

M E M O R A N D U M

DATE: 23/2/00
TO: Board of the Agency
FROM: Dr Jonathan Derham, Chairman Technical Committee
RE: Objections to Proposed Determination for Irish Fertilizer Industries Arklow, Reg. No. 495

Application Details	
Class of activity:	5.4 & 5.5
Location of activity:	Arklow, Co Wicklow
Original Licence Register No	31
Review application received:	30/6/99
PD Issued	14/10/99
First Party Objection Received	10/11/99

Consideration of the Objections

This report details the findings of the technical committee following examination of the first party objections to the Proposed Determination for the above facility. The Technical Committee met on 11th February and comprised Dr Jonathan Derham (Chairperson), Ms Gunn Nagle, and Ms Becci Cantrell. To facilitate the examination of objections the Inspector for the site, Mr F Clinton, was asked to contribute comment on objections raised. The Committee acknowledge the technical assistance of Ms A Prendergast on NOx issues.

Many of the conditions objected to by IFI relate to clerical errors or clarifications. The Technical Committee in this report has not dwelt on such matters, and consequently they are briefly discussed.

Objection 1: Condition 3.3.1.1

The applicant notes a typographical error in this condition.

Comment

Accepted.

Recommendation: Insert text '95%' at start of condition.

Objection 2: Condition 4.4

The applicant suggests that the condition relation to sewer discharge is not applicable as there is no sewer discharge.

Comment

Accepted.

Recommendation: Delete condition 4.4

Objection 3: Conditions 5.5 & 5.6

The applicant notes that there is repeated text in these two conditions.

Comment

Accepted.

Recommendation: Delete Condition 5.6

Objection 4: Condition 5.9

The applicant notes that should the final licence be granted before 1/12/99 then this condition would have to be reworded (in order to take account of ongoing works).

Comment

A final licence was not issued before the noted date and thus the objection falls.

Recommendation: No change.

Objection 5: Conditions 6.5

The applicant requests a clarification of this condition noting that under the former licence it was agreed to wait for the execution of certain works before determining the two most sensitive species.

Comment

It is accepted that the original toxicity condition, as agreed with the Agency, has yet to be complied with. The condition in the PD for this licence review, as worded, may confuse as it suggests some determination has already been reached regarding sensitive species.

Recommendation: Replace the text 'determined' in condition 6.5 with the 'agreed'.

Objection 6: Conditions 8.6.9, 8.6.10 and 8.6.11

The applicant wishes clarification of these conditions. The applicant submits that the Landfill Operational and Closure Plan (LOCP) agreed with the Agency under the existing licence (Reg 31) is currently assessing the best means of managing landfill gas and leachate and as such the requirements of the conditions may be inappropriate.

Comment

The requirements specified in condition 8.6.9 in respect of landfill gas merely set ELV's for gas migration. This condition does not specify technologies nor interfere with capping proposals. The setting of such an ELV would be in accordance with best international practice for landfilling of waste and is necessary in protecting the environment. Given the nature of operations carried out on site it is undesirable to permit the uncontrolled subterranean migration of explosive/flammable gases. Methane which is the dominant portion of landfill gas in biodegradable fill has a Lower Explosive Limit of 5%v/v.

In relation to leachate management condition 8.6.10 requires that at least three monitoring points per cell be established so as to measure leachate head. It is not readily possible to measure leachate gradient and head without at least three points of measurement. The condition therefore requests the minimum necessary for effective control, and should not interfere with leachate management proposals.

Condition 8.6.11 sets an ELV for leachate head of 1m. International experience and research clearly demonstrates that leachate head on the base of a landfill is the single-most significant factor in controlling the rate of leakage from a landfill. For most landfill structures there is a **tenfold** increase in leakage from a landfill base going from a leachate head of 0.5m to 5m. Hence the operational and environmental imperative behind effective control of leachate head. The 1m head standard is an EU regulatory norm.

Recommendation: No change

Objection 7: Condition 8.6.14

The applicant suggests in a request for clarification on this condition that the requirements of this condition were substantially completed under a condition attaching to the existing licence Register 31. The outcome being the incorporation into a programme for isolation and remediation of groundwater contamination measures to address the findings of the investigation of former waste disposal areas. Thus, they suggest, this condition is now not necessary.

Comment

It may be that the thrust of the condition has been complied with but the execution of the remedial works identified as a result of investigation the old landfill areas are ongoing. The revised licence needs to embrace the execution of any such programmes, to ensure so far as is possible that corrective or improvement

programmes, etc., commenced under licence Register 31 are not permitted to fall between it and the reviewed licence.

Recommendation: Insert new condition 1.6:

All ongoing investigations, programmes or strategies for this site, required, agreed or adopted under the terms of previous IPC Licence (Register 31) become part of this licence.

Objection 8: Condition 10.1.2

The applicant identifies a number of Borehole locations specified in Condition 10.1.2 that no longer exist for one reason or another.

Comment

References to BH94/13, BH97/17 & BH97/18 are superfluous and should be removed from both condition 10.1.2 and from Schedule 5(i) Groundwater Monitoring.

Recommendation: Delete reference to boreholes:

BH94/13, BH97/17 & BH97/18

from condition 10.1.2. Refer to Recommendation on Objection 21 for amendment of Schedule 5(i) Groundwater Monitoring

Objection 9: Condition 10.2.1

The applicant objects to the lack of a specified timeframe in this condition, for the implementation of standard bunding provisions. They request that the text 'Timeframe to be agreed' be inserted.

Comment

Condition 10.2.1 is linked to Condition 10.2.2, which requires the testing of bund structures. The existing licence Register 31 required the installation of such structures. That said, it is clear from the applicant's objection they are some way off having all bunds to standard. Some of this delay being perhaps linked to recent related environmental improvements. Having regard to the matters detailed in this objection and to condition 10.2.2, it is perhaps reasonable to give the licensee a final period to get site bunding facilities in order.

Recommendation: Insert the following text to the beginning of Condition 10.2.1:

Within four months of date of grant of this licence, ...

Objection 10: Condition 10.2.2

The applicant requests a six months timeframe to have the bund structures tested.

Comment

Refer comments on objection 10.2.1 above.

Recommendation: Replace text “one” with text “six” in Condition 10.2.2

Objection 11: Conditions 10.2.6 & 10.2.7

The applicant notes an overlap in the requirements of these two conditions.

Comment

Accepted.

Recommendation: Delete superfluous Condition 10.2.6

Objection 12: Condition 10.2.11

The applicant objects to the stipulation that uncontaminated storm water be separated from effluent. They comment that site studies had indicated that 50% of the nitrogen in the final effluent came from diffuse sources such as storm water. This being principally due to the nature of air emissions from the prilling process. The applicant suggests that future separation may be appropriate if studies show there is no significant nitrogen loading of the storm water following decommissioning of the prilling process.

Comment

Given the comment regarding the diffuse contamination of storm water, the direct discharge of it to the surface water system without treatment would not be appropriate at this time. The list of items to be included in the site EMP as specified in Schedule 6(i) of the PD, does make reference to the separation of storm and effluent waters. The Technical Committee considers that the thrust of the condition has merit, and so we proposed that it should remain, with an amendment to reflect the specified EMP objective.

Recommendation: Replace Condition 10.2.11 with the following:

The licensee shall as part of their EMP establish a program for the diversion and monitoring of uncontaminated surface water runoff from roofs and non-contaminated impervious areas of the site, to the surface water system.

Objection 13: Schedule 1(i) CAN 2 A2

The applicant requests a one-year extension in the specified period required to achieve new plant BATNEEC for Ammonia and Particulate. They propose interim limits.

Comment

The 50mg/Nm³ limit specified in the Schedule as applying from September 1, 2000 is in fact a limit the applicant was required to achieve under the existing licence (Reg 31) by December 1999. The revised licence is proposing to relax that requirement for nearly another year. The technology to achieve the required abatement (condenser) is, we are advised, standard and readily achievable. The extension in time will facilitate the evaluation of use of abatement equipment that has recently become available on site due to other works.

Recommendation: No Change.

Objection 14: Schedule 1(i) NA4 A1/1 & NA5 A1/1

The applicant objects to the new plant BATNEEC limits for NO₂ (300mg/m³) that the revised licence proposes for the stated emission points. The applicant states that the necessary technology to achieve these limits (Selective Catalytic Reduction) cannot be economically justified.

Comment

The two emission points in question are currently permitted to discharge approximately 600 tonnes (combined) per annum of NO₂ into the atmosphere (at 410mg/m³). The revised licence specifies an 18 month timeframe to reduce that to approximately 440tpa NO₂ (i.e. at 300mg/m³). This would equate to an approximate 25% reduction in permitted load. The existing licence (Reg 31) had specified the achievement of the 300mg/m³ NO₂ limits for vent NA5 A1/1 by December 1999, and for Vent NA4 A1/1 by September 2001. The revised licence extends that period for Vent NA5 A1/1 for another year and a half.

The applicants in Attachment 12 of IPC Licence Review Application (Reg 495) state that based on actual flow-rates over the years 1997 and 1998 the total annual tonnage of NO_x released from the two vents ranged 360tpa to 418tpa. This is notably less than the total tonnage that would be released at permitted flow rates for the new plant BATNEEC standard of 300mg/m³ (440tpa). This has to be considered against the backdrop that the plant is a 24hr all year round operation, i.e. the NO_x release is anticipated to be reasonable uniform throughout the year.

To put these releases in context the new Peat fired Power station near Edenderry discharges c. 1261tpa NO_x, and the new ESB natural gas plant in Dublin, 1077tpa NO_x. The Selective Catalytic Reduction is, we are advised, a standard technology and is available to deal with the emission.

Modeling data submitted as part of the application for IPC Reg 31 (current licence) suggested the site was complying with National Ambient Standards detailed in SI 244/87 (200µg/m³, 98thile of mean hourly values). The new EU Directive (99/30/EC) specifies a tighter 99.8thile of mean hourly values ambient standard of 200µg/m³. However sites are given 10 years to achieve this limit, with specified incremental interim standards.

The Technical Committee is of the opinion that where modeling indicates no ambient emission impact, a licence requirement to spend significant sums putting in abatement for a modest 25% reduction in load; may not be the optimum BATNEEC approach to the problem. The Committee considers a condition requiring the applicant to comply at all times with the new EU standard will result in the development of a more realistic NO₂ reduction program that perhaps that specified in the PD. It is therefore necessary to replace Condition 5.10 with an appropriate alternative. The Technical Committee recommends that *The Items to be Addressed in the EMP* table in Schedule 6(i) should be extended with the addition of a site requirement to explore NO₂ emissions reduction at the site.

The Technical Committee also recommend the introduction of a total NO₂ load limit from the two vents to reflect the actual annual loads presented by the applicant. The ambient NO_x data presented by the applicant as an argument to resist the application of new plant BATNEEC for NO_x for these vents is naturally influenced by actual total NO_x loads. If the Agency is to accept the statement on low ambient impact then the actual total loadings must be locked into the licence.

Additionally the EU Ambient hourly Air Standard (Council Directive 1999/30/EC) is specified as NO₂ and not NO_x. It is therefore appropriate to provide in the ambient monitoring program (maintained under Condition 11.9 of the PD) for the monitoring of NO₂. The reporting of this data to be supported by modeling as necessary in order to demonstrate compliance with the EU standard. One additional condition is added (Condition 11.10) which requires the assessment of ambient monitoring data to be carried out in accordance with the EU Directive.

Recommendation: Replace Condition 5.10 with the following:

The Nitric Acid Plants 4 and 5 shall be shut down as soon as is practicable in a manner consistent with safety and the protection of the environment when, at any of the ambient monitoring stations referred to in Condition 11.9, the concentration of either NO₂ or NO_x exceeds the relevant ambient air quality standards specified in EU Council Directive 1999/30/EC.

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Insert new condition 5.11:

Within six months of date of grant of this licence the licensee shall submit to the Agency a report (using up-to-date data) on the results of dispersion modeling for Oxides of Nitrogen (NO_x and NO₂) emissions from the site. This report shall make any recommendations necessary to improve on the representativeness of the existing ambient air monitoring station locations and program referred to in Condition 11.9.



Replace condition 11.9 with the following:

The licensee shall maintain at the locations specified in Attachment 18 of IPC Licence Review Application Register No.495, the five existing ambient air monitoring stations for the continuous monitoring of ammonia, Oxides of Nitrogen (as NO₂ and NO_x) and suspended particulates. The results of this monitoring are to be reported monthly with a summary report included as part of the AER. This program shall be revised as necessary to have regard to any recommendation arising from compliance with Condition 5.11.

Insert new Condition 11.10:

The licensee shall ensure that data-quality for assessment of Ambient Air monitoring results is in accordance with the objectives specified in Annex VIII of Council Directive 1999/30/EC.

Insert to *The Items to be Addressed in the EMP* table in Schedule 6(i) the following text:

The reduction of NO₂ emissions from the Nitric Acid Plants.

Insert to table one of Schedule 6(i) *Recurring Reports*, the following line;

Ambient Air Quality Monitoring	:	Monthly	:	Ten days after the end of the month being reported on.
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Insert to second table of Schedule 6(i) *Annual Environmental Report Content*, the following line of text;

Summary Report on Ambient Air Monitoring

Insert to last table of Schedule 6(i) *Once-Off Reports*, the following line of text;

Report on air dispersion Modeling for NO ₂	:	Within six months of date of grant of this licence
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Replace the two tables (in Schedule 1(i)) labeled Emission Point Reference NA4 A1/1 and NA5 A1/1 with the following:

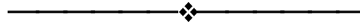
Emission Point Reference No.: NA4 A1/1
Location : Nitric Acid Plant 4 Tailgas Exhaust

Volume to be emitted: Maximum in any one day : 1,716,000 m³
Maximum rate per hour : 71,500 m³

Minimum discharge height: 65 m above ground

Parameter	Emission Limit Value ^{Note 1}
Oxides of Nitrogen	410 mg/m ³

Note 1: Or less, as may be dictated by the requirements of Condition 5.10



Emission Point Reference No.: NA5 A1/1
Location : Nitric Acid Plant 5 Tailgas Exhaust

Volume to be emitted: Maximum in any one day : 2,270,400 m³
Maximum rate per hour : 94,600 m³

Minimum discharge height: 66 m above ground

Parameter	Emission Limit Value ^{Note 1}
Oxides of Nitrogen	410 mg/m ³

Note 1: Or less, as may be dictated by the requirements of Condition 5.10



Emission Point Reference Nos.: NA4 A1/1 & NA5 A1/1
Location : Nitric Acid Plants 4 & 5 Tailgas Exhaust

Parameter	Emission Limit Value
Oxides of Nitrogen	Maximum combined vent load of 420tpa



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Objection 15: Schedule 2(i)

The applicant notes that if the wording of the Schedule could vary if the licence was issued before December 1999.

Comment

The 1 December Date specified in the Schedule is no longer relevant as it has passed.

Recommendation: Delete superfluous text '*From December 1, 1999 to*' from Schedule 2(i) and replace with '*Until*'

Objection 16: Schedule 2(ii) and 2(iii)

These Schedules specify continuous monitoring for Suspended Solids. The applicant notes the current monitoring frequency on site for Suspended Solids is Daily with the analysis of a 24hr flow proportionate sample. They submit that it may be possible in the future to use continuous monitors and want the option to use either daily and/or continuous.

Comment

SS levels in effluent from the plant in Autumn of 1999 averaged less than 100mg/l with occasional high of up to 300mg/l, and a rarer peak in the range of 1000mg/l. The Avoca River becomes tidal a short distance downstream of the IFI plant. The Technical Committee consider a daily composite to be appropriate, but will give the company the option to use continuous if they wish. A footnote needs to be inserted to the Schedule 2(iii) regarding flow proportionate sampling.

Recommendation: Replace Schedule 2(ii) with the following:

Schedule 2(ii) Effluent Treatment Control

Emission Point Reference No.: EFF1
 Description of Treatment: Settling Lagoon

Monitoring:

Monitoring to be Carried Out	Monitoring Frequency	Monitoring Equipment/Method
Flow	Continuous	Flow Meter/Recorder
Suspended solids	Daily (24 hr composite) or Continuous	Turbidity probe
Ammonia	Daily	Ammonia probe
Nitrate	Daily	Nitrate probe
pH	Continuous	pH Meter/Recorder

Equipment:

Control Parameter	Equipment	Backup equipment
Effluent Transfer	Lift pumps	Standby pumps and spares held on site
Suspended Solids	Retention pond Sludge removal equipment	Standby retention capacity Spares



Schedule 2(iii) Monitoring of Emissions to Water

Emission Point Reference No.: EFF1

Parameter	Monitoring Frequency	Analysis Method/Technique
Flow	Continuous	On-line flow meter with recorder
Temperature	Continuous	On-line temperature probe with recorder
pH	Continuous	pH electrode/meter and recorder
Chemical Oxygen Demand	Daily ^{Note 3}	Standard Method ^{Note 1}
Biochemical Oxygen Demand	Monthly ^{Note 3}	Standard Method ^{Note 1}
Suspended Solids	Daily ^{Note 3} or Continuous	Turbidity meter
Total Nitrates (as N)	Daily ^{Note 3}	Standard Method ^{Note 1}
Total Ammonia (as N)	Daily ^{Note 3}	Ion selective electrode
Total Phosphate	Monthly ^{Note 3}	Standard Method ^{Note 1}
Total Heavy Metals	Bi-annually ^{Note 3}	Atomic Absorption/ICP
Chlorides	Daily ^{Note 3}	Standard Method ^{Note 1}
Sulphate	Monthly ^{Note 3}	Standard Method ^{Note 1}
Toxicity ^{Note 2}	Bi-annually ^{Note 3}	To be agreed with the Agency

Note 1: "Standards Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 19th Ed. 1995, American Public Health Association, 1015 Fifteenth Street, N.W., Washington DC 20005, USA.

Note 2: The Toxicity of the effluent shall be determined on an appropriate aquatic species. The number of toxic units (TU) = 100/ x hour LC₅₀ in percentage vol/vol so that higher TU values reflect greater levels of toxicity.

Note 3: All samples shall be collected on a 24 hour flow proportional composite sampling basis.



Objection 17: Schedules 3(i) and 3(ii)

The applicant identified two waste streams, which should be permitted to be disposed of on-site as per existing licence. Specifically, Spent Ion Exchange Resin, and Sludge from the WWTP.

Comment

The Spent Ion Exchange Resin is very stable and suitable for on-site landfill. It is not a hazardous waste. It is miss-classified in the revised licence.

The WWTP sludge is characterised by very high Nitrogen. This sort of waste would be quite suitable for recovery by landspreading. Disposal to on-site landfill would not represent best practice for such highly leachable wastes, particularly as the landfill is unlined.

Recommendation: See recommendation for Objection 18
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Objection 18: Schedules 3(i) and 3(ii)

The applicant identified a number of wastes that would appear to be miss-categorised and suitable for on-site landfilling (i.e. different to that specified). Specifically (a) Plastic/Steel drums, (b) Disposable Overalls & Gloves and (c) Paper and Cardboard

Comment

Waste (a) is suitable for on-site landfill only after all recovery options have been exhausted. There should be no reason to landfill any steel or metal wastes. These can be recycled.

Waste (b) can be landfilled on site. These items are prone to wind blow. The IFI landfill is visible from the new Arklow by-pass and appears untidy. There have been a number of complaints made regarding the appearance of the landfill. It is therefore recommended such wastes be bailed prior to landfilling.

Waste (c) can be landfilled on site only after all recovery options explored. In respect of wind-blow the case for bailing also holds.

The Technical Committee recommends that *The Items to be Addressed in the EMP* table in Schedule 6(i) should be extended with the addition of a site requirement to actively explore waste recovery/recycling options.

The Technical committee also note the inclusion of Waste Oil Filters in Schedule 3(ii) Other Wastes. Waste Oil Filters are a hazardous waste and therefore belong in Schedule 3(i).

Recommendation: Insert to *The Items to be Addressed in the EMP* table in Schedule 6(i) the following text:

Recovery/recycling opportunities for all waste materials.

Replace Schedules 3(i) and 3(ii) with the following:

Schedule 3(i) Hazardous Wastes for Disposal/Recovery

Waste Materials	Method of off-site disposal/recovery ^{Note 1}
Degreasing Solutions	Agreed hazardous waste recovery/disposal contractor
Spent catalysts	Agreed hazardous waste recovery/disposal contractor
Waste lubricating and engine oils, Oil Filters	Agreed hazardous waste recovery/disposal contractor
Fluorescent lamps	Agreed hazardous waste recovery/disposal contractor
Other (Note 2)	

Note 1: Any variation from those contractors named in the IPC Licence application, or subsequent agreements, must have the prior written agreement of the Agency.

Note 2: No other hazardous waste to be disposed of off-site without prior notice to, and prior agreement of the Agency



Schedule 3(ii) Other Wastes for Disposal/Recovery

Waste Materials	Further Treatment on-site	On-site recovery, reuse or recycling	Method of off-site disposal/Recovery <small>Note 1</small>
Spent catalyst gauzes from the nitric acid plants	None	None	Agreed recovery contractor.
Waste sludge from the settling lagoon	Dewatering	None	Agreed landspreading contractor
Scrap metal, steel drums	None	Re-use where practicable	Agreed recovery contractor
Air filters	None	None	Agreed disposal contractor.
Paper & cardboard	Segregation & Bailing	Re-use as much as practicable	Agreed recovery contractor / On-site landfill.
Waste plastic packaging	Bailing	Re-use as much as practicable	Agreed recovery method/On-site landfill
Disposable overalls & gloves	Bailing	None	On-site landfill.
Plastic drums	None	Re-use as much as practicable	On-site landfill.
Spent ion exchange resin	None	None	On-site landfill
Waste wooden pallets	None	Re-use as much as practicable	On-site landfill
Domestic/canteen waste	None	None	Off-site landfill.
Filter bags from CAN plants	Residue removal	None	On-site landfill
Limestone/China Clay	None	None	On-site landfill
Other (Note 2)			

Note 1: Any variation from those contractors named in the IPC Licence application, or subsequent agreements, must have the prior written agreement of the Agency

Note 2: No other waste shall be disposed of or recovered off-site without prior notice to, and prior written agreement of the Agency.



Objection 19: Schedule 4(i) PN14

The applicant identified a problem with specified reference distances for noise measurement at the granulation stack. The applicant suggests an alternative approach.

Comment

The alternative is satisfactory to the Agency Noise specialist.

Recommendation: See recommendation for Objection 20

Objection 20: Schedule 4(i) PN1-9, PN12

The applicant identified a clerical error in Schedule 4(i) describing ELV's for certain sources as sound Pressure limits, rather than correctly as sound Power limits.

Comment

Accepted.

Recommendation: Replace Schedule 4(i) with the following:

Schedule 4(i) Noise

Sources

Source Location	Reference ^{Note 1}	Sound Power Limit - dB(A)
CAN 2 cooling tower	PN1	92
CAN 2 cooling water pump	PN2	89
NA4 cooling tower	PN3	99
NA4 cooling water pump	PN4	100
NA5 cooling tower	PN5	100
NA5 cooling water pumps	PN6	97
Air filter house NA4	PN7	106
Ancillary plant NA4	PN8	110
Air intake of CAN 1 cooler stage 2 fan	PN12	99
		Sound Pressure Limit dB(A) at locator or reference distance
NA5 general	PN9	110 @ perimeter of NA5 plant
Ammonia valve 301 CAN 1	PN10	93 @ 1m from Ammonia valve 301N Can Plant No 1.
CAN 2B Granulation Scrubber Stack	PN14	55 @ 200 m from source

Note 1: See IPC application and IPC Licence Review application for location references.

Objection 21: Schedule 5(i)

The applicant points to previous agreements with the Agency (under licence 31) in relation to groundwater monitoring. These conflict with the Schedule.

Comment

The Technical Committee recommends that Schedule 5(i) be amended to reflect cited agreements.

Recommendation: Replace Schedule 5(i) with the following:

Schedule 5 (i) Groundwater Monitoring

Emission Point Reference No's: BH94/1 to BH94/17 inclusive (except BH94/13) and BH97/1 to BH97/16 inclusive

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Biannually	pH electrode/meter
COD	Biannually	Standard Method
Total Ammonia	Biannually	Standard Method
Total Nitrogen	Biannually	Standard Method
Nitrate	Biannually	Standard Method
Nitrite	Biannually	Standard Method
Conductivity	Biannually	Standard Method
Alkali Metals	Biannually	Standard Method
Heavy Metals	Biannually	Standard Method
Sulphate (as SO ₄)	Biannually	Standard Method
Bicarbonate	Biannually	Standard Method
Chloride	Biannually	Standard Method



Recommendation

The Technical committee recommend issue of an IPC licence to Irish Fertilizer Industries subject to amendment of the PD as detailed herein.

Dr Jonathan Derham

For and on behalf of the Technical Committee