Protection	
Tyvek Suits, Gloves	PPE Room Unit 3 Unit 9 on RHS rack
Chemical Splash Suit	
Wellington Boots	
Emergency Fire Tools	
Hydrant Keys & upstands	Unit 9 entrance Unit 2 Side Gate exit
Manhole cover lifting keys	Unit 9 entrance Unit 2 Side Gate exit Environmental Analyst & Gas terminal
Firefighting Foam Drums & Diffuser attachment	Unit 9 entrance Unit 2 Side Gate exit
Fire Suits – Tunic & pull-ups	PPE Room Unit 3
Fire Gloves	PPE Room Unit 3
Flash Hoods	PPE Room Unit 3
First Aid Kits	
	Unit 1 Hallway (PORTABLE) Unit 2 Supervisors Office Unit 5 Pilot Plant Bay Unit 10 Canteen Unit 1 QC Maintenance Workshop
Defibrillator (AED)	Unit 1 Hallway
Emergency telephone numbers Next of Kin Contact number Torch and batteries Master keys, Locker Keys, Leakstop Putty	Emergency Kit Bag in old reception
Spare Male & Female Clothing & towels bags	Emergency Kit Press in old reception

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Emergency Procedure Appendix 3

Emergency Equipment Type & Location

<p>Site drawings:</p> <ul style="list-style-type: none"> · Water Hydrants · Electrical Isolation Panels & switches · Gas & Diesel supply isolation points · Cylinder storage locations · Firewater Diversion to Retention pond · Fire Extinguishing Equipment · Safety Shower locations · Assembly Point 	<p>Emergency Kit Press in old reception</p>
<ul style="list-style-type: none"> ● EP7 Emergency Response Procedure, ● EL-13 Emergency Controller Checklist, ● EL-14 Assistant Controller Checklist, notebook and pen, ● Incident Scenarios? ● Sample bottles 	<p>Emergency Kit Bag in old reception</p>

MONITORING OF AMBIENT NOISE LEVELS AT ARRAN CHEMICAL
COMPANY, UNIT 1-3 MONKSLAND INDUSTRIAL ESTATE,
ATHLONE, CO. ROSCOMMON IN COMPLIANCE WITH THE
REQUIREMENTS OF IPPC LICENCE REGISTER
No. P0110-02.

For the Attention of: Mr. Cyril Furey
Arran Chemicals
Monksland Industrial Estate
Athlone
Co. Roscommon

Report Prepared by: Mr. Donal Moran
Environmental Scientist



Peter Coogan
Acoustic Consultant (IOA)



Survey Completed by: Mr. Donal Moran
Environmental Scientist

Report No: ECS5484

Monitoring Date: 29th August 2019

Report Date: 10th September 2019

This report shall not be reproduced except in full, without the approval of BNM Environmental. All queries concerning the report or its contents should be forwarded to the Monitoring Team Leader.

EXECUTIVE SUMMARY

Arran Chemical Company Ltd is required to carry out a noise survey at its plant on an annual basis, in accordance with the requirements of their Integrated Pollution Prevention & Control (IPPC) Licence, Register No. P0110-2. This comprises of an annual assessment of environmental noise levels at two locations at the Arran Chemicals Company, Monksland Industrial Estate, Athlone, Co. Roscommon. The site was subsequently visited by an Acoustic Consultant from Bord na Mona Environmental on the 29th of August 2019 to conduct the annual noise survey for 2019.

In compliance with Condition 12 Schedule B.4. Of the company's IPPC license, Arran Chemicals Ltd is required to ensure that "no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location or exceed the specified limit value(s)" subject to Condition 12 B.4. (1): Daytime limit 55dB(A), (2): Night-time limit 45dB(A).

Triplicate daytime and duplicate night-time noise monitoring was conducted in accordance with the Environmental Protection Agency, "Guidance note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities"

All measurements exceeded the daytime licence limit LAeq (55dB(A)), however noise levels were dominated by local activities outside the Arran Chemicals facility i.e road traffic.

All measurements exceeded the night time noise limit LAeq (45 dB(A)). Similar to daytime, noise levels were dominated by road traffic at N1 and chiller fans in neighbouring facilities at the NSL.

A Faint hum of fans from the direction of Alkermes/Arran was audible on occasion but largely inaudible in presence of background sound levels at N1.

Tonal noise was not detected at any of the monitoring locations during day-time or night-time hours.

Based upon the results of the noise survey, it was concluded that the Arran Chemicals Ltd was compliant with the limits as stipulated in IPPC Licence P0110-02 (Condition 12) for both day and night-time measurements.

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2.0	METHODOLOGY
2.1	Measurement Parameters
2.2	Tonal & Impulsive Characteristics
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2.4	Site Information
3.0	INSTRUMENTATION EQUIPMENT USED
4.0	MONITORING LOCATIONS
5.0	RESULTS
6.0	DISCUSSION
APPENDIX 1:	Noise Meter Calibration Certificates
APPENDIX 2:	Checklist as per NG4 Document

1.0 **INTRODUCTION**

In compliance with the requirements stipulated in IPPC Licence, register no. P0110-02, Arran Chemicals is required to:

- a) Carry out a noise survey of the site operations annually.
- b) Ensure that activities on-site shall not give rise to noise levels off-site, at any noise sensitive location, which exceed the following sound pressure limits (L_{Aeq} , 30 minutes):

Daytime	55 dB (A)
Night-time	45 dB (A)

This report presents details of both the methodologies employed and results obtained.

2.0 **METHODOLOGIES**

2.1 **Measurement Parameters**

2.1.1 L_{Aeq} Values

L_{Aeq} (t) values represent the A-weighted continuous equivalent sound level over a specified time (t). This value expresses the average levels over time and is a linear integral.

2.1.2 LA_{90} and LA_{10} Values

The LA_{90} and LA_{10} values represent the A-weighted sound levels exceeded for a percentage of the instrument measuring time. LA_{10} indicates that for 10% of the monitoring period, the sound levels were greater than the quoted value. LA_{10} is a good statistical parameter for expressing event noise such as passing traffic. The LA_{90} represents post event sound levels and is a good indicator of background noise levels.

2.1.3 LA_{Max} Values

The maximum RMS, A-Weighted sound pressure level occurring within a specified time period.

2.2 **Tonal and Impulsive Characteristics**

For the purpose of this report, tonal noise is characterised in accordance with Section 5.1 of the EPA's NG4 document, which indicates that a noise source is tonal if a 1/3 octave band exceeds adjacent bands by;

- 15dB in low/frequency 1/3 octave bands (25Hz to 125Hz);
- 8dB in middle/frequency bands (160Hz to 400Hz), and;
- 5dB in high/frequency bands (500Hz to 10,000Hz).

An impulsive noise is of short duration (typically less than one second), it is brief and abrupt, its' startling effect causes greater annoyance than would be expected from a simple measurement of sound pressure level. For example an instantaneous bang/thud that maybe associated with pile driving, hammering etc.

2.3 Standards and Guidance

The acoustic assessment and subsequent report are in accordance with International Standard Organisation (ISO) 1996 Acoustics – Description and Measurement of Environmental Noise Part 1, 2, and 3 in addition to the Environmental Protection Agency Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

2.4 Site information

- 2.4.1 All measurements were taken at 1.5 m height above local ground level and >3.5 meters away from reflective surfaces.
- 2.4.2 The onsite weather conditions were dry, with a light/gentle breeze (≤ 5 m/s) during the daytime and night-time assessment.
- 2.4.3 Triplicate noise measurements were obtained at each sampling location during daytime hours and duplicate measurements during night-time hours, for a minimum time period of 30 minutes, in accordance with the EPA Noise Guidance 4 document.

3.0 INSTRUMENTATION EQUIPMENT USED

The following equipment was employed during the acoustic assessment

Bruel & Kjaer Real-Time Noise Analyzer Type 2250-Light
Model No: 2250-Light
Serial No. 3000428
Certificate and Calibration:
16th November 2018



Calibrator Type: B&K 4231
Serial No: 2415925
Date of Certificate and Calibration:
16th November 2018



Table 1: On Site Calibrations

Calibration Date	29/08/19	29/08/19
Calibration level	94 dB(A)	94 dB(A)
Sensitivity	43.57 mV/Pa	43.60 mV/Pa
Deviation before monitoring	- 0.02dB	0.03dB
Deviation after monitoring	0.00dB	0.00dB

A handheld Garmin GPS60 was used to record the grid coordinated of each environmental noise monitoring location.

A handheld anemometer (Kestrel 2500) was used to take on-site weather measurements on the night of monitoring.

Certified current annual calibration certificates are provided in *Appendix 2*

Note: The monitoring equipment was manned throughout the sampling period and comments/notes taken to assist the interpretation and assessment of results.

4.0 MONITORING LOCATIONS

Table 1 presents details of the noise monitoring locations.

TABLE 1: LOCATION OF NOISE MONITORING MEASUREMENTS			
Map Ref. No.	Location Type	Grid Ref.	Geographical location
N1	Boundary	N0064041160	North West opposite Savoury Fare
NSL	Boundary	N0049640928	NSL West of Arran Chemicals

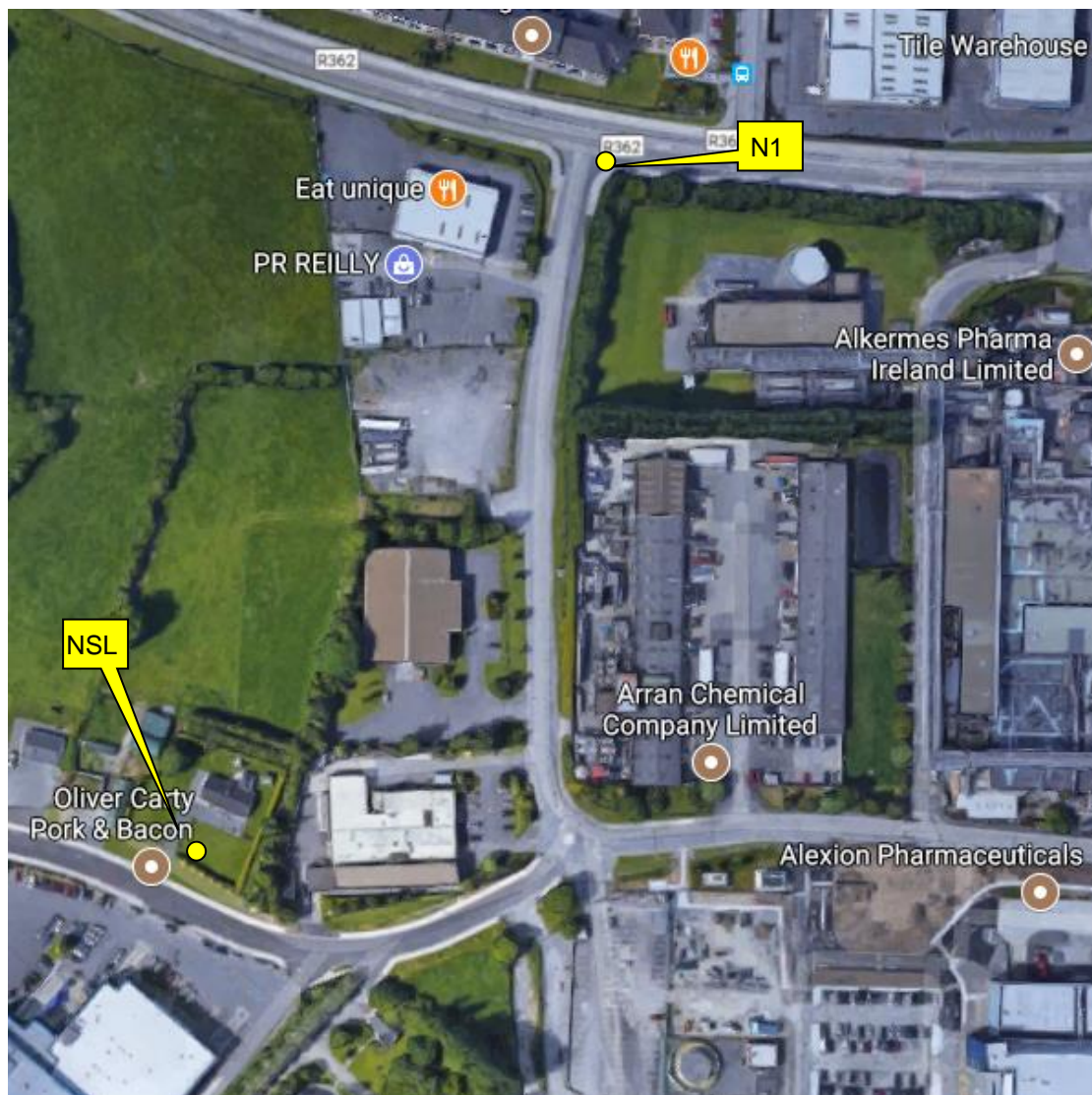


Figure 1: Monitoring Locations

5.0 **RESULTS**

The results of the investigation carried out by BnM Environmental, at the Arran Chemicals facility, are presented as follows:

Table 2: On-site weather observations.

Table 3: Day Time Noise Measurement Results

Table 4: Night Time Noise Measurement Results

On-site weather data was measured using a hand-held kestrel 2500 anemometer. The results of on-site weather data recordings are presented in Table 2 below.

TABLE 2 - ON-SITE WEATHER DATA RECORDINGS / OBSERVATIONS					
Date	Rainfall	Temp (°C)	Pressure (mBar)	Mean Wind Speed (m/s)	Wind Direction
29 th September (@5am)	No	11	-	2.2	North East
29 th September (@8am)	No	14	-	2.6	North East

TABLE 3: DAY TIME NOISE MEASUREMENT RESULTS

Noise Ref	Survey Period (Min.)	Start Time	LAeq dB(A)	LA ₁₀ dB(A)	LA ₉₀ dB(A)	LA _{Max} dB(A)	Tonal or Impulsive Noise	Tonal Penalty (5dB) Applied	Comments / Site Observations Summary
N1	30	07.00	66	69	55	89	X	-	<p>Site Faint hum of fans from Alkermes/Arran largely inaudible in presence of background sound levels.</p> <p>Offsite Noise levels dominated by traffic on the R362 main road along with traffic on access road to the Monksland Business Park. Birds singing. Hustle of leaves on trees. Hum of construction in neighbouring facility audible. LAFmax attributed to horns sounding or passing Motorbike with loud revs in round 1 and 3.</p>
		08.37	67	70	61	82	X	-	
		10.17	66	68	57	90	X	-	
NSL	30	07.33	57	57	53	77	X	-	<p>Site No evidence of noise from the direction of Aran Chemicals. Local noise only.</p> <p>Offsite Distance traffic on motorway -Continuous. Birds singing. Movement of traffic on adjacent road – intermittent. Fans / Motors (faint) in Oliver Carty's Dominant-Continuous. Intermittent reversing alarms from forklift and lorries – Oliver Carty. Plastic container being dropped and dragged along ground Lorries idling in yard of Oliver Carty's and people talking.</p>
		10.50	57	59	53	85	X	-	
		11.57	56	57	51	78	X	-	

Note: Results in **bold text** represent noise levels detected above the 55dB(A) IPPC Licence Limit and attributed to site activities

Note: Results in **bold text** represent noise levels detected above the 55dB(A) IPPC Licence Limit and attributed to offsite activities

TABLE 4: NIGHT TIME NOISE MEASUREMENT RESULTS

Noise Ref	Survey Period (Min.)	Start Time	LAeq dB(A)	LA ₁₀ dB(A)	LA ₉₀ dB(A)	LA _{Max} dB(A)	Tonal or Impulsive Noise	Tonal Penalty (5dB) Applied	Comments / Site Observations Summary
N1	15	05.07	57	59	49	73	X	-	<p>Site Faint hum of fans from Alkermes/Arran largely inaudible in presence of background sound levels. Low ringing of a motor.</p>
		05.41	60	64	51	79	X	-	<p>Offsite Noise levels dominated by traffic on the R362 main road along with traffic on access road to the Monskland Business Park. Birds Singing. Fans audible in direction of Oliver Carty's. Vehicles entering industrial estate across the R362.</p>
NSL	15	05.24	48	51	44	61	X	-	<p>Site Faint hum of fans in the direction of Aran Chemicals. Local noise dominant.</p>
		05.59	51	53	46	62	X	-	<p>Offsite Distance traffic on motorway -Continuous. Movement of traffic on adjacent road – intermittent - LAFmax Fans / Motors in Oliver Carty's Dominant-Continuous in round 2. Short air release from fans. Birds singing.</p>

Note: Results in **bold text** represent noise levels detected above the 45dB(A) IPPC Licence Limit and attributed to site activities

Note: Results in **bold text** represent noise levels detected above the 45dB(A) IPPC Licence Limit and attributed to offsite activities

6.0 DISCUSSION

Noise monitoring was undertaken at 2 noise locations (N1 & NSL) at the Arran Chemicals facility, Monksland Industrial Estate, Athlone.

Table's 2 present the weather conditions on the day of monitoring. The weather conditions were suitable for noise monitoring as the day was dry and the wind-speed was less than 5 meters per second.

Tables 3 & 4 presents day and nighttime noise measurements undertaken on the 29th August 2019.

Locations N1 and NSL best represent the noise levels emanating from the site. Of those two locations, location NSL refers to the nearest noise sensitive location. The M6 motorway lies in close proximity to the site boundary and the nearest sensitive location.

Location N 1:

Location N1 is situated north-west from the site, opposite the Savoury Fare. This location is on the corner of the entrance to the industrial estate and is adjacent to a main road.

Daytime

Daytime noise measurements ranged from 66 to 67 dB(A), above the guideline limit of 55dB(A). Observations during each measurement noted that noise levels were dominated by traffic on the R362 main road 2m from the noise meter. Additionally traffic on the main access road to and from the Monksland Business Park were intermittently dominant. The LAFmax recorded ranged from 82 to 89 dB(A) and attributed to passing trucks.

A Faint hum of fans with a ringing noise from the direction of Alkermes/Arran was faint but largely inaudible in presence of background sound levels.

Night-Time

Night-time noise measurements ranged from 57 to 60 dB(A), above the guideline limit of 45dB(A). Similar to daytime measurements, noise levels were dominated by traffic on the R362 main road combined with traffic on the main access road to and from the Monksland Business Park. The LAFmax recorded ranged from 73 to 79 dB(A) and attributed to passing trucks.

A Faint hum of fans from the direction of Alkermes/Arran was occasionally audible but largely inaudible in presence of background sound levels.

Location NSL:

Location NSL is the Noise Sensitive Location South west of Arran Chemicals Ltd. This NSL is also the closest location to the M6 motorway.

Daytime

Daytime noise measurements ranged from 56 to 57 dB(A), above the guideline limit of 55dB(A). Observations during each measurement noted that traffic on the M6 motorway was continuous and clearly audible. Locally, noise was dominated by chiller fans in Oliver Carty's, intermittent forklift movement and traffic on adjacent access road.

There was no evidence of noise form the direction of the Arran chemicals facility on the day of monitoring.

Night-time

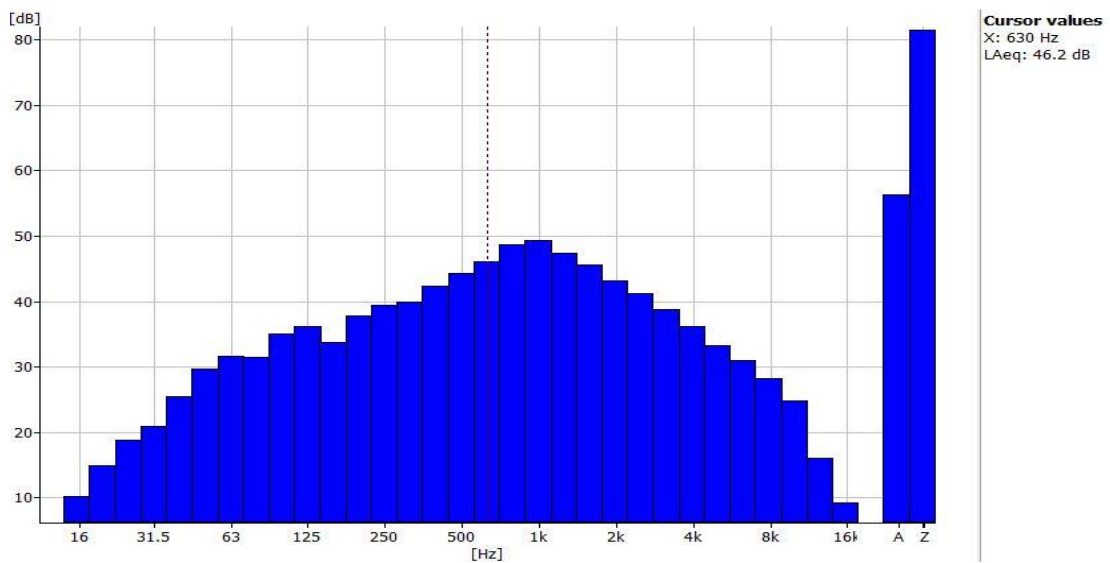
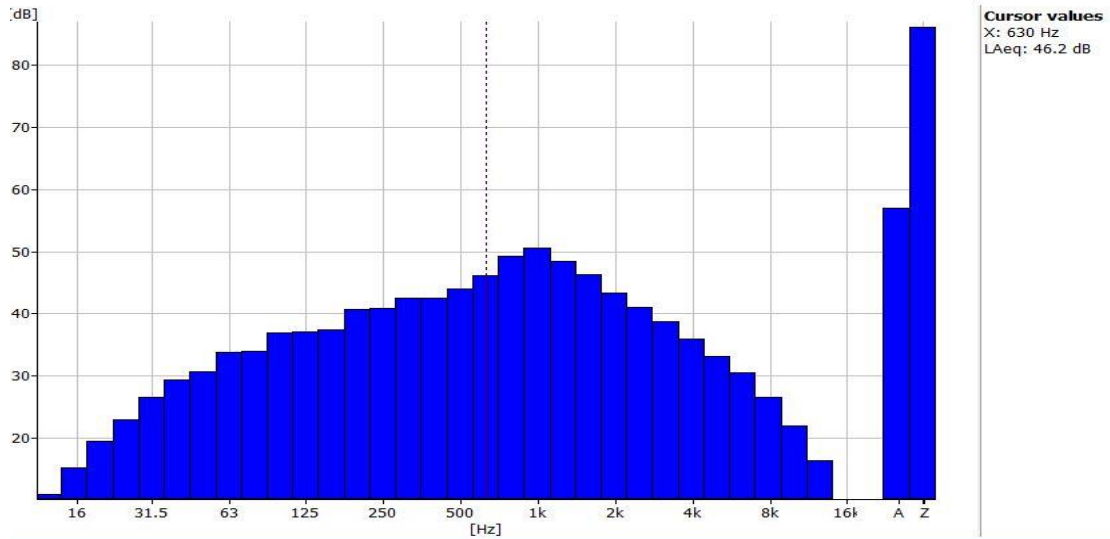
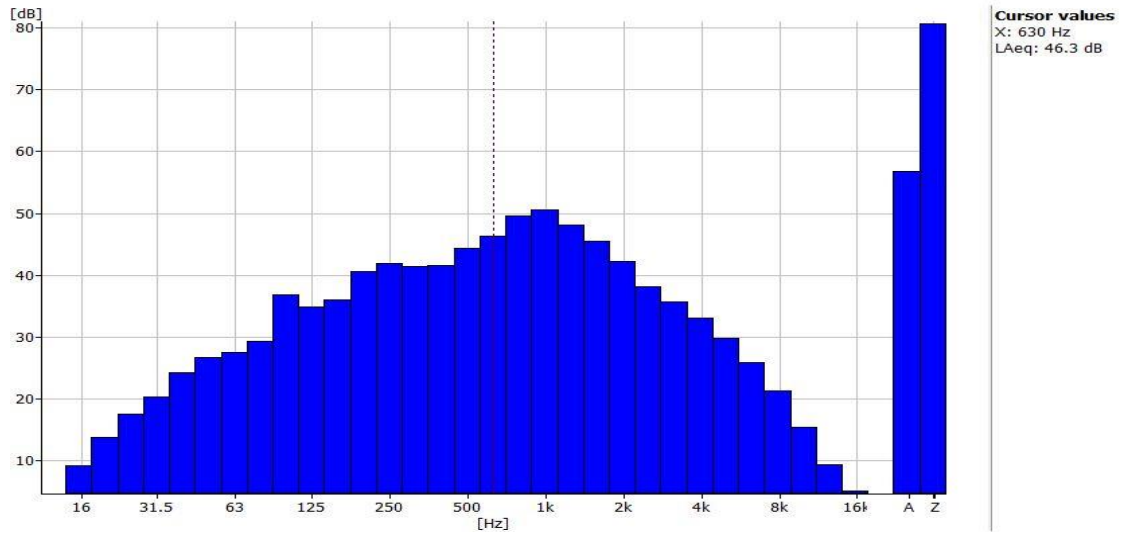
Night-time noise measurements ranged from 48 to 51 dB(A), above the guideline limit of 45dB(A). Similar to daytime measurements, traffic on the M6 motorway was continuous and clearly audible. The dominated source of noise was the passing traffic on the local road and chiller fans in Oliver Carty's.

There was a low hum of fans evidence of noise form the direction of the Arran chemicals facility on the day of monitoring.

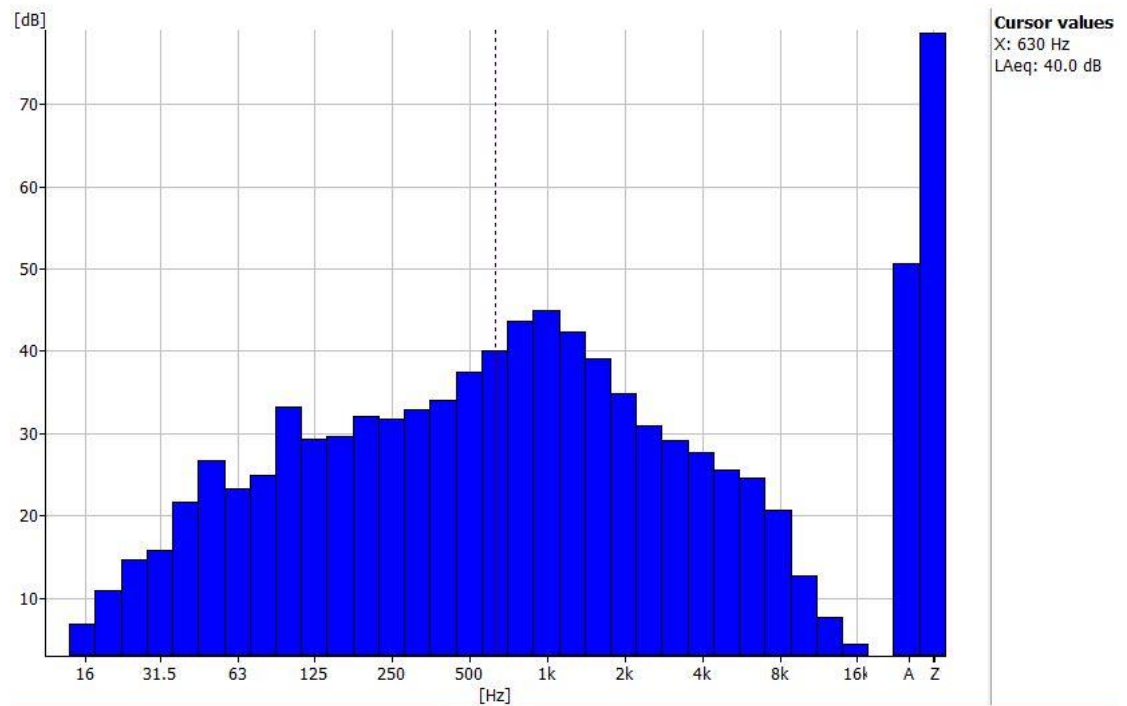
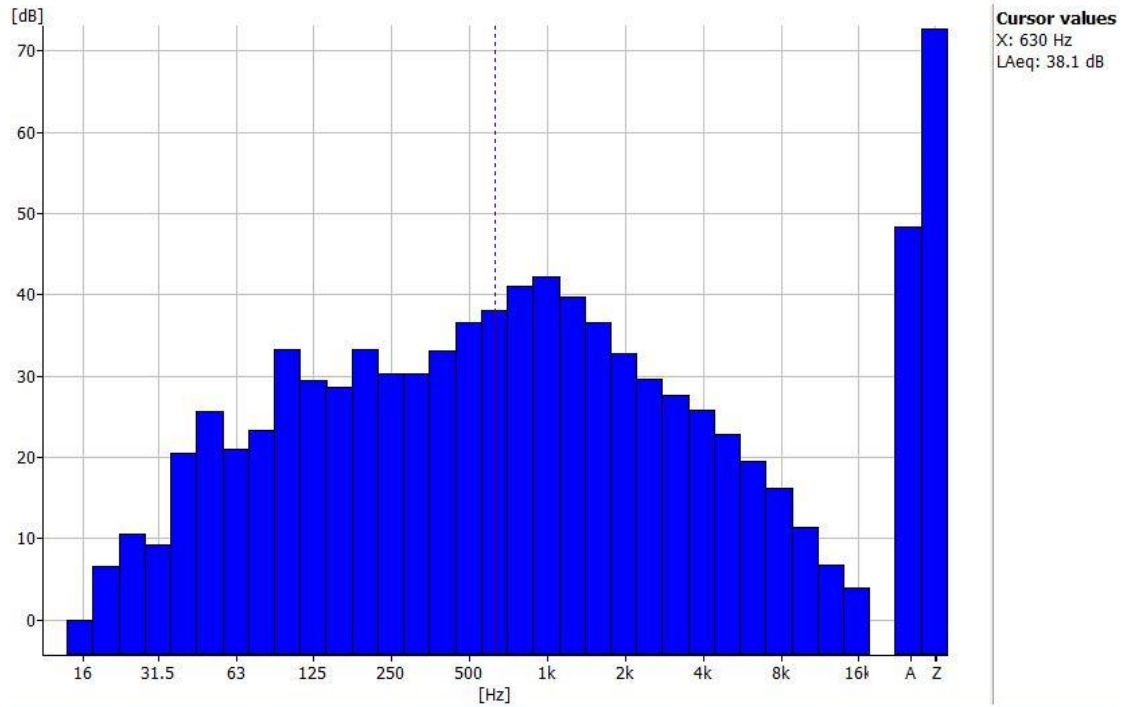
Tonal Assessment

Tonal noise was not detected at any monitoring locations during day-time or night-time noise monitoring events.

Tonal graphs for monitoring location NSL 1 are provided overleaf.



Tonal Graphs NSL -Daytime



Tonal Graphs NSL –Night-time

APPENDIX 1

Noise Meter Calibration Certificates



NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to **Bord na Mona PLC**
Main Street
Newbridge
Co Kildare

Attention of **Peter Coogan**

Certificate Number	184307
Item Calibrated	Bruel and Kjaer 2250 Light Sound Level Meter with Type 4950 Microphone
Serial Numbers	3000428 (Sound Level Meter) and 3093097 (Microphone)
Client ID Number	None
Order Number	3047220
Date Received	16 Nov 2018
NML Procedure Number	AP-NM-09

Method The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).

Calibration Standards Norsonic 1504A Calibration System incorporating:
SR D5360 Signal Generator, No. 0735 [Cal. Due Date: 21 Dec 2018]
Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 19 Nov 2019]
B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 28 Apr 2019]
B&K 4228 Pistonphone, No. 0740 [Cal. Due Date: 21 Mar 2019]
B&K 4226 Acoustical Calibrator, No. 0150 [Cal. Due Date: 20 Jun 2019]

Calibrated by


David Fleming

Approved by


Paul Hetherington

Date of Calibration

20 Nov 2018

Date of Issue

20 Nov 2018



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C. (for details see www.bipm.org)



NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to **Bord na Mona PLC**
Main Street
Newbridge
Co Kildare

Attention of **Peter Coogan**

Certificate Number	184306
Item Calibrated	Bruel & Kjaer Type 4231 Sound Calibrator
Serial Number	2415925
Client ID Number	None
Order Number	3047220
Date Received	16 Nov 2018
NML Procedure Number	AP-NM-13

Method The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity (half-inch configuration). The calibrator's operating frequency was also measured.

Calibration Standards Norsonic 1504A Calibration System incorporating:
Agilent 34401A Digital Multimeter, File No. 0736 [Cal due: 19 Nov 2019]
B & K 4134 Measuring Microphone, File No. 0743 [Cal due: 28 Apr 2019]
B & K 4228 Pistonphone, File No. 0740 [Cal due: 21 Mar 2019]

Calibrated by


David Fleming

Approved by


Paul Hetherington

Date of Calibration

19 Nov 2018

Date of Issue

20 Nov 2018



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

Appendix 2

Checklist as per NG4 Guidance Document.

Item	Included
	Yes (✓) – No (✗)
Manufacturer, model type and serial number of the sound level meter, calibrator and microphone used for annual survey.	✓
The type of windshield and other microphone attachments used.	✓
The date the equipment was last calibrated to a traceable standard	✓
A statement of on site calibration before and after the measurements	✓
The frequency weighting networks and meter response time (i.e. fast or slow)	✓
A description of the measurement site and of the range of sound sources including the type of sound (continuous, intermittent, impulsive, tonal).	✓
Measures to exclude extraneous noise and reference to the methodologies followed throughout the survey.	✓
A map of the measurement site showing the locations of the measurement positions.	✓
Photographs illustrating the positioning of the sound level meter (recommended but optional).	✓*
Details of the intervening ground between sources and measurement positions and the presence of barriers etc.	✓
The time and date of the measurement.	✓
A description of the meteorological conditions	✓
The background noise level (where practicable).	✓
The names of the person/s that undertook the survey and drafted the survey report.	✓

* = Available upon request