
APPENDIX 9.4 – NOISE MEASUREMENTS

1. SURVEY

1.1 A survey of the exterior noise levels generated through operational activities associated with peat and biomass fired Power Stations (similar to the proposed usage at West Offaly Power Station (WOP)) has been undertaken. The existing and planned operational procedures have been reviewed (at WOP) to determine the specific operations that are likely to have the greatest noise impact on the existing residential dwellings nearby. Six items of equipment or activities relevant to operations at WOP were highlighted as producing significant levels of noise, these items are listed below:

- Main Power Station Chimney
- Moving and loading biomass (Wheeled Loader)
- Peat deliveries by rail (start/stop train manoeuvres)
- Loading Pellet Silo (HGV and auger conveyor)
- HGV Unloading Building (HGV with moving floor)
- HGV Unloading Building (dust extraction fan)

1.2 Measurements of noise from use of the equipment listed above have been made to facilitate noise predictions.

Instrumentation

1.3 The noise measurements were made with three RION model NL-52 Sound Level Meters (SLMs) each fitted with a 1/2" microphone and complying with the Class 1 standard in IEC 61672-1:2002¹. The microphones were each fitted with a 45 mm radius foam ball windshield and the SLMs were mounted on tripods at a height of approximately 1.2 to 1.5 metres.

1.4 The meters were programmed to measure a number of statistical noise indices, including the L_{Aeq} , L_{A90} and corresponding $\frac{1}{3}$ octave band levels, together with the maximum and minimum levels, in consecutive 1 minute periods with results automatically stored at the end of each measurement period.

¹ International Electrotechnical Commission, 2002, IEC 61672-1:2002 "Sound level meters - Part 1: Specifications"

Site Visits

- 1.5 As part of the survey, site visits were made to Edenderry, Loch Ree and West Offaly Power Stations. No noise measurements were taken at Edenderry but a tour of the ancillary plant and operational procedures was undertaken in order to understand the way in which this peat and biomass fired power station is currently operating (outside of the main building containing energy generation plant). Measurements of delivery lorries unloading (and the associated dust extractor fan) were made at Loch Ree Power Station (LRP) and all other measurements used in the WOP noise assessment were made on site at WOP.
- 1.6 The main WOP building is located approximately 500m southwest from the main road (R357) and is positioned behind storage buildings and fuel loading areas providing maximum separation distance (within the site boundary) between the power generating plant and residential locations. Other than WOP, the main noise source in the area is road traffic noise from local traffic on the R357 through Shannon Bridge, which makes it relatively easy to measure noise sources on-site without significant influence from extraneous noise sources. Measurements at WOP were made over two separate site visits, the first carried out during a Biomass trial where noise was measured from Wheeled Loader movements and Pellet Silo loading. During the second visit to WOP, the plant was operating under normal peat fired conditions allowing noise to be measured from train movements (associated with peat deliveries) and ambient noise generated from the main power station chimney was also measured.

Measurement Procedure

- 1.7 Noise measurements were conducted at LRP in the afternoon on the 7th of February 2018. Measurements were made of lorries unloading at distances of approximately 5 m and 32 m (simultaneously) along with measurements of the dust extractor fan operating on its own at a distance of 5 m.
- 1.8 Noise measurements were conducted at WOP on the 15th of February and 8th of March 2018. Simultaneous measurements were made of lorries being loaded with biomass (using a wheeled loader) at distances of approximately 5 m and 25 m from the back of the lorry. Simultaneous measurements were made of a temporary pellet silo being loaded from a lorry (using an auger conveyor) at distances of approximately 10 m and 25 m. Measurements were made of train manoeuvres at 2m from the edge of the track (at a location within the site boundary) whilst simultaneous measurements of ambient noise were conducted at two distant locations (approximately 330 m and 450 m from the main chimney) considered to be representative of the nearest residential receptors. In addition

to all those listed above, a number of other measurements were made at various distances but were not found to be useful and have not been used in the assessment of noise at WOP.

- 1.9 Calibration was carried out on all SLM's at each site visit using a B&K Type 4231 Acoustic Calibrator (s/n 2699281) set at a level of 94.06 dB at the start of the measurements and checked at the end with no significant drift being observed. All equipment was within its relevant laboratory calibration period; details of the equipment and calibration certificates are available on request.

Results of Noise Measurements

- 1.10 The overall noise levels in terms of the A-weighted average noise level are shown below at Table 1. Results of the average 1/3 Octave Band noise measurements are presented at Table 2 using the 1/3 Octave Ref column from table 1 to identify the measurements. It should be noted that only frequency bands considered to be unaffected by extraneous noise have been included in the analysis and presented here.

Table 1 – Measured Overall Noise Levels

Site	Item	Dist.	dB LAeq	1/3 Octave Ref
LRP	Lorry unloading	5m	82.4	1
LRP	Lorry unloading	32m	69.2	2
LRP	Extractor fan	5m	75.5	3
WOP	Pellet Silo	10m	71.7	4
WOP	Pellet Silo	25m	65.8	5
WOP	Wheeled Loader	15m	82.5	6
WOP	Wheeled Loader	25m	77.0	7
WOP	Ambient noise	330m	41.5	8
WOP	Ambient noise	450m	37.3	9
WOP	Train Manoeuvres	2m	76.3	10

- 1.11 In addition to the results above, it is noted that the train manoeuvring noise is very percussive which means that a continuous noise level does not necessarily represent the peak levels generated by couplings between rail trucks. It is also noted that the wheeled loader is the loudest item of plant that was measured and that this is at least partially related to a loud tonal reversing beeper operating at a frequency of around 2 kHz. The results for the wheeled loader (ref 6 and 7) in Table 2 show the relatively high contributions from the 1.6 kHz 1/3 octave band (76 – 82 dBA).

Table 2 – Measured Average A-weighted 1/3 Octave Band Noise Levels

Ref	A-weighted 1/3 Octave band (Hz) L _{Aeq} (dB)																												
	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
1	28.4	36.4	45.0	46.3	46.6	45.7	51.8	60.6	53.5	62.2	67.0	60.1	66.6	69.8	75.6	74.4	72.7	73.2	72.3	70.1	69.2	66.4	65.6	60.3	56.6	52.2	46.7	41.5	35.4
2	19.2	26.3	32.4	34.2	35.7	38.3	41.3	50.6	43.4	45.7	54.6	49.7	55.4	56.6	62.2	59.0	58.6	59.9	61.4	58.6	55.5	52.5	49.9	44.9	40.9	37.0	31.6	27.0	22.2
3	32.2	38.8	44.9	46.3	44.0	46.1	48.4	51.8	53.3	53.4	58.2	60.9	62.8	63.4	70.6	65.0	65.6	63.4	65.0	63.2	62.5	58.0	54.9	51.9	50.5	47.1	43.3	37.5	30.1
4	28.0	29.9	42.7	40.4	43.8	50.4	47.5	48.8	50.0	50.7	53.4	54.4	59.3	56.4	58.1	59.4	59.0	60.9	60.7	61.0	61.7	60.8	60.9	61.9	58.7	55.1	49.5	-	-
5	28.0	31.0	45.1	39.7	43.5	51.8	45.5	45.8	49.0	49.5	49.6	51.3	54.8	52.6	53.9	55.4	55.3	56.2	54.4	54.1	55.5	51.3	50.4	48.7	45.4	40.5	34.3	-	-
6	-	32.5	46.9	53.4	60.5	59.6	57.9	55.7	58.9	60.7	58.3	54.9	57.1	57.1	58.6	59.7	60.7	70.5	81.9	62.1	58.4	-	-	-	-	-	-	-	-
7	-	25.2	40.2	46.4	55.0	55.6	54.4	52.0	56.3	58.0	55.1	51.2	52.2	51.2	52.0	53.4	54.9	65.1	76.3	57.1	54.9	-	-	-	-	-	-	-	-
8	18.3	18.1	25.1	28.7	27.6	30.0	30.8	30.2	33.0	33.4	32.4	33.3	30.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	15.6	16.8	17.1	24.1	25.2	26.0	26.2	26.0	26.9	24.5	24.9	24.2	33.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	29.0	33.3	40.7	47.1	59.9	54.9	57.2	58.5	59.3	61.1	62.8	65.1	66.8	66.3	65.4	66.0	66.5	66.8	64.2	62.2	61.7	59.5	56.3	53.3	50.6	45.9	41.1	-	-