



Headquarters,
Johnstown Castle Estate,
County Wexford, Ireland

GREENHOUSE GAS EMISSIONS PERMIT

Permit Register Number:	IE-GHG058-10373-5
Operator:	Intel Ireland Limited Collinstown Industrial Park Leixlip Kildare
Installation Name:	Intel Ireland
Site Name:	Intel Ireland
Location:	Collinstown Industrial Park Leixlip Kildare Ireland

Introductory Note

This introductory note does not form a part of the Greenhouse Gas Emissions Permit.

This Greenhouse Gas Emissions Permit authorises the holder to undertake named activities resulting in emissions of Carbon Dioxide from the listed emission sources. It also contains requirements that must be met in respect of such emissions, including monitoring and reporting requirements. This Greenhouse Gas Emissions Permit places an obligation on the Operator to surrender allowances to the Agency equal to the annual reportable emissions of carbon dioxide equivalent from the installation in each calendar year, no later than four months after the end of each such year.

Contact with Agency:

If you contact the Agency about this Greenhouse Gas Emissions Permit please quote the following reference: Greenhouse Gas Emissions Permit N^o IE-GHG058-10373.

All correspondence in relation to this permit should be addressed to:

Email: help.ets@epa.ie

By Post: Climate Change Unit, Environmental Protection Agency
P.O. Box 3000, Johnstown Castle Estate,
Co. Wexford

Updating of the permit:

This Greenhouse Gas Emissions Permit may be updated by the Agency, subject to compliance with Condition 2. The current Greenhouse Gas Emissions Permit will normally be available on the Agency's website at www.epa.ie and [ETSWAP](#).

Surrender of the permit:

Before this Greenhouse Gas Emissions Permit can be wholly or partially surrendered, a written application must be made to the on-line ETS portal, and written permission received from, the Agency through [ETSWAP](#).

Transfer of the permit or part of the permit:

Before this Greenhouse Gas Emissions Permit can be wholly or partially transferred to another Operator a joint written application to transfer this Greenhouse Gas Emissions Permit must be made (by both the existing and proposed Operators) to, and written permission received from, the Agency through the on-line ETS portal [ETSWAP](#).

Licence held pursuant to the Environmental Protection Agency Act 1992, as amended. (as of the date of this permit):

IPC/IE Licence Register Number
P0207-04

Status Log

Current Permit

Permit number	Date application received	Date Permit issued	Comment
IE-GHG058-10373-5	02 October 2018	18 February 2020	Addition of a new emission source S61 (RCTO oxidiser in FAB 10) and related emission point A67; The replacement of an emergency generator in Fab 10 at an existing emission source S25; Update of the monitoring methodology to include "Fall-back Approach" in relation to the minor source stream VO-001 (VOC Solvent Vapours).

Previous Permits

Permit number	Change Type	Date application received	Date Permit issued	Comment
IE-GHG058-10373-1	GHG Permit Application	19 August 2013	28 August 2013	
IE-GHG058-10373-2	GHG Variation	25 February 2014	08 July 2014	Addition of 9 new emission sources, relabelling of one emission point and the inclusion of bottled natural gas as a de minimis source stream.
IE-GHG058-10373-3	GHG Variation	23 January 2015	26 February 2015	Addition of 5 emergency burners associated with the ASU as emission sources S71-S75 Addition of a second TMXW System as emission source S70

Permit number	Change Type	Date application received	Date Permit issued	Comment
IE-GHG058-10373-4	GHG Variation	27 November 2015	13 March 2018	<ol style="list-style-type: none">1. Addition of emission source boiler S76 (and related emission point A104) and generator S77 (and related emission point A232).2. Addition of source stream VOC Solvent Vapours (VO-001).3. Correction of thermal input capacities of generators S21-S36 and S43 and S44

End of Introductory Note

Glossary of Terms

For the purposes of this permit the terms listed in the left hand column shall have the meaning given in the right hand column below:

The Agency	Environmental Protection Agency.
Agreement	Agreement in writing.
Allowance	Permission to emit to the atmosphere one tonne of carbon dioxide equivalent during a specified period issued for the purposes of Directive 2003/87/EC by the Agency or by a designated national competent authority of a Member State of the European Union.
Annual Reportable Emissions	Reportable Emissions of carbon dioxide made in any calendar year commencing from 1 January 2005 or the year of commencement of the activity, whichever is the later.
A & V Regulation	Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council and any amendments or revisions thereto.
Category A Installation	As defined in Article 19.2 (a) of the M&R Regulation.
Category B Installation	As defined in Article 19.2 (b) of the M&R Regulation.
Category C Installation	As defined in Article 19.2 (c) of the M&R Regulation.
The Directive	Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.
Emissions	The release of greenhouse gases into the atmosphere from sources in an installation.
EPA	Environmental Protection Agency.
Fall-Back Methodology	As defined in Article 22 of the M&R Regulation.
GHG	Greenhouse gas.
GHG Permit	Greenhouse gas emissions permit.
Greenhouse Gas	Any of the gases in Schedule 2 of the Regulations.
IPC/IE	Integrated Pollution Control/Industrial Emissions.
Installation	Any stationary technical unit where one or more activities listed in Schedule 1 to the Regulations are carried out. Also any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution. References to an installation include references to part of an installation.

Installation with low emissions	As defined in Article 47 of the M&R Regulation.
Major Source Streams	As defined in Article 19.3 (c) of the M&R Regulation.
M&R Regulation	Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and any amendments or revisions thereto.
Mis-statement	An omission, misrepresentation or error in the Operators reported data, not considering the uncertainty permissible pursuant to Article 12(1)(a) of Regulation (EU) no 601/2012.
N/A	Not applicable.
Monitoring Plan	The Plan submitted and approved in accordance with Condition 3.1 of this permit and attached at Appendix 1.
Non-conformity	Any act or omission by the Operator, either intentional or unintentional, that is contrary to the greenhouse gas emissions permit and the requirements of the Monitoring Plan.
The National Administrator	The person so designated in accordance with the requirements of any Regulations adopted as provided for under Article 19.3 of Directive 2003/87/EC.
The Operator (for the purposes of this permit)	Intel Ireland Limited
“operator”	Any person who operates or controls an installation or to whom decisive economic power over the functioning of the installation has been delegated.
Person	Any natural or legal person.
Reportable emissions	The total releases to the atmosphere of carbon dioxide (expressed in tonnes of carbon dioxide equivalent) from the emission sources specified in Table 2 and arising from the Schedule 1 activities which are specified in Table 1.
The Regulations	European Communities (Greenhouse Gas Emissions Trading) Regulations 2012 (S.I. No 490 of 2012) and any amendments or revisions thereto.
The Verifier	A legal person or another legal entity carrying out verification activities pursuant to Regulation (EU) No 600/2012 and accredited by a national accreditation body pursuant to Regulation (EC) No 765/2008 and Regulation (EU) No 600/2012 or a natural person otherwise authorised, without prejudice to Article 5(2) of Regulation (EC) No 765/2008, at the time a verification report is issued.
The Registry	The Registry as provided for under Article 19 of Directive 2003/87/EC.

Schedule 1

Schedule 1 to the Regulations.



Reasons for the Decision

The Agency is satisfied, on the basis of the information available, that subject to compliance with the conditions of this permit, the Operator is capable of monitoring and reporting emissions in accordance with the requirements of the Regulations.

Activities Permitted

Pursuant to the Regulations the Agency issues this Greenhouse Gas Emissions Permit, subject to any subsequent revisions, corrections or modifications it deems appropriate, to:

The Operator:

Intel Ireland Limited
Collinstown Industrial Park
Leixlip
Kildare

Company Registration Number: 902934

to carry out the following

Categories of activity:

Annex 1 Activity

Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)
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at the following installation(s):

Intel Ireland **Installation number:** 45

located at

Collinstown Industrial Park
Leixlip
Kildare
Ireland

subject to the five conditions contained herein, with the reasons therefor and associated tables attached thereto.

Conditions

Condition 1. The Permitted Installation

- 1.1 This permit is being granted in substitution for the previous GHG permit granted to the Operator as listed in the Status Log of this GHG permit.
- 1.2 The Operator is authorised to undertake the activities and/or the directly associated activities specified in Table 1 below resulting in the emission of carbon dioxide:

Table 1 - Activities which are listed in Schedule 1 of the Regulations and other directly associated activities carried out on the site:

Installation No.: 45

Activity Description
Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)
Directly Associated Activity Description
N/A

- 1.3 Carbon dioxide from Schedule 1 activities shall be emitted to atmosphere only from the emission sources as listed in Table 2 below:

Table 2 Emission Sources and Capacities:

Emission Source Reference	Emission Source Description	Capacity	Capacity Units
S1	Fab 10 Energy Centre Boiler (A01)	6.17	MW
S2	Fab 10 Energy Centre Boiler (A03)	6.17	MW
S3	Fab 10 Energy Centre Boiler (A04)	6.17	MW
S4	Fab 10 Energy Centre Boiler (A05)	6.17	MW
S5	Fab 10 Energy Centre Boiler (A06)	4.32	MW
S6	Fab 14 Energy Centre Boiler (A101)	9	MW
S7	Fab 14 Energy Centre Boiler (A102)	9	MW

Emission Source Reference	Emission Source Description	Capacity	Capacity Units
S8	Fab 14 Energy Centre Boiler (A103)	9	MW
S13	Fab 24 Energy Centre Boilers (A201)	9.13	MW
S14	Fab 24 Energy Centre Boilers (A202)	9.13	MW
S15	Fab 24 Energy Centre Boilers (A203)	9.13	MW
S16	Fab 24 Energy Centre Boilers (A204)	9.13	MW
S17	Fab 24 Energy Centre Boilers (A205)	9.13	MW
S18	Fab 24 Energy Centre Boilers (A248)	9.13	MW
S19	Fab 24 Energy Centre Boilers (A253)	9.13	MW
S21	Emergency Generator No. 3 (A31)	4.7	MW
S22	Emergency Generator No. 4 (A32)	4.7	MW
S23	Emergency Generator No. 6 (A33)	4.7	MW
S25	Emergency Generator No. 5 (A34)	4.87	MW
S27	Emergency Generator No. 11 (A122)	4.3	MW
S28	Emergency Generator No. 10 (A123)	4.3	MW
S29	Emergency Generator No. 9 (A124)	4.3	MW

Emission Source Reference	Emission Source Description	Capacity	Capacity Units
S30	Emergency Generator No. 8 (A125)	4.3	MW
S31	Fab 24 Emergency Generator No. 15 (A227)	5	MW
S32	Fab 24 Emergency Generator No. 16 (A228)	5	MW
S33	Fab 24 Emergency Generator No. 17 (A229)	5	MW
S34	Fab 24 Emergency Generator No.18 (A230)	5	MW
S35	Fab 24 Emergency Generator No. 19 (A231)	5	MW
S36	Fab 24 Emergency Generator No. 21 (A233)	5	MW
S37	Fab 24 RCTO Oxidiser Exhaust No. 1 (A214)	0.4	MW
S38	Fab 24 RCTO Oxidiser Exhaust No. 2 (A215)	0.4	MW
S39	Fab 24 RCTO Oxidiser Exhaust No. 3 (A216)	0.4	MW
S41	Fab 10 RCTO Oxidiser Exhaust (A65)	0.4	MW
S43	Emergency Generator No. 13 (A58)	5	MW
S44	Emergency Generator No. 12 (A59)	5	MW
S46	IR2 Firewater Pump (A99)	0.46	MW
S47	Fab 24 Firewater Pump (A299)	0.39	MW

Emission Source Reference	Emission Source Description	Capacity	Capacity Units
S60	Fab 10 RCTO Oxidiser Exhaust (A66)	0.53	MW
S62	Fab 14 RCTO Oxidiser Exhaust (A155)	0.53	MW
S63	Fab 14 RCTO Oxidiser Exhaust (A156)	0.53	MW
S64	Fab 14 RCTO Oxidiser Exhaust (A157)	0.53	MW
S65	Fab 24-1 RCTO Oxidiser Exhaust (A287)	0.53	MW
S66	Fab 24-2 RCTO Oxidiser Exhaust (A267)	0.53	MW
S67	Fab 24-2 RCTO Oxidiser Exhaust (A268)	0.53	MW
S68	Fab 24-2 RCTO Oxidiser Exhaust (A269)	0.53	MW
S69	Trimix Waste Treatment System A (A256A)	1.17	MW
S71	Fab 10 ASU Emergency Burner No. 1 (A301)	2.2	MW
S72	Fab 10 ASU Emergency Burner No. 2 (A301)	2.2	MW
S73	Fab 10 ASU Emergency Burner No. 3 (A301)	2.2	MW
S74	Fab 10 ASU Emergency Burner No. 4 (A301)	2.2	MW
S75	Fab 10 ASU Emergency Burner No. 5 (A301)	2.2	MW
S70	Trimix Waste Treatment System B (A256B)	1.17	MW

Emission Source Reference	Emission Source Description	Capacity	Capacity Units
S76	Fab 14 Energy Centre Boiler (A104)	2.47	MW
S77	Fab 24 Emergency Generator No. 20 (A232)	4.25	MW
S61	Fab 10 RCTO Oxidiser Exhaust (A67)	0.41	MW

- 1.4 The activity shall be controlled, operated and maintained so that emissions of carbon dioxide shall take place only as set out in this GHG Emissions Permit. The permit does not control emissions of gases other than carbon dioxide. All agreed plans, programmes and methodologies required to be carried out under the terms of this permit, become part of this permit.
- 1.5 This GHG Permit is for the purposes of GHG emissions permitting under the European Communities (Greenhouse Gas Emissions Trading) Regulations 2012 and any amendments to the same only and nothing in this permit shall be construed as negating the Operator's statutory obligations or requirements under any other enactments or regulations unless specifically amended by the Regulations.
- 1.6 Any reference in this permit to 'installation' shall mean the installation as described in the Greenhouse Gas Emissions Permit application and any amendments approved by the Agency.

Reason: To describe the installation and clarify the scope of this permit.

Condition 2. Notification

- 2.1 No alteration to, or reconstruction in respect of, the activity or any part thereof which would, or is likely to, result in a change in:
- 2.1.1 the nature or functioning of the installation;
 - 2.1.2 the capacity of the installation as detailed in this permit;
 - 2.1.3 the fuels used at the installation;
 - 2.1.4 the range of activities to be carried out at the installation
- that may require updating of the GHG permit shall be carried out or commenced without prior notice to and without the prior written agreement of the Agency.
- 2.2 The Operator shall notify the Agency in writing of the cessation of all or part of any activity listed in Table 1 of this permit no later than one month from the date of cessation or by 31 December of the year of cessation, whichever is sooner.
- 2.3 The Operator shall apply for an update of this GHG Permit where there is a change to the Operator name and/or registered address of the Operator, within seven days of the change.
- 2.4 For installations or parts of installations which have not come into operation when the application for this permit was made the Operator shall notify the Agency of the date of commencement of the activity within seven days of commencement.

- 2.5 The Operator shall notify the Agency in writing within three days of becoming aware of any factors which may prevent compliance with the conditions of this permit.
- 2.6 The Operator shall submit to the Agency by 21 January of each year a declaration of operability. The declaration submitted shall be in the format required by the Agency.
- 2.7 All notifications required under Condition 2 above shall be made to the address given in the Explanatory Note included with this permit.
- 2.8 The Operator shall submit to the Agency by 31 December of each year all relevant information about any planned or effective changes to the capacity, activity level and operation of an installation. The information submitted shall be in the format required by the Agency.

Reason: To provide for the notification of updated information on the activity.

Condition 3. Monitoring and Reporting

- 3.1 The Operator shall monitor and record greenhouse gas emissions on site in accordance with the M&R Regulation and the approved Monitoring Plan attached at Appendix 1 to this GHG permit and in compliance with any other guidance approved by the Agency for the purposes of implementing the Directive and/or the Regulations.
- 3.2 The Operator shall modify the monitoring plan in any of the following situations:
 - 3.2.1 new emissions occur due to new activities carried out or due to the use of new fuels or materials not yet contained in the monitoring plan;
 - 3.2.2 the change of availability of data, due to the use of new measurement instrument types, sampling methods or analysis methods, or for other reasons, leads to higher accuracy in the determination of emissions;
 - 3.2.3 data resulting from the previously applied monitoring methodology has been found incorrect;
 - 3.2.4 changing the monitoring plan improves the accuracy of the reported data, unless this is technically not feasible or incurs unreasonable costs;
 - 3.2.5 the monitoring plan is not in conformity with the requirements of the M&R Regulation and the Agency requests a change;
 - 3.2.6 it is necessary to respond to the suggestions for improvement of the monitoring plan contained in the verification report.

The Operator shall notify any proposals for modification of the monitoring plan to the Agency without undue delay. Any significant modifications of the monitoring plan, as defined in Article 15 of the M&R Regulation, shall be subject to approval by the Agency. Where approved these changes shall be implemented within a timeframe agreed by the Agency.

- 3.3 Temporary changes to the monitoring methodology:
 - 3.3.1 Where it is for technical reasons temporarily not feasible to apply the tier in the monitoring plan for the activity data or each calculation factor of a fuel or material stream as approved by the Agency, the Operator shall apply the highest achievable tier until the conditions for application of the tier approved in the monitoring plan have been restored. The Operator shall take all necessary measures to allow the prompt restoration of the tier in the approved monitoring plan. The Operator shall notify the temporary change to the monitoring methodology without undue delay to the Agency specifying:
 - (i) The reasons for the deviation from the tier;

- (ii) in detail, the interim monitoring methodology applied by the Operator to determine the emissions until the conditions for the application of the tier in the monitoring plan have been restored;
 - (iii) the measures the Operator is taking to restore the conditions for the application of the tier in the approved monitoring plan;
 - (iv) the anticipated point in time when application of the approved tier will be resumed.
- 3.3.2 A record of all non-compliances with the approved monitoring plan shall be maintained on-site and shall be available on-site for inspection by authorised persons of the Agency and/or by the Verifier at all reasonable times.
- 3.4 The Operator shall appoint a Verifier to ensure that, before their submission, the reports required by Condition 3.5 below are verified in accordance with the criteria set out in Schedule 5 of the Regulations, the A&V Regulation and any more detailed requirements of the Agency.
- 3.5 The written report of the verified annual reportable emissions and the verification report in respect of each calendar year shall be submitted to the Agency by the Operator no later than 31 March of the following year. The reports shall be in the format required by the Agency and meet the criteria set out in the M&R and A&V Regulations.
- 3.6 The Operator shall enter the verified annual reportable emissions figure for the preceding year into the Registry no later than 31 March of the following year. This figure shall be electronically approved by the Verifier in the registry no later than 31 March of each year.
- 3.7 Where an Operator is applying the Fall-Back methodology, the Operator shall assess and quantify each year the uncertainties of all parameters used for the determination of the annual emissions in accordance with the ISO Guide to the Expression of Uncertainty in Measurement or another equivalent internationally accepted standard and include the verified results in the written report of the verified annual reportable emissions to be submitted to the Agency by 31 March each year.
- 3.8 An Operator shall submit to the Agency for approval a report containing the information detailed in (i) or (ii) below, where appropriate, by the following deadlines:
 - (a) for a category A installation, by 30 June every four years;
 - (b) for a category B installation, by 30 June every two years;
 - (c) for a category C installation, by 30 June every year.
 - (i) Where the Operator does not apply at least the tiers required pursuant to the first subparagraph of Article 26(1) and to Article 41(1) of the M&R Regulation, the Operator shall provide a justification as to why it is technically not feasible or would incur unreasonable costs to apply the required tiers. Where evidence is found that measures needed for reaching those tiers have become technically feasible and do not incur unreasonable costs, the Operator shall notify the Agency of appropriate modifications to the monitoring plan and submit proposals for implementing appropriate measures and its timing.
 - (ii) Where the Operator applies a fall-back monitoring methodology, the Operator shall provide a justification as to why it is technically not feasible or would incur unreasonable costs to apply at least tier 1 for one or more major or minor source streams. Where evidence is found that measures needed for reaching at least tier 1 for those source streams have become technically feasible and do not incur unreasonable costs, the Operator shall notify the Agency of appropriate modifications to the monitoring plan, submit proposals and a timeframe for implementing appropriate measures.
- 3.9 Where the verification report states outstanding non conformities, misstatements or recommendations for improvements the Operator shall submit a report to the Agency for approval

by 30 June of the year in which the verification report is issued. This requirement does not apply to the Operator of an installation with low emissions where the verification report contains recommendations for improvements only. The report shall describe how and when the Operator has rectified or plans to rectify the non-conformities identified and to implement recommended improvements. Where recommended improvements would not lead to an improvement of the monitoring methodology this must be justified by the Operator. Where the recommended improvements would incur unreasonable costs the Operator shall provide evidence of the unreasonable nature of the costs. The Operator shall implement the improvements specified by the Agency in response to the report submitted in accordance with this Condition in accordance with a timeframe set by the Agency.

- 3.10 The Operator shall make available to the Verifier and to the Agency any information and data relating to emissions of carbon dioxide which are required in order to verify the reports referred to in Condition 3.5 above or as required by the Agency to facilitate it in establishing benchmarks and/or best practice guidance.
- 3.11 Provision shall also be made for the transfer of environmental information, in relation to this permit, to the Agency's computer system, as may be requested by the Agency.
- 3.12 The Operator shall retain all information as specified in the M&R Regulation for a period of at least 10 years after the submission of the relevant annual report.
- 3.13 A record of independent confirmation of capacities listed in this permit shall be available on-site for inspection by authorised persons of the Agency at all reasonable times.
- 3.14 The Operator shall keep records of all modifications of the monitoring plan. The records shall include the information specified in Article 16.3 of the M&R Regulation.
- 3.15 The Operator shall ensure that members of the public can view a copy of this permit and any reports submitted to the Agency in accordance with this permit at all reasonable times. This requirement shall be integrated with the requirements of any public information programme approved by the Agency in relation to any other permit or licence held by the Operator for the site.

Reason: *To provide for monitoring and reporting in accordance with the Regulations.*

Condition 4. Allowances

- 4.1 Surrender of Allowances
- 4.1.1 The Operator shall, by 30 April in each year, surrender to the Agency, or other appropriate body specified by the Agency, allowances equal to the annual reportable emissions in the preceding calendar year.
- 4.1.2 The number of allowances to be surrendered shall be the annual reportable emissions for the preceding calendar year plus such allowances as may be necessary to cover any earlier calendar year in respect of which allowances remain outstanding and due. This includes allowances to cover the amount of any annual reportable emissions in respect of which allowances were not surrendered in accordance with Condition 4.1.1 in the previous year, and the amount of any reportable emissions which were discovered during the previous year to have been unreported in reports submitted under Condition 3 in that or in earlier years.
- 4.1.3 In relation to activities or parts of activities which have ceased to take place and have been notified to the Agency in accordance with Condition 2.2 above, the Operator shall surrender to the Agency allowances equal to the annual reportable emissions from such activities in the preceding calendar year or part thereof, together with such allowances as

may be necessary to cover any earlier calendar year in respect of which allowances remain outstanding and due as described in Condition 4.1.2 above.

- 4.1.4 The Operator may, from 2008 onwards, subject to the provisions of the Regulations and the relevant National Allocation Plan for that compliance year, surrender emission reduction units (ERUs) and certified emission reduction units (CERs) in place of allowances.
- 4.2 The holding, transfer, surrender and cancellation of allowances shall be in accordance with the requirements of any Regulations adopted as provided for under Article 19.3 of Directive 2003/87/EC, any amendment or revision to the same and any guidance issued by the Agency or the National Administrator.
- 4.3 The Operator shall provide the National Administrator with all the necessary information for the opening of an Operator holding account for the installation described in Condition 1 of this permit within twenty working days of the issue of this permit, unless such an account is already open.

Reason: To provide for the surrendering, holding, transfer and cancellation of allowances in respect of reported emissions.

Condition 5. Penalties

5.1 Any Operator who fails to comply with Condition 4.1 above shall be subject to the provisions of the Regulations, including, but not limited to the payment of penalties.

Reason: To provide for the payment of excess emissions penalties as required under the Regulations.

Sealed by the seal of the Agency on this the 18 February 2020:

PRESENT when the seal of the Agency was affixed hereto:

Ms. Annette Prendergast
Inspector/ Authorised Person

Appendix 1 to Greenhouse Gas Emissions Permit Number IE-GHG058-10373

Monitoring Plan

1. Guidelines & Conditions

1. Directive 2003/87/EC as amended by Directive 2009/29/EC (hereinafter "the (revised) EU ETS Directive") requires operators of installations which are included in the European Greenhouse Gas Emission Trading Scheme (the EU ETS) to hold a valid GHG emission permit issued by the relevant Competent Authority and to monitor and report their emissions and have the reports verified by an independent and accredited verifier.

The Directive can be downloaded from:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0087:20090625:EN:PDF>

2. The Monitoring and Reporting Regulation (Commission Regulation (EU) No 601/2012) (hereinafter the "MRR") defines further requirements for monitoring and reporting.

The MRR can be downloaded from:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:181:0030:0104:EN:PDF>

Article 12 of the MRR sets out specific requirements for the content and submission of the monitoring plan and its updates. Article 12 outlines the importance of the Monitoring plan as follows:

The monitoring plan shall consist of a detailed complete and transparent documentation of the monitoring methodology of a specific installation [or aircraft operator] and shall contain at least the elements laid down in Annex I.

Furthermore Article 74(1) states:

Member States may require the operator and aircraft operator to use electronic templates or specific file formats for submission of monitoring plans and changes to the monitoring plan as well as for submission of annual emissions reports tonne-kilometre data reports verification reports and improvement reports. Those templates or file format specifications established by the Member States shall at least contain the information contained in electronic templates or file format specifications published by the Commission

3. All Commission guidance documents on the Monitoring and Reporting Regulation will be published at the link below as they become available:

http://ec.europa.eu/clima/policies/ets/monitoring/index_en.htm

(a) Information sources:

EU Websites:

EU-Legislation: <http://eur-lex.europa.eu/en/index.htm>

EU ETS general: http://ec.europa.eu/clima/policies/ets/index_en.htm

Monitoring and Reporting in the EU ETS: http://ec.europa.eu/clima/policies/ets/monitoring/index_en.htm

Environmental Protection Agency Website:

<http://www.epa.ie>

Environmental Protection Agency Contact:

GHGpermit@epa.ie

2. Application Details

The Installation Name, Site Name and the address of the site of the installation are detailed below. The Site Name and address can be updated from the Organisation Details Page on the ETSWAP website. The Installation Name can only be updated by your Competent Authority.

Installation name Intel Ireland

Site name Intel Ireland

Address Collinstown Industrial Park
Leixlip
Kildare
Ireland

Grid reference of site main entrance 298500E, 237000N

Licence held pursuant to the Environmental Protection Agency Act 1992, as amended. Yes

IPC/IE Licence Register Number	Licence holder	Competent body
P0207-04	Intel Ireland Limited	Environmental Protection Agency

Has the regulated activity commenced at the Installation? Yes

Date of Regulated Activity commencement 01 January 2005

This information is only required to identify the first relevant reporting year of an installation. If the installation was in operation from the beginning of 2008 and held a Greenhouse Gas Emissions Permit from this point, 1 January 2008 will be used where the actual date of commencement is not readily known.

3. About the Operator

The information about the "Operator" is listed below. The "Operator" is defined as the person who it is proposed will have control over the relevant Regulated Activities in the installation in respect of which this application is being made.

(b) Operator Details

The name of the operator and where applicable the company registration number are detailed below. These details can only be updated by the Environmental Protection Agency.

Operator name Intel Ireland Limited

Company Registration Number 902934

Operator Legal status

The legal status of the operator is: Company / Corporate Body

(c) Company / Corporate Body

Is the trading / business name different to the operator name? No

Registered office address

Address Line 1	Collinstown Industrial Park
Address Line 2	N/A
City/Town	Leixlip
County	Kildare
Postcode	N/A

Principal office address

Is the principal office address different to the registered office address? No

Holding company

Does the company belong to a holding company? No

(d) Operator Authority

Does the operator named above have the authority and ability to:

- | | |
|---|-----|
| a. manage site operations through having day-to-day control of plant operation including the manner and rate of operation | Yes |
| b. ensure that permit conditions are effectively complied with | Yes |
| c. control monitor and report specified emissions | Yes |
| d. be responsible for trading in Allowances so that at the end of a reporting period allowances can be balanced against reported emissions. | Yes |

4. Service Contact

e. Service Contact

Address Collinstown Industrial Park
Leixlip
Kildare
Ireland

5. Installation Activities

f. Installation Description

Below is a description of the installation and its activities, a brief outline description of the site and the installation and the location of the installation on the site. The description also includes a non-technical summary of the activities carried out at the installation briefly describing each activity performed and the technical units used within each activity.

Intel Ireland operates a semiconductor manufacturing plant, located west of Leixlip, Co. Kildare. The manufacturing part of the site is bounded by the R148 Road to the south, the river Ryewater to the north, Kellystown Lane to the west and the Royal Canal to the east. The manufacturing plant includes Medium Pressure Hot Water Boilers (MPHW) which operate on Natural Gas, but can use Gas Oil as a back-up. In addition, Natural Gas is used in the RCTO (Rotary Concentrator Thermal Oxidiser) Air Abatement Systems, the Trimix Waste Treatment (TMXW) System and the emergency burners on the Air Separation Unit (ASU). Gas Oil is also used for Emergency Generators and Firewater Pumps. Bottled Natural Gas is used as a pilot fuel when the Boilers are run on Gas Oil. The RCTO's also burn VOC Solvent Vapours in addition to Natural Gas.

g. Annex 1 Activities

The table below lists the technical details for each Annex 1 activity carried out at the installation.

Note that 'capacity' in this context means:

- Rated thermal input (for combustion installations) which is defined as the rate at which fuel can be burned at the maximum continuous rating of the installation multiplied by the calorific value of the fuel and expressed as megawatts thermal.
- Production capacity for those specified Annex I activities for which production capacity determines ETS eligibility.

Annex 1 Activity	Total Capacity	Capacity units	Specified Emissions
Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)	223.23	MW	Carbon Dioxide

Emission Source Reference	Emission Source Description
S6	Fab 14 Energy Centre Boiler (A101)
S7	Fab 14 Energy Centre Boiler (A102)
S8	Fab 14 Energy Centre Boiler (A103)
S13	Fab 24 Energy Centre Boilers (A201)
S14	Fab 24 Energy Centre Boilers (A202)
S15	Fab 24 Energy Centre Boilers (A203)
S16	Fab 24 Energy Centre Boilers (A204)
S17	Fab 24 Energy Centre Boilers (A205)
S18	Fab 24 Energy Centre Boilers (A248)
S19	Fab 24 Energy Centre Boilers (A253)
S21	Emergency Generator No. 3 (A31)
S22	Emergency Generator No. 4 (A32)
S23	Emergency Generator No. 6 (A33)
S25	Emergency Generator No. 5 (A34)
S27	Emergency Generator No. 11 (A122)
S28	Emergency Generator No. 10 (A123)
S29	Emergency Generator No. 9 (A124)
S30	Emergency Generator No. 8 (A125)
S31	Fab 24 Emergency Generator No. 15 (A227)
S32	Fab 24 Emergency Generator No. 16 (A228)
S33	Fab 24 Emergency Generator No. 17 (A229)
S34	Fab 24 Emergency Generator No.18 (A230)
S35	Fab 24 Emergency Generator No. 19 (A231)
S36	Fab 24 Emergency Generator No. 21 (A233)
S37	Fab 24 RCTO Oxidiser Exhaust No. 1 (A214)
S38	Fab 24 RCTO Oxidiser Exhaust No. 2 (A215)
S39	Fab 24 RCTO Oxidiser Exhaust No. 3 (A216)
S41	Fab 10 RCTO Oxidiser Exhaust (A65)
S43	Emergency Generator No. 13 (A58)
S44	Emergency Generator No. 12 (A59)
S46	IR2 Firewater Pump (A99)
S47	Fab 24 Firewater Pump (A299)
S60	Fab 10 RCTO Oxidiser Exhaust (A66)
S62	Fab 14 RCTO Oxidiser Exhaust (A155)
S63	Fab 14 RCTO Oxidiser Exhaust (A156)
S64	Fab 14 RCTO Oxidiser Exhaust (A157)
S65	Fab 24-1 RCTO Oxidiser Exhaust (A287)

Emission Source Reference	Emission Source Description
S66	Fab 24-2 RCTO Oxidiser Exhaust (A267)
S67	Fab 24-2 RCTO Oxidiser Exhaust (A268)
S68	Fab 24-2 RCTO Oxidiser Exhaust (A269)
S69	Trimix Waste Treatment System A (A256A)
S71	Fab 10 ASU Emergency Burner No. 1 (A301)
S72	Fab 10 ASU Emergency Burner No. 2 (A301)
S73	Fab 10 ASU Emergency Burner No. 3 (A301)
S74	Fab 10 ASU Emergency Burner No. 4 (A301)
S75	Fab 10 ASU Emergency Burner No. 5 (A301)
S70	Trimix Waste Treatment System B (A256B)
S76	Fab 14 Energy Centre Boiler (A104)
S77	Fab 24 Emergency Generator No. 20 (A232)
S61	Fab 10 RCTO Oxidiser Exhaust (A67)

The table below lists the emission sources which are linked to the Regulated Activities at the installation.

Emission Source Reference	Emission Source Description
S1	Fab 10 Energy Centre Boiler (A01)
S2	Fab 10 Energy Centre Boiler (A03)
S3	Fab 10 Energy Centre Boiler (A04)
S4	Fab 10 Energy Centre Boiler (A05)
S5	Fab 10 Energy Centre Boiler (A06)
S6	Fab 14 Energy Centre Boiler (A101)
S7	Fab 14 Energy Centre Boiler (A102)
S8	Fab 14 Energy Centre Boiler (A103)
S13	Fab 24 Energy Centre Boilers (A201)
S14	Fab 24 Energy Centre Boilers (A202)
S15	Fab 24 Energy Centre Boilers (A203)
S16	Fab 24 Energy Centre Boilers (A204)
S17	Fab 24 Energy Centre Boilers (A205)
S18	Fab 24 Energy Centre Boilers (A248)
S19	Fab 24 Energy Centre Boilers (A253)
S21	Emergency Generator No. 3 (A31)
S22	Emergency Generator No. 4 (A32)
S23	Emergency Generator No. 6 (A33)
S25	Emergency Generator No. 5 (A34)

Emission Source Reference	Emission Source Description
S27	Emergency Generator No. 11 (A122)
S28	Emergency Generator No. 10 (A123)
S29	Emergency Generator No. 9 (A124)
S30	Emergency Generator No. 8 (A125)
S31	Fab 24 Emergency Generator No. 15 (A227)
S32	Fab 24 Emergency Generator No. 16 (A228)
S33	Fab 24 Emergency Generator No. 17 (A229)
S34	Fab 24 Emergency Generator No.18 (A230)
S35	Fab 24 Emergency Generator No. 19 (A231)
S36	Fab 24 Emergency Generator No. 21 (A233)
S37	Fab 24 RCTO Oxidiser Exhaust No. 1 (A214)
S38	Fab 24 RCTO Oxidiser Exhaust No. 2 (A215)
S39	Fab 24 RCTO Oxidiser Exhaust No. 3 (A216)
S41	Fab 10 RCTO Oxidiser Exhaust (A65)
S43	Emergency Generator No. 13 (A58)
S44	Emergency Generator No. 12 (A59)
S46	IR2 Firewater Pump (A99)
S47	Fab 24 Firewater Pump (A299)
S60	Fab 10 RCTO Oxidiser Exhaust (A66)
S62	Fab 14 RCTO Oxidiser Exhaust (A155)
S63	Fab 14 RCTO Oxidiser Exhaust (A156)
S64	Fab 14 RCTO Oxidiser Exhaust (A157)
S65	Fab 24-1 RCTO Oxidiser Exhaust (A287)
S66	Fab 24-2 RCTO Oxidiser Exhaust (A267)
S67	Fab 24-2 RCTO Oxidiser Exhaust (A268)
S68	Fab 24-2 RCTO Oxidiser Exhaust (A269)
S69	Trimix Waste Treatment System A (A256A)
S71	Fab 10 ASU Emergency Burner No. 1 (A301)
S72	Fab 10 ASU Emergency Burner No. 2 (A301)
S73	Fab 10 ASU Emergency Burner No. 3 (A301)
S74	Fab 10 ASU Emergency Burner No. 4 (A301)
S75	Fab 10 ASU Emergency Burner No. 5 (A301)
S70	Trimix Waste Treatment System B (A256B)
S76	Fab 14 Energy Centre Boiler (A104)
S77	Fab 24 Emergency Generator No. 20 (A232)
S61	Fab 10 RCTO Oxidiser Exhaust (A67)

I. Emission Points

The table below lists all the emission points at the installation, which may include directly associated activities/excluded activities.

Emission Point Reference	Emission Point Description
A01	Fab 10 Energy Centre Boiler
A03	Fab 10 Energy Centre Boiler
A04	Fab 10 Energy Centre Boiler
A05	Fab 10 Energy Centre Boiler
A06	Fab 10 Energy Centre Boiler
A101	Fab 14 Energy Centre Boiler
A102	Fab 14 Energy Centre Boiler
A103	Fab 14 Energy Centre Boiler
A122	Emergency Generator No. 11
A123	Emergency Generator No. 10
A124	Emergency Generator No. 9
A125	Emergency Generator No. 8
A201	Fab 24 Energy Centre Boiler No. 1
A202	Fab 24 Energy Centre Boiler No. 2
A203	Fab 24 Energy Centre Boiler No. 3
A204	Fab 24 Energy Centre Boiler No. 4
A205	Fab 24 Energy Centre Boiler No. 5
A248	Fab 24 Energy Centre Boiler No. 6
A253	Fab 24 Energy Centre Boiler No. 7
A214	Fab 24 RCTO Oxidiser Exhaust No. 1
A215	Fab 24 RCTO Oxidiser Exhaust No. 2
A216	Fab 24 RCTO Oxidiser Exhaust No. 3
A227	Fab 24 Emergency Generator No. 15
A228	Fab 24 Emergency Generator No. 16
A229	Fab 24 Emergency Generator No. 17
A230	Fab 24 Emergency Generator No. 18
A231	Fab 24 Emergency Generator No. 19
A233	Fab 24 Emergency Generator No. 21
A299	Fab 24 Firewater Pump
A31	Emergency Generator No. 3
A32	Emergency Generator No. 4
A33	Emergency Generator No. 6

Emission Point Reference	Emission Point Description
A34	Emergency Generator No. 5
A65	Fab 10 RCTO Oxidiser Exhaust
A58	Emergency Generator No. 13
A59	Emergency Generator No. 12
A99	IR2 Firewater Pump
A66	Fab 10 RCTO Oxidiser Exhaust
A155	Fab 14 RCTO Oxidiser Exhaust
A156	Fab 14 RCTO Oxidiser Exhaust
A157	Fab 14 RCTO Oxidiser Exhaust
A287	Fab 24-1 RCTO Oxidiser Exhaust
A267	Fab 24-2 RCTO Oxidiser Exhaust
A268	Fab 24-2 RCTO Oxidiser Exhaust
A269	Fab 24-2 RCTO Oxidiser Exhaust
A256A	Trimix Waste Treatment System A
A301	Fab 10 ASU Burners Stack (S71-75)
A256B	Trimix Waste Treatment System B
A104	Fab 14 Energy Centre Boiler (S76)
A232	Fab 24 Emergency Generator No. 20 (S77)
A67	Fab 10 RCTO Oxidiser Exhaust (S61)

m. Source Streams (fuels and/or materials)

The table below lists the source streams which are used in Schedule 1 Activities at the installation.

Source Stream Reference	Source Stream Type	Source Stream Description
NG-001	Combustion: Commercial standard fuels	Natural Gas
GO-001	Combustion: Commercial standard fuels	Gas/Diesel Oil
NG-002	Combustion: Other gaseous & liquid fuels	Natural Gas (bottled)
VO-001	Combustion: Other gaseous & liquid fuels	VOC Solvent Vapours

n. Emissions Summary

The table below provides a summary of the emission source and source stream details in the installation.

Source streams (Fuel / Material)	Emission Source Refs.	Emission Point Refs.	Annex 1 Activity
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	A01,A03,A04,A05,A06,A101,A102,A103,A201,A202,A203,A204,A205,A248,A253,A214,A215,A216,A65,A66,A155,A156,A157,A287,A267,A268,A269,A256A,A301,A256B,A104,A67	Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S44,S46,S47,S77	A01,A03,A04,A05,A06,A101,A102,A103,A122,A123,A124,A125,A201,A202,A203,A204,A205,A248,A253,A227,A228,A229,A230,A231,A233,A299,A31,A32,A33,A34,A58,A59,A99,A232	Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)
NG-002	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19	A01,A03,A04,A05,A06,A101,A102,A103,A201,A202,A203,A204,A205,A248,A253	Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)
VO-001	S37,S38,S39,S41,S60,S61,S62,S63,S64,S65,S66,S67,S68	A155,A156,A157,A214,A215,A216,A267,A268,A269,A287,A65,A66,A67	Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)

o. Excluded Activities

Certain activities that result in greenhouse gas emissions may be excluded under the EU ETS Directive for example truly mobile sources such as vehicle emissions.

Do you have any excluded activities which need to be identified in your monitoring plan? No

7. Low Emissions Eligibility

p. Low Emissions Eligibility

The operator may submit a simplified monitoring plan for an installation where no nitrous oxide activities are carried out and it can be demonstrated that:

- (a) the average verified annual emissions of the installation during the previous trading period was less than 25 000 tonnes CO_{2(e)} per year or;

(b) where this data is not available or inappropriate a conservative estimate shows that emissions for the next 5 years will be less than 25 000 tonnes CO_{2(e)} per year.

Note: the above data shall include transferred CO₂ but exclude CO₂ stemming from biomass.

Does the installation satisfy the criteria for installations with low emissions (as defined by Article 47 of the MRR)? No

8. Monitoring Approaches

q. Monitoring Approaches

Emissions may be determined using either a calculation based methodology ("calculation") or measurement based methodology ("measurement") except where the use of a specific methodology is mandatory according to the provisions of the MRR. [MRR Article 21].

Note: the operator may subject to competent authority approval combine measurement and calculation for different sources. The operator is required to ensure and demonstrate that neither gaps nor double counting of reportable emissions occurs.

Please specify whether or not you propose to apply the following monitoring approaches. Select all monitoring approaches that are applicable to you. The consecutive sections will become mandatory based on the selected approaches.

Calculation	Yes
Measurement	No
Fall-back approach	Yes
Monitoring of N ₂ O	No
Monitoring of PFC	No
Monitoring of transferred / inherent CO ₂	No

9. Calculation

r. Approach Description

The calculation approach including formulae used to determine annual CO₂ emissions:

The Site (Intel Ireland) is a Class A Installation and, therefore, as a minimum, the Tiers specified in Annex V of the Monitoring and Reporting Regulation (MRR) must be met. The site uses Natural Gas (NG-001) within its Hot Water Boilers, the Rotary Concentrator Thermal Oxidiser (RCTO) Abatement and the Trimix Waste Treatment (TMXW) Systems as well as the 5 No. emergency burners associated with the Fab 10 ASU. It also uses Gas Oil/Diesel (GO-001) for the operation of the Emergency Generators and Fire Pumps and as a back-up fuel to the Hot Water Boilers. In addition, bottled Natural Gas (NG-002) is used as a pilot fuel for the boilers when they operate on Gas Oil/Diesel. The RCTO's also burn VOC Solvent Vapours (VO-001) in addition to the Natural Gas.

The CO₂ emissions (tCO₂) is calculated as follows: Activity Data (Fuel consumed (tonnes or Nm³) x NCV (TJ/tonne or TJ/Nm³)) x Emission Factor (EF) (tCO₂/TJ) x Oxidisation Factor (OF).

Natural Gas (NG-001)

Combustion of Natural Gas gives rise to approx. 95% of the total CO₂ emissions at the installation. The Activity Data for Natural Gas is derived from the amount of gas (kWh) used based on the monthly gas bills supplied by the gas supplier. The amount of fuel consumed is measured by Gas Networks Ireland (GNI) turbine meters (1.41. % uncertainty) and therefore meets Tier 4. There are a total of 6 meters within the Gas Networks Ireland (GNI) compound on the Intel Ireland site, however, two of these meters are not related to Intel but support the GNI distribution network. Of the remaining 4 meters, only two of these meters (Serial Numbers: - 83034799, 8034800) are currently in use to supply Intel. These meters are the property of GNI who are responsible for maintenance and calibration. The stated accuracy of the meter is 1% and the pressure/temperature conversion uncertainty is also 1%. Hence, the overall uncertainty is 1.41% which meets the required uncertainty for Tier 4 which is +/- 1.5%. As the value on the gas bills is volume in m³ corrected to 288.15 Kelvin, this actual gas volume must be corrected to standardised gas volume (Nm³) before reporting in the Annual Emission Report. The Tier 2b NCV is derived from the kWh figure in the gas bill in accordance with the EPA document entitled "Country Specific Net Calorific Values and CO₂ Emission Factors for use in the Annual Installation Emissions report" available on the EPA website for the year being reported as follows: The gross kWh as reported on the bill is multiplied by the gross to net conversion factor (value which varies from year to year is listed on the EPA website) and then converted to TeraJoules (TJ) by multiplying by 3.6 x 10⁻⁶. The total annual net TJ divided by the total Nm³ of Natural gas is the NCV value in TJ/Nm³.

The Emission Factor (Tier 2a) used is the Country Specific Factor (tCO₂/TJ) (contained in the document titled "Country Specific Net Calorific Values and CO₂ Emission Factors for use in the Annual Installation Emissions report" for the year being reported which is available on the EPA website) and the Tier 1 Oxidation factor of 1 is applied.

Gas oil/Diesel (GO-001)

The amount of Gas Oil (in litres) is derived from the supplier invoices for deliveries during the reporting year and the opening and closing balances of gas oil based on the level

indicators installed in the Storage Tanks used by the Emergency Generators and Hot Water Boilers. (In the case of opening and closing balances for the Fire Pump storage tanks, a conservative assumption is made with regard to the levels). The formula used is:- Quantity used = Opening Balance + Deliveries – Closing Balance and this method of determination of fuel combustion is considered to meet Tier 2 overall (5% uncertainty). This volume is converted to mass (in kilotonnes) using a density factor provided by the supplier. This mass of gas oil is converted to Energy Content (in TJ) by multiplying by the Tier 2a NCV (Country Specific Factor). This is, in turn, converted into tCO₂ by applying the Tier 2a Emission Factor (tCO₂/TJ) (Country Specific) and the Tier 1 Oxidation Factor of 1. The value for Net Calorific Value and Emission factor for gas oil is taken from the document titled "Country Specific Net Calorific Values and CO₂ Emission Factors for use in the Annual Installation Emissions Report" for the year being reported which is available on the EPA website.

The amount of CO₂ generated between 2014-2018 from the use of gas oil and bottled natural gas was on average less than 2% of the total CO₂ emissions and less than 1,000 tonnes/annum and therefore, are deemed as De-Minimis sources.

Bottle Natural gas (NG-002)

In relation to the bottled Natural Gas (NG-002) a no tier approach is applied for activity data as follows:-A very conservative assumption is used that all cylinders are used up on an annual basis. Each cylinder contains 6.41 kgs of Natural Gas (CH₄) and there are 4 cylinders at each of the 3 energy centres on site. The total is taken as 6.41*3*4 = 77 kgs. Tier 1 Calculation factors (emission factor and NCV) are taken from Annex VI of the MRR to convert kgs of Natural Gas to Tonnes of CO₂.

VOC Solvent Vapours (VO-001)

The source stream VOC Solvent Vapours (VO-001) is classified as a minor source stream. As such in accordance with Monitoring and Reporting Regulations (MRR) for minor source streams the operator shall apply the highest tier which is technically feasible and does not incur unreasonable costs with a minimum of tier 1.

A NCV value of 33.61 TJ/Gg (33,614,000 J/kg) is taken from literature (source: American Institute of Chemical Engineer (AIChE)) based on the known composition of the VOC Solvent Vapours VO-001 source stream. Tier 2a allows for country specific factors for the respective fuel in accordance with point (c) of Article 31(1) i.e. including literature values agreed with the competent authority. The composition of the source stream will be regularly checked to ensure that this NCV value remains representative and if necessary updated with the agreement of the Competent Authority.

The Emission Factor for the source stream VOC Solvent Vapours VO-001 is also required to meet Tier 2a and this is determined as follows in accordance with point (c) of Article 31(1) i.e. including literature values agreed with the competent authority: A stoichiometric equation of 44/12 is used to convert from TOC (as C) to CO₂. It is assumed that all the solvent in the source stream is Cyclohexanone (C₆H₁₀O) as this is the most common solvent evaporated with the highest Heating Value. The Emission Factor of 80 tCO₂/TJ for this source stream is derived as follows; 1 Tonnes of Cyclohexanone has an NCV of 0.03361 TJ (i.e. 1,000kgs*33,614,000J/kg = 33,614,000,000J = 33,614,000kJ = 33,614MJ = 33.614GJ = 0.03361 TJ), a carbon content of 0.73 tonnes C (i.e. 1 tonne * 73%) and based on stoichiometry (carbon content) this would generate 2.68 tonnes CO₂ (i.e. 0.73 tonnes C * 44/12 tonnes CO₂/tonne C). Therefore, there is 2.68 tonnes CO₂ in 0.03361 TJ of Cyclohexanone which allows the calculation of an Emission Factor for Cyclohexanone of 80 tCO₂/TJ (i.e. 2.68 tonnes CO₂ / 0.03361 TJ = 80 tonnes CO₂/TJ). The composition of the source stream will be regularly checked to ensure that this NCV value remains representative and if necessary updated with the agreement of the Competent Authority.

Amount of fuel combusted: A No Tier Fall Back approach to determine amount of fuel combusted is being applied as follows: The mass of solvent is determined from a monthly flow measurement at the RCTO's and the continuous on-line Inlet TOC FID Analysers. The monthly flow measurements are taken by an accredited emissions monitoring company and the figures used in the calculation are considered to be conservative as the highest of the monthly flow measurements at each RCTO are used. The mass of TOC is converted stoichiometrically into a mass of Cyclohexanone (73% of Cyclohexanone is Carbon) and the mass of Cyclohexanone is used as the kg fuel consumed in the Activity Data.

The required Tier for this minor source stream (VOC Solvent Vapours (VO-001) is Tier 2 (+/- 5% uncertainty). Where this highest tier cannot be met Article 26 states that for a minor source stream the operator shall apply the highest tier which is technically feasible and does not incur unreasonable costs with a minimum of Tier 1 (7.5% uncertainty). As per Article 22, the Operator may use a monitoring methodology that is not based on tiers (the "fall-back methodology) for selected source streams provided all the following conditions are met:

(a) Applying at least Tier 1 under the calculation-based methodology for one or more major source streams or minor source streams and a measurement-based methodology for at least one emission source related to the same source streams is technically not feasible or would incur unreasonable costs

(b) The operator assesses and quantifies each year the uncertainty of all parameters used for the determination of the annual emission sin accordance with the ISO Guide to Expression of Uncertainty in Measurement (JCGM 100:2008) or another equivalent internationally accepted standard and includes the results in the annual emissions report.

(c) The operator demonstrates to the satisfaction of the competent authority that by applying such fall-back monitoring methodology, the overall uncertainty thresholds for the annual level of greenhouse gas emissions for the whole installation do not exceed 7.5% for category A installations, 5.0 % for category B installations and 2.5% for category C installations.

An initial unreasonable costs assessment in December 2017 determined that installing continuous flow meters at the inlets to the RCTO System would incur unreasonable costs. As per the requirements of Article 22 (b) and (c) of the MRR An Uncertainty Assessment "Uncertainty Assessment for Article 22 "Fall-Back Methodology" was carried out in May 2019. Having regard to ISO Guide to Expression of Uncertainty in Measurement (JCGM 100:2008) the report determined that the expanded uncertainty related to the 2018 emissions over the whole installation did not exceed 7.5% for this Category A installation. Even if significant conservative adjustment factors are applied to the total

uncertainty of the VOC measurement, the overall Category A uncertainty threshold of 7.5% is still not exceeded (e.g. if $u_{\text{VOC}} = 100\%$, then $u_{\text{total}} = 4.29\%$).

s. Measurement Devices

Below is a description of the specification and location of the measurement systems used for each source stream where emissions are determined by calculation

Also a description of all measurement devices including sub-meters and meters used to deduct non-Annex I activities to be used for each source and source stream.

Source Stream Refs.	Emission Source Refs.	Measurement Device Ref.	Type of Measurement Device	Measurement Range	Metering Range Units	Specified Uncertainty (+/- %)	Location
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	S/N 83034798	Turbine Meter GNI incoming Gas Meter A	10000	Sm3/hr	1.41	GNI Gas Compound
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	S/N 83034797	Turbine Meter-GNI-Incoming Gas Meter B	10000	Sm3/hr	1.41	GNI Gas Compound
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	S/N 83034800	Turbine Meter-GNI Incoming Gas Meter C	5000	Sm3/hr	1.41	GNI Gas Compound

Source Stream Refs.	Emission Source Refs.	Measurement Device Ref.	Type of Measurement Device	Measurement Range	Metering Range Units	Specified Uncertainty (+/- %)	Location
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	S/N 83034799	Turbine Meter - GNI Incoming Gas Meter D	5000	Sm ³ /hr	1.41	GNI Gas Compound
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S44,S77	Oil Tank Level Indicators (IR1-LT-161-1-01 LT-25U-1-1 LT-25U-1-2 LT-25U-1-3 LT-161-1-200 LT-161-2-200 IRC3-LIT-161-01-200 IRC3-LIT-161-02-200 IRC3-LIT-161-03-200	Bellows meter	Various	Various	5	Oil Tanks
GO-001	S46,S47	Firewater Pump Tank Level Switches (IR1 & IR2 & Fab 24)	Level Switch	N/A	N/A	N/A	Firewater Pump Tanks
NG-002	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19	(N/A) - Conservative Estimate	Not Applicable- Activity based upon Estimated Usage	NA	NA	N/A	Exterior of each Energy Centre
VO-001	S41,S60,S61	Fab 10 TOC Analysers	Flame Ionisation Detector (FID)	0 - 400	ppm	2	Near Fab 10 RCTO's
VO-001	S62,S63,S64	Fab 14 TOC Analyser	Flame Ionisation Detector	0 - 400	ppm	2	Near Fab 14 RCTO's
VO-001	S37,S38,S39,S65	Fab 24-1 TOC	Flame Ionisation	0 - 400	ppm	2	Near Fab 24-1

Source Stream Refs.	Emission Source Refs.	Measurement Device Ref.	Type of Measurement Device	Measurement Range	Metering Range Units	Specified Uncertainty (+/- %)	Location
		Analyser	Detector (FID)				RCTO's
VO-001	S66,S67,S68	Fab 24-2 TOC Analyser	Flame Ionisation Detection (FID)	0 - 400	ppm	2	Near Fab 24-2 RCTO's
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S44,S46,S47,S77	Gas Oil Supplier Fiscal Meters	Supplier Owned and Controlled	Supplier Owned and Controlled	Supplier Owned and Controlled	5	Supplier Owned and Controlled
VO-001	S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S61	RCTO Inlet Flow Measurements	Pitot Tube	Variable	Nm3/hr	8.35	Inlet to RCTO Units

Source Stream Refs.	Measurement Device Ref.	Determination Method	Instrument Under Control Of	Conditions Of Article 29(1) Satisfied	Invoices Used To Determine Amount Of Fuel Or Material	Trade Partner And Operator Independent
NG-001	S/N 83034798	Continual	Trade partner	Yes	Yes	Yes
NG-001	S/N 83034797	Continual	Trade partner	Yes	Yes	Yes
NG-001	S/N 83034800	Continual	Trade partner	Yes	Yes	Yes
NG-001	S/N 83034799	Continual	Trade partner	Yes	Yes	Yes
GO-001	Oil Tank Level Indicators (IR1-LT-161-1-01 LT-25U-1-1 LT-25U-1-2 LT-25U-1-3 LT-161-1-200 LT-161-2-200 IRC3-LIT-161-01-200 IRC3-LIT-161-02-	Continual	Operator	N/A	N/A	N/A

Source Stream Refs.	Measurement Device Ref.	Determination Method	Instrument Control Of	Under	Conditions Of Article 29(1) Satisfied	Invoices Used To Determine Amount Of Fuel Or Material	Trade Partner And Operator Independent
	200 IRC3-LIT-161-03-200						
GO-001	Firewater Pump Tank Level Switches (IR1 & IR2 & Fab 24)	Batch	Operator		N/A	N/A	N/A
NG-002	(N/A) - Conservative Estimate	Batch	Operator		N/A	N/A	N/A
VO-001	Fab 10 TOC Analysers	Continual	Operator		N/A	N/A	N/A
VO-001	Fab 14 TOC Analyser	Continual	Operator		N/A	N/A	N/A
VO-001	Fab 24-1 TOC Analyser	Continual	Operator		N/A	N/A	N/A
VO-001	Fab 24-2 TOC Analyser	Continual	Operator		N/A	N/A	N/A
GO-001	Gas Oil Supplier Fiscal Meters	Continual	Trade partner		Yes	Yes	Yes
VO-001	RCTO Inlet Flow Measurements	Batch	Operator		N/A	N/A	N/A

t. Applied Tiers

The table below identifies the tiers applied against the relevant input data for each source stream and confirms whether a standard (MRR Article 24) or mass balance (MRR Article 25) approach is applied.

(i) The highest tiers as defined in Annex II of the MRR should be used by Category B and C installations to determine the activity data and each calculation factor (except the oxidation factor and conversion factor) for each major source stream. Category A installations should apply as a minimum the tiers listed in Annex V.

(ii) Operators may apply a tier one level lower than those referred to in sub paragraph (i) above for Category C installations and up to two levels lower for Category A and B installations with a minimum of tier 1 if the operator can demonstrate to the satisfaction of the competent authority that this is not technically feasible or would lead to unreasonable cost to apply the higher tier. The justification for not applying the higher tier should be recorded when completing the tier table.

(iii) The competent authority may allow an operator to apply even lower tiers than those referred to in the sub paragraph (ii) with a minimum of tier 1 for a transition period of up to three years if the operator can demonstrate to the satisfaction of the competent authority that this is not technically feasible or would lead to unreasonable cost to apply the

higher tier and provides an improvement plan detailing how and by when at least the tier referred to in sub paragraph (ii) will be achieved. The improvement plan should be referenced in subsequent table and provided to the competent authority at the time of submission of this plan.

(iv) For minor source streams operators shall apply the highest tier which is technically feasible and will not lead to unreasonable costs with a minimum of tier 1 for activity data and each calculation factor. For de-minimis source streams operators may use conservative estimations rather than tiers unless a defined tier can be achieved without additional effort (MRR Article 26(2)).

(v) Installations with low emissions as identified in section 6(d) may apply as a minimum tier 1 for determining activity data and calculation factors for all source streams unless higher accuracy is achievable without additional effort.

* Note 1: For commercial standard fuels the minimum tiers listed in Annex V of the MRR may be applied for all activities in all installations.

* Note 2: If you are intending to apply a fall-back approach please complete the table below and select "n/a" for the tiers to be applied for each source stream where a fall-back approach is used. Section 10 "Fall-back" must also be completed for these source streams.

* Note 3: For biomass or mixed fuels the emission factor is the preliminary emission factor as defined in Definition 35 Article 3 of the MRR.

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
NG-001	S1,S13, S14,S15,S16,S17,S18, S19,S2, S3,S37, S38,S39,S4,S41,S5,S6,S60,S6	S/N 83034 797,S/N 83034 799,S/N 83034 800	<1.5%	Standard	4	2b	2a	N/A	1	N/A	N/A	36500	92.87	Major	Yes	n/a	n/a

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
	1,S62,S63,S64,S65,S66,S67,S68,S69,S7,S70,S71,S72,S73,S74,S75,S76,S8																
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S4	Firewater Pump Tank Level Switches (IR1 & IR2 & Fab 24), Oil Tank Level Indicators (IR1-LT-161-1-	<5.0%	Standard	2	2a	2a	N/A	1	N/A	N/A	1000	2.54	De-minimis	N/A	n/a	n/a

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
	4,S46,S47,S77	01 LT-25U-1-1 1 LT-25U-1-2 2 LT-25U-1-3 3 LT-161-1-200 LT-161-2-200 IRC3-LIT-161-01-200 IRC3-LIT-161-02-200 IRC3-LIT-161-03-200															
NG-002	S1,S2,S3,S4,S5,S6,S7,	(N/A) - Conservative	N/A	Standard	No tier	1	1	N/A	1	N/A	n/a	0.3	0	De-minimis	N/A	n/a	n/a

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
	S8,S13, S14,S15,S16,S17,S18, S19	Estimate															
VO-001	S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S61	Fab 10 TOC Analysers,Fab 14 TOC Analyser,Fab 24-1 TOC Analyser,Fab 24-2 TOC Analyser,RCTO Inlet Flow Measurements	<10.0%	Fall-back Approach	No tier	2a	2a	N/A	1	N/A	N/A	1800	4.58	Minor	No	Un-Reasonable Cost associated with installing continuous Flow Meters at the inlets to the RCTO Systems. (Unreasonable Costs	n/a

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
																Spread sheet calculation provided to Agency - 22nd Dec 2017). Even if significant conservative adjustment factors are applied to the total uncertainty of the VOC measu	

Source Stream Refs.	Emission Source Refs.	Measurement Device Refs.	Overall Metering Uncertainty (less than +/- %)	Applied Monitoring Approach	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied	Estimated Emissions tCO _{2(e)}	% of Total Estimated Emissions	Source Category	Highest Tiers Applied	Justification for not applying the highest tiers	Improvement Plan Reference (where applicable)
																old of 7.5% is still not met (e.g. if uVOC =100%, then utotal = 4.29%)	

Total Estimated Emissions for Calculation (tonnes CO_{2(e)})

39300.3

u. Uncertainty Calculations

The table below lists evidence attached to the application that demonstrates compliance with the applied tiers in accordance with Article 12 of the MRR.

Attachment	Description
Sustech (2019) Intel Ireland - Uncertainty Assessment for Article 22 Fall-Back Methodology (v. 1.2).pdf	Intel Ireland 2018 Uncertainty Assessment (Fall-Back Methodology)

v. Applied tiers

Applied tiers for each source stream

Source Stream Ref.	Emission Source Refs.	Activity Data Tier Applied	Net Calorific Value Tier Applied	Emission Factor Tier Applied	Carbon Content Tier Applied	Oxidation Factor Tier Applied	Conversion Factor Tier Applied	Biomass Fraction Tier Applied
NG-001	S1,S13,S14,S15,S16,S17,S18,S19,S2,S3,S37,S38,S39,S4,S41,S5,S6,S60,S61,S62,S63,S64,S65,S66,S67,S68,S69,S7,S70,S71,S72,S73,S74,S75,S76,S8	4	2b	2a	N/A	1	N/A	N/A
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S44,S46,S47,S77	2	2a	2a	N/A	1	N/A	N/A
NG-002	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19	No tier	1	1	N/A	1	N/A	n/a
VO-001	S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S61	No tier	2a	2a	N/A	1	N/A	N/A

w. Justification for Applied tiers

Justifications for the applied tiers for each major source stream where highest tiers are not currently achieved.

Source Stream Ref.	Emission Source Refs.	Justification for the applied tier	Improvement Plan Reference (where applicable)
VO-001	S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S61	Un-Reasonable Cost associated with installing continuous Flow Meters at the inlets to the RCTO Systems. (Unreasonable Costs Spreadsheet calculation provided to Agency - 22nd Dec 2017). Even if significant conservative adjustment factors are applied to the total uncertainty of the VOC measurement, the overall Category A uncertainty threshold of 7.5% is still not met (e.g. if uVOC =100%, then utotal = 4.29%).	n/a

10. Calculation Factors

x. Default Values

The table below lists, for each parameter, where default values are to be used for calculation factors.

Source Stream Refs.	Emission Source Refs.	Parameter	Reference Source	Default Value applied (where appropriate)
NG-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S37,S38,S39,S41,S60,S62,S63,S64,S65,S66,S67,S68,S69,S71,S72,S73,S74,S75,S70,S76,S61	EF	Ireland's National Greenhouse Gas Inventory	n/a
GO-001	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19,S21,S22,S23,S25,S27,S28,S29,S30,S31,S32,S33,S34,S35,S36,S43,S44,S46,S47,S77	NCV & EF	Ireland's National Greenhouse Gas Inventory	n/a
NG-002	S1,S2,S3,S4,S5,S6,S7,S8,S13,S14,S15,S16,S17,S18,S19	EF and NCV	Annex VI of the MRR	n/a
VO-001	S37,S38,S39,S41,S60,S61,S62,S63,S64,S65,S66,S67,S68	NCV and Emission Factor	Literature and Stoichiometric Carbon Content of Cyclohexanone and literature NCV	80 t CO ₂ /TJ ; 33.614 TJ/kT of Cyclohexanone

Sampling and Analysis

Do you undertake sampling and analysis of any of the parameters used in the calculation of your CO₂ emissions? No

11. Fall-back Approach

y. Approach Description

A detailed description of the monitoring methodology applied for all source streams or emission sources for where a **fall-back** monitoring methodology is applied in accordance with Article 22 of the MRR

Article 22 of the MRR provides that an operator may use a methodology that is not based on tiers for selected source streams or emission sources where certain criteria set out in that article are met.

A No Tier Fall Back approach to determine amount of fuel combusted is being applied as follows: The mass of solvent is determined from monthly flow measurement at the RCTO's and the continuous on-line Inlet TOC FID Analysers. The monthly flow measurements are taken by an accredited emissions monitoring company and the figures used in the calculation are considered to be conservative as the highest of the monthly flow measurements at each RCTO are used. The mass of TOC is converted stoichiometrically into a mass of Cyclohexanone (73% of Cyclohexanone is Carbon) and the mass of Cyclohexanone is used as the kg fuel consumed in the Activity Data. The required Tier for Activity Data for this minor source stream (VOC Solvent Vapours (VO-001) is Tier 2 (+/- 5% uncertainty). Where this highest tier cannot be met Article 26 states that for a minor source stream the operator shall apply the highest tier which is technically feasible and does not incur unreasonable costs with a minimum of Tier 1 (7.5% uncertainty). As per Article 22, the Operator may use a monitoring methodology that is not based on tiers (the "fall-back methodology) for selected source streams provided all the following conditions are met:

(a) Applying at least Tier 1 under the calculation-based methodology for one or more major source streams or minor source streams and a measurement-based methodology for at least one emission source related to the same source streams is technically not feasible or would incur unreasonable costs

(b) The operator assesses and quantifies each year the uncertainty of all parameters used for the determination of the annual emission sin accordance with the ISO Guide to Expression of Uncertainty in Measurement (JCGM 100:2008) or another equivalent internationally accepted standard and includes the results in the annual emissions report.

(c)The operator demonstrates to the satisfaction of the competent authority that by applying such fall-back monitoring methodology, the overall uncertainty thresholds for the annual level of greenhouse gas emissions for the whole installation do not exceed 7.5% for category A installations, 5.0 % for category B installations and 2.5% for category C installations.

An initial unreasonable costs assessment in December 2017 determined that installing continuous flow meters at the inlets to the RCTO System would incur unreasonable costs. As per the requirements of Article 22 (b) and (c) of the MRR An Uncertainty Assessment "Uncertainty Assessment for Article 22 "Fall-Back Methodology" was carried out in May 2019 using 2018 emissions data. ref: Sustech report.

z. Approach Justification

A concise justification for the application of a fall-back approach to the above emission sources in line with the provisions set out in Article 22:

An initial unreasonable costs assessment in December 2017 determined that installing continuous flow meters at the inlets to the RCTO System would incur unreasonable costs. As per the requirements of Article 22 (b) and (c) of the MRR An Uncertainty Assessment “Uncertainty Assessment for Article 22 Fall-Back Methodology” was carried out in May 2019 using 2018 emissions data. ref: Sustech report. Having regard to ISO Guide to Expression of Uncertainty in Measurement (JCGM 100:2008) the Sustech report determined that the expanded uncertainty related to the 2018 emissions over the whole installation did not exceed 7.5% for this Category A installation. Even if significant conservative adjustment factors are applied to the total uncertainty of the VOC measurement, the overall Category A uncertainty threshold of 7.5% is still not exceeded (e.g. if uVOC =100%, then utotal = 4.29%).

aa. Annual Uncertainty Analysis

Details about the written procedures used for carrying out the annual uncertainty analysis required under Article 22 of the MRR:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Each year in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (JCGM 100:2008) or another equivalent internationally accepted standard the operator will assess and quantify the uncertainties of all parameters used for the determination of the annual emissions having regard to the results in the annual emissions report. The Operator must demonstrate to the satisfaction of the competent authority that by applying such fall-back monitoring methodology the overall uncertainty thresholds for the annual level of greenhouse gas emissions for the whole installation do not exceed 7.5 % (Category A installation). Section 9.5 of Intel Ireland GHG Monitoring and Reporting Procedure outlines the steps to be carried out annually to carry out the annual uncertainty analysis required under Article 22 of the MRR.
Post or department responsible for the procedure and for any data generated	EHS GHG Programme owner
Location where records are kept	Cdocs
Name of IT system used	N/A
List of EN or other standards applied	N/A

12. Management

bb. Monitoring and Reporting Responsibilities

Responsibilities for monitoring and reporting emissions from the installation are listed below:

Relevant job titles/posts and provide a succinct summary of their role relevant to monitoring and reporting are listed below.

Job Title / Post	Responsibilities
EHS (GHG Program Owner)	Overall responsibility for management of program including, identification of sources, maintenance of procedures and records, completion of calculations, obtaining 3rd party verification, submission of Emission Reports.
CS Engineering (Energy Engineer)	Overall responsibility for use of Energy, including reviewing fuel usage data, reviewing energy saving projects and implementing the projects where feasible.
Operation & Maintenance	Maintenance of records with regard to the delivery of Oil and calibration of Oil Tank Indicators
Finance	Maintenance of records with regard to the purchase of Natural Gas and Oil.
EHS Manager	Appoint the GHG Program Owner and ensure his/her competence.

Attachment	Description
N/A	N/A

cc. Assignment of Responsibilities

Details of the procedure used for managing the assignment of responsibilities for monitoring and reporting within the installation and for managing the competencies of responsible personnel in accordance with Article 58(3)(c) of the MRR:

This procedure identifies how the monitoring and reporting responsibilities for the roles identified above are assigned and how training and reviews are undertaken.

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Responsibilities are set out in Section 5 of this procedure including the responsibility on the EHS Manager to appoint a competent GHG Program Owner. Section 5 has been amended to describe how training and reviews are undertaken in relation to assigned roles.
Post or department responsible for the procedure and for any data generated	EHS Dept
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

dd. Monitoring Plan Appropriateness

Details of the procedure used for regular evaluation of the monitoring plan's appropriateness covering in particular any potential measures for the improvement of the monitoring methodology:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Section 7.1 describes how the list of emissions sources are kept up to date and how changes to the installation are included in monitoring plan. Calculation methods related to Natural Gas, gas oil and bottle natural gas are included in Section 9.1 to 9.4 and Section 9.5 describes compliance with the overall uncertainty related to fall-back approach for VOC Solvent Vapours . The GHG Program owner is responsible for assessing the potential for improvement of these monitoring methodologies by carrying out a regular evaluation of the appropriateness of the monitoring methodology.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)

Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

ee. Data Flow Activities

Details of the procedures used to manage data flow activities in accordance with Article 57 of the MRR:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Section 8 describes the collection of the data and Section 9 describes the calculation methodology. Section 17.0 includes a Data Flow diagram.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A
List of primary data sources	Natural Gas Bills
	RCTO TOC Monitors
	RCTO Flow measurement reports
	Gas Oil/Diesel Delivery Dockets
	Gas Oil/Diesel Annual Stock-takes (based upon level indicators in Storage Tanks)
Description of the relevant processing steps for each specific data flow activity.	Natural Gas:-
Identify each step in the data flow and include the formulas and data used to determine emissions from the primary data. Include details of any relevant electronic data processing and storage systems and other inputs (including manual inputs) and confirm how outputs of data flow activities are recorded	<ol style="list-style-type: none"> 1. Natural Gas Bills show gross kWh consumed. 2. The gross kWh figure multiplied by gross to net calorific value conversion factor to convert from gross kWh to net kWh. 3. The net kWh figure multiplied by 0.0000036 to convert to net TeraJoules (TJ). 4. The net annual TJ figure is multiplied by Country Specific Emission Factor (tCO₂/TJ) and multiplied by an Oxidation Factor of 1 to obtain the annual emission in tCO₂. <p>(The raw data (i.e. kWh figure from gas bills) are entered into a spreadsheet stored in the CDocs System. The calculations are also completed in this spread sheet).</p> <ol style="list-style-type: none"> 5. As the gas volume on gas bills is in m³ corrected to 288.15 Kelvin this must be converted to standardised

volume of gas consumed in accordance with the MRR as follows: $V_s \text{ (Nm}^3\text{)} = (V_a * 273.15) / 288.15$ where V_s is the standardised gas volume and V_a is the actual gas volume determined from the gas bills. The NCV (net calorific value) (TJ/Nm³) of the Natural gas fuel is then calculated as follows: $\text{TJ/Nm}^3 = \text{Annual net TJ} / \text{Annual standardised gas volume}$.

VOC Solvent Vapours:-

1. There is a No Tier Fall Back approach applied for determination of quantity of the minor source stream VOC Solvent Vapours (VOC-001) consumed. The amount of VOC Solvent Vapours is calculated from the TOC monitors on the RCTO Inlets. In cases where TOC monitored data is not available, an extrapolation based upon production levels is used to estimate the TOC loads on the RCTO's.

2. This figure is multiplied by 44/12 to convert to CO₂

3. It is assumed that all of the VOC Solvent Vapour is Cyclohexanone as this is the most common solvent evaporated. The carbon content of Cyclohexanone is 73% w/w.

4. The Calorific Value of the Cyclohexanone (33,614,000 J/kg) is then used to estimate the TJ's and, therefore, the value of TonnesCO₂/TJ of VOC is back calculated. The calculated Emission Factor (EF) is 80 tCO₂/TJ for Cyclohexanone.

5. The flow value used for each RCTO System is based upon the highest of the twelve monthly measurements taken on that RCTO System in each year.

Gas Oil/Diesel

1. The amount of oil used is determined by using the formula:- Deliveries + Opening Stock - Closing Stock.

2. This figure is converted to tonnes using a density factor provided by the oil supplier.

3. This figure is then converted to kilotonnes (kt) by dividing by 1,000.

4. The quantity of oil used (in tonnes) is multiplied by the Country Specific NCV. This in turn is multiplied by the Country Specific Emission Factor (tCO₂/TJ) to calculate the emissions (in tCO₂).

(The raw data (i.e. quantities on delivery dockets, annual stock-takes and oil density from supplier) are entered into a spreadsheet stored in the CDocs System. The calculations are also completed in this spreadsheet).

Bottled Natural Gas:- In relation to the bottled Natural Gas (NG-002) a no tier approach is applied for activity data as follows:-A very conservative assumption is used that all cylinders are used up on an annual basis. Each cylinder contains 6.41 kgs of Natural Gas (CH4) and there are 4 cylinders at each of the 3 energy centres on site. The total is taken as $6.41 * 3 * 4 = 77$ kgs. Tier 1 Calculation factors (emission factor and NCV)) are taken from Annex VI of the MRR to convert kgs of Natural Gas to Tonnes of CO2.

Submit relevant documents to record data flow activities

Attachment	Description
N/A	N/A

ff. Assessing and Controlling Risks

Details of the procedures used to assess inherent risks and control risks in accordance with Article 58 of the MRR:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Section 16.0 includes a Risk Assessment. The task of assessment of inherent risks and control risks are assigned to the GHG Program Owner and documented in Section 5 (Responsibilities). This is required to be reviewed on an annual basis.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

gg. Quality Assurance of Metering / Measuring Equipment

Details of the procedures used to ensure quality assurance of measuring equipment in accordance with Article 58 and 59 of the MRR.

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Section 10 outlines the controls in place for the calibration of measuring equipment and Section 12 details the requirements for Quality Assurance. Additional responsibilities are also outlined in Section 5 (Responsibilities). Gas Networks Ireland are responsible for the maintenance and calibration of the gas meters at Intel. Copies of the Gas Networks Ireland Calibration certificates for the four meters are obtained and held on site.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

hh. Quality Assurance of Information Technology used for Data Flow Activities

Details of the procedures used to ensure quality assurance of information technology used for data flow activities in accordance with Article 58 and 60 of the MRR:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	This procedure outlines the IT Systems used for Data Flow Activities. External IT systems are the responsibility of the external supplier. Internal IT systems are the responsibility of Intel's IT Department. The key internal IT system is the CDocs Document Management System which is used to store raw data, complete calculations and store procedures and records. In addition, a Facilities Management System (FMS) is used to hold monitoring data related to Inlet TOC analysers (VOC Solvent Vapours) and fuel oil tank level indicators (Gas Oil). These systems are managed by the IT Department which has its own protocols for testing, back-up, recovery and security.
Post or department responsible for the procedure and for any data generated	EHS / IT
Location where records are kept	CDocs (Document Management System) and Facilities Management System (FMS)
Name of IT system used	CDocs (Document Management System) and Facilities Management System (FMS)

List of EN or other standards applied N/A

ii. Review and Validation of Data

Details of the procedures used to ensure regular internal reviews and validation of data in accordance with Articles 58 and 62 of the MRR.

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Data is reviewed by another environmental engineer prior to submission to the EPA. This includes comparison with recent years data and analysis of the causes of increases or decreases and criteria for rejecting and/or updating data.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

jj. Corrections and Corrective Actions

Details of the procedures used to handle corrections and corrective actions in accordance with Articles 58 and 63 of the MRR:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Corrective and Preventative Actions are outlined in Section 11. This section defines what actions are to be taken when errors or inaccuracies are identified. Section 10 specifies the controls in place for the calibration of measuring equipment and Section 12 details the requirements for Quality Assurance.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

kk. Control of Outsourced Activities

Details of the procedures used to control outsourced processes in accordance with Articles 59 and 64 of the MRR.

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Outsourced Activities include measurement of incoming gas flows (by GNI), measurement of oil deliveries (Oil Company), determination of density of oil (Oil Company), annual stock-takes of oil (external competent consultant) and calibration/servicing of Inlet TOC monitors (Environmental Monitoring Systems and Versum Materials). Each of these bodies are believed to be reputable and reliable, but secondary checks includes analysis of gas usage before payment of bills and comparison of oil deliveries and stock-takes with the level indicators on the oil tanks. In addition, the verification carried out by Versum Materials is a check on Environmental Monitoring Systems Ltd. (EMS) servicing and analyser accuracy.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

II. Record Keeping and Documentation

Details of the procedures used to manage record keeping and documentation:

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87.0
Diagram reference	N/A
Brief description of procedure. The description should cover the essential parameters and operations performed	Document are managed through the CDocs System and hard copies of documents are retained in the EHS Department Filing System (EHS Cabinets) for a period of 10 years. Section 14 of the Procedure specifies that records must be held to meet the requirement of Article 66 and Annex IX of the Monitoring and Reporting Regulation.
Post or department responsible for the procedure and for any data generated	EHS
Location where records are kept	CDocs (Document Management System)
Name of IT system used	CDocs (Document Management System)
List of EN or other standards applied	N/A

mm. Risk Assessment

The results of a risk assessment that demonstrates that the control activities and procedures are commensurate with the risks identified:

Attachment	Description
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Attachment	Description
Blank Document.docx	Risk Assessment is included in Intel Ireland GHG Monitoring and Reporting Procedure

nn. Environmental Management System

Does your organisation have a documented Environmental Management System? Yes

Is the Environmental Management System certified by an accredited organisation? Yes

The standard to which the Environmental Management System is certified: ISO 14001

13. Changes in Operation

oo. Changes in Operation

Article 24(1) of Commission Decision 2011/278/EC requires that Member States must ensure that all relevant information about any planned or effective changes to the capacity activity level and operation of an installation is submitted by the operator to the competent authority by 31 December each year. Article 12(3) of the MRR further provides that Member States may require information to be included in the monitoring plan of an installation for the purposes of meeting these requirements.

Details of the procedure used to ensure regular reviews are carried out to identify any planned or effective changes to the capacity activity level and operation of the installation that have an impact on the installation's allocation:

The procedure specified below cover the following:

- planning and carrying out regular checks to determine whether any planned or effective changes to the capacity activity level and operation of an installation are relevant under Commission Decision 2011/278/EC; and
- Procedures to ensure such information is submitted to the competent authority by 31 December of each year.

Title of procedure	Intel Ireland GHG Monitoring and Reporting Procedure
Reference for procedure	GSS-EHS-EMS-PRO-039-87
Diagram reference	N/A
Brief description of procedure. The description should	This responsibility is assigned to the GHG Program Owner

cover the essential parameters and operations performed and the procedure is included under Section 7.1. The GHG Program Owner completes regular reviews to identify any planned or effective changes to the capacity, activity level and operation of the installation and that have an impact on the installation's allocation under Commission Decision 2011/278/EC. If such changes are identified, then these will be communicated to the EPA before 31st December of each year. Details of the Activity Level each year will be submitted to the EPA by 21st of January of the following year.

Post or department responsible for the procedure and for any data generated EHS

Location where records are kept CDocs (Document Management System)

Name of IT system used CDocs (Document Management System)

14. Abbreviations

pp. Abbreviations Acronyms or definitions

Abbreviations acronyms or definitions that have been used in this monitoring plan:

Abbreviation	Definition
FAB	Semiconductor Fabrication Plant (i.e. manufacturing plant)
EG	Emergency Generator
RCTO	Rotary Concentrator Thermal Oxidiser (a type of Air Emission Abatement System)
NG	Natural Gas
GO	Gas Oil
MPHW	Medium Pressure Hot Water
IR....	Building Designation on the Intel Ireland site (e.g. IR1, IR3, IR5)
S....	Emissions Source Reference
A...	Emission Point Reference
LT	Level Transmitter
LIT	Level Indicator and Transmitter
EHS	Environmental Health and Safety Department
CDocs	Intel's Document Management System
VOC	Volatile Organic Compound

Abbreviation	Definition
TOC	Total Organic Carbon

15. Additional Information

Any other information:

Attachment	Description
Thermal Input Capacity (TIC) Calculation for Fab 10 RCTO No 3 (S61-A67).xlsx	TIC Calculation for F10 RCTO No. 3 (Source S61)
Extract from Equipment Schedule for Fab 10 RCTO No 3.docx	Extract from Equipment Schedule for Fab 10 RCTO No. 3 (S61)
TIC Calculation for S25 (Emergency Generator No. 5).xlsx	TIC Calculation for S25 (Emergency Generator No. 5)
S25 Emergency Generator No. 5 datasheet (4).pdf	S25 Emergency Generator No. 5 datasheet
GSS-EHS-EMS-PRO-039-87.0.docx	Intel Ireland GHG Monitoring and Reporting Procedure

16. Confidentiality

qq. Confidentiality Statement

It is the Environmental Protection Agency's policy to make information received by it in the course of its work open to inspection by any person on request. This is in accordance with the provisions of the European Communities (Access to Information on the Environment) Regulations 2007 to 2011.

In the event that you considered that some of the information being submitted of a confidential nature, then the nature of this information and the reasons why it should be considered confidential, with reference to the European Communities (Access to Information on the Environment) Regulations 2007 to 2011 and any amendments must be explicitly requested using the facility below. The Board of the Environmental Protection Agency will consider the requests and if the information can be deemed as confidential and necessary.

Notwithstanding any request for confidentiality, the Environmental Protection Agency explicitly reserves the right to release data to the Commission, including emissions and allocations to the public, on the basis that the data will be used for the purposes foreseen in Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

Please tick this box if you consider that any part of your false

form should be treated as commercially
confidential/sensitive:

END of Appendix I.