Site Visit Report

The site visit process is a sample on a particular day of an installation's compliance with some of its licence conditions. Where non-compliance against a particular condition has not been reported, this should not be construed to mean that there is full compliance with that condition of the licence.

Instructions and actions arising from the visit shall be addressed, or where applicable noted, by the licensee in order to ensure compliance, to improve the environmental performance of the installation and to provide clarification on certain issues.

The licensee shall take the actions specified to close out the non-compliances and observations raised in this Site Visit Report.

Licensee

Name of Installation	Irish Cement Limited (Limerick)
Licensee	Irish Cement Limited
Licence Register No.	P0029-03
CRO Number	9212
Site Address	Castlemungret, Limerick
Site Visit Reference No.	SV12145

Report Detail

Issue Date	09/05/2017
Prepared By	David Matthews

Site Visit Detail

Date Of Inspection	06/04/2017	**Announced**		No	
Time In	00:05	**Time Out**		05:00	
Visited by on behalf of the EPA	Enfonic Limited				
Licensee Personnel and Role	See report.				
Photo Taken	No	**Samples Taken**	No	**Video Taken**	No

Scope

This is a report on noise monitoring carried out in the vicinity of this site. Please find the detailed technical report attached.

Media

Air

Site Areas Inspected

See report.

Documents Inspected

See report.

TECHNICAL NOTE

Client: Environmental Protection Agency (EPA)
Date: May 8th 2017 **Revision**: 2
Re: Noise complaint investigation of the Irish Cement Limited in Castlemungret, Co. Limerick

1. SCOPE

Following receipt of noise nuisance complaints, the EPA commissioned Enfonic to investigate if the Irish Cement Limited plant, Castlemungret, Co. Limerick was exceeding the noise emission limits, set out in their Industrial Emissions (IE) Licence (P0029-03), at three nearby noise sensitive locations (NSLs).

Due to the nature of the NSL residents' noise complaints, the EPA determined that attended night-time noise monitoring at each NSL was necessary. Three monitoring periods, each of 30-minute duration, were carried out at each NSL, between 00:00-05:00. This noise monitoring was used to analyse if the IE licence limits were exceeded by the facility, notably;

- Night-time (22:00-08:00) – 45dB $L_{Aeq,\ 30\ minutes}$
- No audible tonal emissions from the facility.

2. METHODOLGY

The three noise sensitive locations (NSL) were:

- **NSL1** - Ard Aulin.
- **NSL2** - Ard Thomain.
- **NSL3 -** Ard Thomain.

The NSL noise nuisance was reportedly worst when residents were downwind from the Irish Cement plant. As a result the noise monitoring was carried out on Thursday 6th April 2017, when there was a low speed (less than 5m/s) in a west/north-west wind direction.

A Class 1 Bruel and Kjaer Type 2250 Sound Level Meter (SLM) was positioned at a height of 1.5m. Three consecutive measurements of L_{Aeq} (broadband and 1/3 Octaves) and L_{AF90} were gathered over 30 minute periods, at each NSL. The ISO 1996-2:2007 simplified reference method was used to assess if there were audible tones at the NSLs.

An explanation of the acoustic terminology used in this report is in given in Appendix A.

The equipment used was calibrated before use and verified afterwards – no calibration drift was observed. Measurements were made generally in accordance with ISO 1996-2:2007 Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels.

The details of the equipment used is contained in Appendix B.

3. RESULTS

The results presented below relate to the ambient noise levels recorded between 00:05 and 05:00 on Thursday 6th April at each of the three NSLs and include notes on the main noise sources noted

during each measurement. The weather conditions were suitable for monitoring: 4°C, dry, westerly/north-westerly breeze at 3 m/s.

As outlined below, while the steady state noise from the Irish Cement plant was dominant, the IE night-time noise emission limit was not exceeded during any 30 minute noise monitoring period.

Table 1: NSL 1 – 3 Noise monitoring results

	Start Time	Elapsed Time	L_{Aeq}	$L_{AF90.0}$	Main noise sources noted
NSL 1	06/04/2017 00:05	00:30:00	40	37	1,2,3
	06/04/2017 00:37	00:30:00	41	36	1,2,3
	06/04/2017 01:07	00:30:00	38	35	1,2,3
NSL 2	06/04/2017 01:44	00:30:00	44	42	1,2
	06/04/2017 02:15	00:30:00	44	42	1,2
	06/04/2017 02:45	00:30:00	44	41	1,2
NSL 3	06/04/2017 03:27	00:30:00	45	43	1
	06/04/2017 03:59	00:30:00	45	42	1
	06/04/2017 04:30	00:30:00	44	42	1,4

Notes:

1 Steady state factory noise
2 Intermittent road traffic from surrounding roads
3 Local road traffic in estate
4 Bird song / dawn chorus

3.2 REVIEW OF TONAL NOISE AND IMPULSIVITY

Based on the methodology outlined in Annex D of ISO 1996-2:2007 (E);
"A tone is deemed to be present when the level difference between the L_{Aeq} at the 1/3 octave band of the tone and each adjacent 1/3 octave band is greater than or equal to 15dB for low-frequencies (25Hz to 125Hz), 8dB for middle-frequencies (160Hz to 400Hz) or 5dB for high-frequencies (500Hz to 10,000Hz)."

Applying the methodology outlined above, none of the nine monitoring periods had audible tones present in the 1/3 octave band spectrum (see graphs in Appendix C).

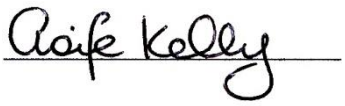
There was no impulsive noise detected at the three NSLs during the monitoring periods.

4. CONCLUSIONS

Based on the noise monitoring carried out on Thursday 6th April, 2017 the Irish Cement Limited plant was found to be in compliance with their night-time noise emission limits set in their IE licence. The monitoring was undertaken during typical operational conditions and the plants downwind noise was measured at the NSLs.

END

For and on behalf of Enfonic Ltd



Aoife Kelly, PhD
Acoustic Engineer and Consultant

APPENDIX A

Acoustic Terminology

dB(A):

The human ear is more susceptible to mid-frequency noise than the high and low frequencies.To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.

L_{Aeq}

The value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t2 - t1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10lg_{10}\left\{\left(\frac{1}{T}\right)\int_{t1}^{t2}\left[\frac{P_A(t)^2}{p_{0^2}}\right]dt\right\}$$

where:

P_0 is the reference sound pressure (20 µPa); and
$P_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

L_n level

If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for I0% of the time. L_{90} is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise, as it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

APPENDIX B

Calibration certificates

Bruel and Kjaer Type 2250 SLM (s/n:2611593) and field calibrator Type 4231 (s/n: 2123002).

Brüel & Kjær

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA DANAK CAL Reg.nr. 307

CERTIFICATE OF CALIBRATION No: CDK1605511 Page 1 of 10

CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 2611593	Id: -
Microphone:	Brüel & Kjær Type 4189	No: 2697054	
Preamplifier:	Brüel & Kjær Type ZC-0032	No: -	
Supplied Calibrator:	Brüel & Kjær Type 4231	No: 2626210	
Software version:	BZ7222 Version 2.1	Pattern Approval:	PTB1.63-4046158
Instruction manual:	BE1712-18		

CUSTOMER

Enfonic Ltd
Tecpro House
IDA Business & Technology Park
Dublin

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C
Environment conditions: *See actual values in **Environmental conditions** sections.*

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-07-09 Date of issue: 2016-07-09

M Önder
Mikail Önder
Calibration Technician

Susanne Jørgensen
Susanne Jørgensen
Approved Signatory

Brüel & Kjær

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA

DANAK
CAL Reg.No. 307
Member of EA MLA

CERTIFICATE OF CALIBRATION

No: CDK1599414 Page 1 of 4

CALIBRATION OF

Calibrator:	Brüel & Kjær Type 4231	No: 2123002 Id: -
½ Inch adaptor:	Brüel & Kjær Type UC-0210	
Pattern Approval:	PTB-1.61-4057176	

CUSTOMER

Enfonic Ltd
Tecpro House
IDA Business & Technology Park
Clonshaugh
17 Dublin
Ireland

CALIBRATION CONDITIONS

Preconditioning:	4 hours at 23°C ± 3°C
Environment conditions:	Pressure: 100.7 kPa. Humidity: 41 % RH. Temperature: 22.6 °C.

SPECIFICATIONS

The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC60942:2003 Annex B Class 1. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær acoustic calibrator calibration application software Type 7794 (version 2.5) by using procedure P_4231_D07.

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-07-28

Susanne Nygaard
Calibration Technician

Date of issue: 2016-07-28

Erik Bruus
Approved Signatory

APPENDIX C

Tone Assessment: Simplified Reference Method (ISO 1996-2:2007)

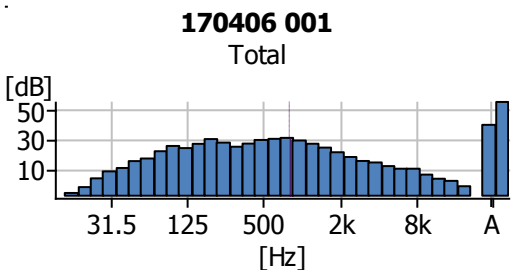


Figure 1: NSL 1 frequency spectrum 1 of 3 -no tone

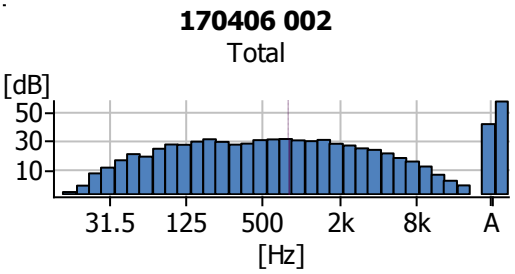


Figure 2: NSL 1 frequency spectrum 2 of 3 -no tone

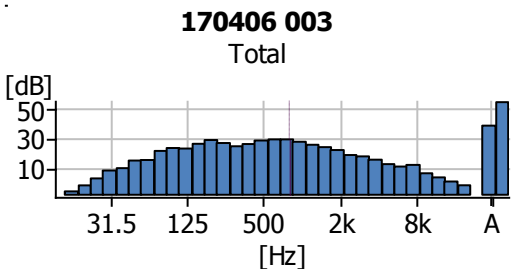


Figure 3: NSL 1 frequency spectrum 3 of 3 -no tone

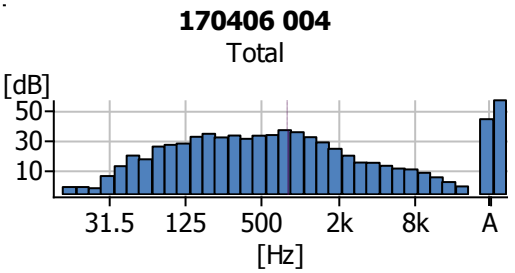


Figure 4: NSL 2 frequency spectrum 1 of 3 -no tone

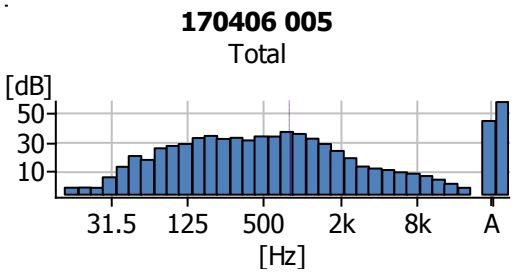


Figure 5: NSL 2 frequency spectrum 2 of 3 -no tone

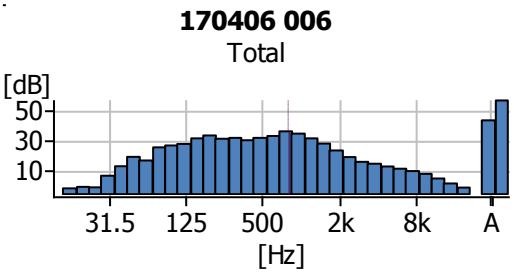


Figure 6: NSL 2 frequency spectrum 3 of 3 -no tone

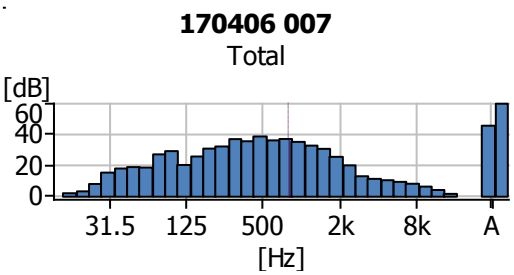


Figure 7: NSL 3 frequency spectrum 1 of 3 -no tone

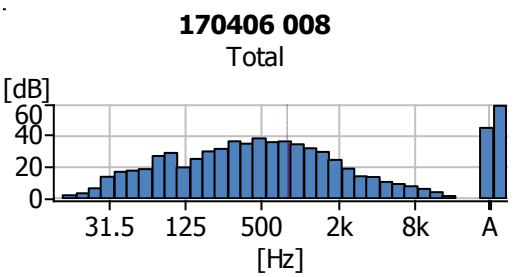


Figure 8: NSL 3 frequency spectrum 2 of 3 -no tone

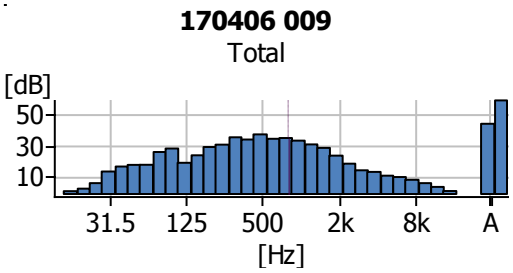


Figure 9: NSL 3 frequency spectrum 3 of 3 -no tone

Summary

See report.

FOLLOW-UP ACTIONS

You are required to complete the instructions and actions, as outlined in this report, within the specified timeframe. Where required, you shall respond to actions specified in Compliance Investigations within the required timeframe.The licensee shall maintain documentary evidence, for review by the EPA, that the prescribed corrective actions were completed within the required timeframe.

(i) Compliance Investigations

You are not required to respond directly to items contained in this EPA site visit report; where an issue requires a direct response, the EPA will generate a Compliance Investigation through the EDEN system. You will receive notification when a Compliance Investigation instruction or action is generated.

(ii) Publication of reports and licensee response.

Please note that this Site Visit Report will be made available for public viewing via the EPA's Licence Enforcement Access Portal within one day of the issue date and will be published on the Licence Details Page of the EPA's website, www.epa.ie, that relates to your licence 60 calendar days after the issue date.

You may if you choose submit, within 45 calendar days of the issue date of this Site Visit Report, a Licensee Public Response that will be published alongside the Site Visit Report. This Response, should you wish to avail of it, provides you with an opportunity to inform the public about how you are implementing the actions set out in the report, activities underway, timescales and target completion dates. Please be aware that the content of your Licensee Public Response must be factual and should not breach the EPAs stated online publication standards.

If you wish to submit a Licensee Public Response to an EPA Site Visit Report, you should do this by clicking on the 'Make a Response' link on the Site Visits page in EDEN. A .pdf document containing your response can be attached and submitted from here.

(iii) Response to Site visit report

Where you do wish to respond directly to a site visit report, you should do this by generating a 'Licensee Return' of the type 'Site Updates/Notifications' and the sub-type 'Response to EPA Report' in EDEN.

Please note that you are required to comply with the conditions of your licence at all times, and where noncompliance occurs you must restore compliance within the shortest possible time. These actions will be verified during subsequent EPA visits.

Please quote the above Inspection Reference Number in any future correspondence in relation to this Report.