

Power Consulting Midlands Ltd

**Renewable Energy Plant at Woodham Rd. Barry
Noise Assessment Prepared for
Sunrise Renewables (Barry) Ltd**

December 2015

1. Introduction

- 1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the “**Project**”).
- 1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the “**2010 Permission**”).
- 1.3 Power Consulting Midlands Ltd (**PCML**) has been commissioned by the Applicant to review the applicability of the noise assessment reports and letters submitted in support of the 2010 Permission in the context of their re-application for a similar plant to be submitted in November 2014.
- 1.4 The noise studies and reports dated from 2009 (the “**2009 Reports**”) are to be found annexed to this report.
- 1.5 PCML considers that this review must address two fundamental issues :-
 - (1) Have the background noise levels changed in a way that would invalidate the conclusions in the 2009 Reports?
 - (2) Does the new plant expect to operate within the noise emissions constraints that were envisaged for the original design approved under the 2010 Permission?

2. Original Report Conclusions

- 2.1 The report issued by AB acoustics dated 23 December 2008 considers background noise levels measured at three locations:

Location 1: Dock View Road / Castleland Street

Location 2: Cory Way and

Location 3: Cei Dafydd (Y Rhodfa)

- 2.2 The results of such calculations produced predicted Specific Noise Levels for the various locations as follows:

Location 1 = 37 dBA

Location 2 = 40 dBA

Location 3 = 22 dBA

These calculations took into account a +5 dBA correction factor added to account for the tonal character etc of the noise having regard to with respect to BS 4142.

- 2.3 The AB Acoustics letter dated 18th March 2009 considered the additional effect of the proposed Atlantic Way facility by analysing the combination of expected noise levels from both plants at two locations where background noise readings

coincide. Data collected by Parsons Brinckerhoff Ltd for the Atlantic Way Project was used.

Location 1 = 37 + 24 = 37 dBA

Location 3 = 32 + 28 = 33 (33.4) dBA

These calculations also took into account a +5 dBA correction factor added to account for the tonal character etc of the noise having regard to with respect to BS 4142.

3. 2014 Site Visit and Noise Measurements

3.1 Below is a plan of the site and the location of the nearest residential properties at which the existing background noise levels were measured (Locations 1, 2 and 3 above):



3.2 During a survey on 21st November 2014 the background noise levels at all three locations were re-checked and found to be consistent with those measurements used in the previous calculations performed by AB Acoustics and Parsons Brinckerhoff Ltd:

3.3 PCML therefore conclude that the calculations performed by AB Acoustics with respect to the combined impact of the original Sunrise design and the Atlantic Way Project are remain valid.

3.4 Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

3.5 It is also reasonable to conclude that the noise attenuation measures proposed by AB Acoustics for the original Sunrise design also remain valid.

4. 2014 Project

- 4.1 PCML has also studied the design proposals and contractual arrangements proposed for the Project which is the subject of the current application. The conclusion is that even in the absence of additional compensating noise attenuation measures being incorporated into the design, no item of plant within the power plant buildings will exceed the noise level of 85db recommended by AB Acoustics.
- 4.2 It is understood that the Atlantic Way project will not now proceed and the planning permission expired on 23rd December 2014. As a result, the conclusions of the original report dated 23rd December 2008 apply with not further consideration required to be given to the impact of the Atlantic Way project.
- 4.3 PCML can therefore confirm that the new configuration is not likely to result in complaints.

29 December 2014

Attachments: The 2009 Reports

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23 December 2008.

Introduction

AB Acoustics were commissioned by Oaktree Environmental Ltd to undertake an environmental noise assessment the proposed site of the installation of a Biomass Gasification Plant to generate electricity from reclaimed wood (Woodham Road Barry CF63 4JE)

At the present time the site operates as a storage yard - - it is proposed to locate the proposed plant within a building on the existing site – it is understood the generator plant will operate on a 24 hour basis.

However this 24 hr operation will consist only of the operation of the generator plant and it is understood that no other equipment will be operated on a 24 hr basis – effectively the plant will be loaded with material for processing during the 'normal' hours that the plant operates and this material is then fed by means of a conveyor into the proposing plant.

The site is part of a well established industrial estate the proposed plant being housed within a purpose designed building.

Below is a plan of the site and the location of the nearest residential properties at which the existing background noise levels were measured:



Location 1 was on Dock View Road opposite the junction with Castleland Street.

Location 2 was at the entrance to the waste ground – which it is proposed to develop at some future date - on Cory Way

Location 3 was on the residential estate at Cei Dafydd

The noise level generated by the proposals is predicted for the residential properties at the three locations..

All calculated levels are FREE FIELD.

Noise Assessment Criteria

The likelihood of complaints about noise from industrial plant can be assessed where the standard is appropriate using BS 4142 – 1997. Within the standard, another standard, BS 8233- 1987 is introduced for general guidance on acceptable noise levels within buildings.

Guidance in BS 8233 –1987 (Sound Insulation and Noise Reduction in Buildings) provides design criteria for noise inside dwellings. These are:

Bedrooms	Laeq,T = 30 dB
Living Areas	Laeq,T = 35 to 40 dB

The 30 dB to 40dB Laeq,t level in BS 8233 – 1987 is in line with the night time internal noise criteria in PPG 24 of 30 dBA. This level is acceptable as avoiding disturbance to sleep.

An internal criteria of 35 - 40 dB Laeq,T 5 mins. Would translate to an outdoor limit of 50 - 55 dB Laeq,T 5 mins. where, by convention, an open window would provide an attenuation of 15 dBA, however an attenuation of 12 dBA is a more realistic figure.

The BS 4142 assessment method considers the likelihood of noise from specific noise sources provoking complaints from residents of nearby sensitive properties.

The Specific Noise Level is the noise level of the source or collection of sources under investigation and should exclude any other noise sources which may otherwise contribute.

The likelihood of complaints is assessed by comparing the noise level from the specific noise source(s) under investigation, against the typical prevailing background noise levels. The audible characteristics of the specific noise source(s) are also taken into account ie. If the noise contains any distinct hums, whines or bangs etc. then a correction of +5 dBA should be added to the measured level. This then becomes the Rating Level.

The margin by which the noise level due to the specific noise source under investigation exceeds the background noise level enables the likelihood of complaints to be assessed.

The greater this distance the greater the likelihood of complaints.

A difference of around +10 dB or more indicates that complaints are likely.

A difference of around +5 dB is of marginal significance.

If the rating level is more than 10 dB below the background level this is a positive indication that complaints are unlikely.

Equipment Used and Measurement Method

The noise levels were measured using a :

Norsonic Type 114 real Time Octave Band Analyser (Type 1 instrument)

Calibration was carried out prior to the measurements – and checked afterwards using a ;

Norsonic Acoustic Calibrator.

The measurements were carried out at the locations described at a height of 1500mm above the ground and away from reflecting surfaces.

The measurements were undertaken at the times stated in the results.

Results

These are tabulated below for the three locations :

Location 1 Dock View Road

The main noise sources at the time of the measurements were ;

Traffic movement along Dock View Road and Ffordd y Mileniwm together with a contribution from both passenger and freight traffic on the railway

Time	L _{Aeq}	L ₉₀
18.12.08 15.30 – 16.30	62.1	55.6
Dry – westerly wind 4.3 – 5.2 m/sec – dry roads		
18.12.08 22.00 – 22.30	55.8	43.1
Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)		
18.12.08 23.10 – 23.20	48.0	44.9
Dry – westerly wind 2.7 m/sec – damp roads		
19.12.08 – 00.25 – 00.35	44.4	41.6

Distance from proposed site scaled at 294 m (reference Google Earth)

Location 2 Cei Dafydd

The main noise source at the time of the measurement was traffic movement along Ffordd y Mileniwm

Time	L _{Aeq}	L ₉₀
19.12.08 - 09.20 – 10.20	53.1	46.5
Dry – westerly wind 0.5m/sec – dry roads		
18.12.08 21.20 – 21.50	47.1	43.4
Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)		
18.12.08 23.25 – 23.35	41.4	41.2
Dry – westerly wind 2.7 m/sec – damp roads		
19.12.08 – 00.40 – 00.50	40.5	40.1

Distance from proposed site scaled at 182 m (reference Google Earth)

Location 3 Cory Way

The main noise source at the time of the measurement was traffic movement along Cory Way with cars and lorries accessing the industrial estate together with a contribution from traffic on Ffordd y Mileniwm

Time	L _{Aeq}	L ₉₀
18.12.08 - 14.15 – 15.15	60.8	53.1
Dry – westerly wind 0.5m/sec – dry roads		
18.12.08 20.45 – 21.15	47.1	43.4
Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)		
18.12.08 23.45 – 23.55	41.4	41.2
Dry – westerly wind 2.7 m/sec – damp roads		
19.12.08 – 00.55 – 01.05	40.5	40.1

Distance from proposed site scaled at 450 m (reference Google Earth)

Discussion of Results

These are discussed on a Location by Location basis

Internal Noise

All the proposed plant will be located internally to the proposed building – no actual measurements have as yet been undertaken on the type of plant that it is proposed to operate within the proposed building.

However the following noise levels of the various plant items are believed to be :

Engines : 85 dBA – as there are 6 of these the level will increase to $85 + 10\log 6 = 93$ dBA

Coolers : 73 dBA

Roller Mill : 90 dBA

Grinder : 120 dBA

These levels are as yet to be confirmed by the various supplies – when more detailed information is available this will be forwarded.

However the client (Sunrise Renewables Ltd) has stipulated that the general internal level in the plant must not exceed 90 dBA (this will of course mean that internal acoustic treatments etc will be required) though this may not be the case at all locations.

This is therefore the internal level that is used in the following discussion

The internal noise from the process will be radiated by the structure of the building itself.

Location 1

The residential properties at Location 1 (Dock View Road) will look down onto the proposed plant as they are elevated above the proposed site – therefore they will have a view of both the rear facade of the building and the roof.

The area of the building that faces the residential properties = $45 * 14.08 = 633.6$ sq m (rear facade)

Roof area = $60.6 * 45 = 2727$ sq m

The attenuation of the building envelope would be an $R_w = 25$ dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

Rear Facade

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** –

see above

S = surface Area of building facing the residential property = **633.6 sq m**

r = distance to houses = **294m**

DI = Directivity Index = 3

$$L_2 = 90 - 6 - 25 + 10 \log 633.6 - 11 - 20 \log 294 + 3$$

$$L_2 = \mathbf{30 (29.6) dBA}$$

Roof

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** –
see above

S = surface Area of building facing the residential property = **2727sq m**

r = distance to houses = **294m**

DI = Directivity Index = 3

$$L_2 = 90 - 6 - 25 + 10 \log 2727 - 11 - 20 \log 294 + 3$$

$$L_2 = \mathbf{36 (35.9) dBA}$$

However the residential properties are at an angle of approximately 30° to the proposed plant therefore the attenuation can be calculated from $A = 10 \log \text{angle} / 180 = 10 \log 30 / 180 = - 8 (7.77)$ – reducing the noise level radiated from the roof at Dock View Road to $36 - 8 = \mathbf{28 dBA}$

The obtain the total level these two calculated levels need to be summed – $30 + 28 = \mathbf{32 (32.1) dBA}$

Location 2

At the present time there is NO residential development on this site – however it is understood that there is a proposal to develop the site for residential properties – the time scale for this is unknown – if the proposed plant is installed prior to the residential development then it would seem reasonable that the possible residential development should cater for any noise that is radiated from the proposed industrial plant.

The residential properties at Location 2 (Cory Way) could only see the side facade of the proposed plant

The area of the building that faces the potential residential properties is 853.2 sq m

The attenuation of the building envelope would be an $R_w = 25$ dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Specified Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** –
see above

S = surface Area of building facing the residential property = **853.2**

.r= distance to houses = **182m**

DI= Directivity Index = 3

$$L_2 = 90 - 6 - 25 + 10 \log 853.2 - 11 - 20 \log 182 + 3$$

$$L_2 = \mathbf{35 (35.1) \text{ dBA}}$$

Location 3

At the present time there is NO residential development between this location and the proposed site – however if the possible residential development does go ahead then it may be that this location will be acoustically screened from the proposed industrial site thereby attenuating the following calculated noise level.

The residential properties at Location 3 (Cie Dafydd)) at the present time see the side facade of the proposed plant

The area of the building that faces the potential residential properties 853.2sq m

The attenuation of the building envelope would be an $R_w = 25$ dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Specified Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** –
see above

S = surface Area of building facing the residential property = **853.2 sq m**

.r= distance to houses = **450m**

DI= Directivity Index = 3

$$L_2 = 90 - 6 - 25 + 10 \log 853.2 - 11 - 20 \log 450 + 3$$

$$L_2 = \mathbf{27 (27.2) \text{ dBA}}$$

Overall Level

The predicted noise level at the various residential properties are summarised below

Location 1 = 32 dBA

Location 2 = 35 dBA

Location 3 = 27 dBA

These levels are the calculated Specific Noise Level for the various locations – with respect to BS 4142 a +5 dBA correction factor should be added to the above figures to account for the tonal character etc of the noise – therefore the resulting Rating Levels are :

Location 1 : 37 dBA

Location 2 : 40 dBA

Location 3 : 32 dBA

These are the levels that are compared to the lowest measured background (L_{90}) at the various locations :

	Difference to Rating Level
Location1 : 41.6 dBA (00.25 / 00.35)	- 4.6 dBA
Location 2 : 40.1 dBA (00.55 / 01.05)	- 0.1 dBA
Location 3 : 40.1dBA (00.40 / 00.50)	- 8.1 dBA

Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

The following should be noted :

No roof lights should be fitted into the roof as these do not have as high an attenuation as the ‘normal’ roof panels.

If the internal level within the proposed plant is in excess of the specified 90 dBA (or is projected to be) then the attenuation of the panels forming the skin of the building must be increased to account for the increase in internal noise level – further details www.kingspanpanels.com

Roger Leach

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Dated : 23.12.08

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18 March 2009.

For the attention of Mr M Muia

Dear Sirs

Reference : Proposed Biomass Plant Barry South Wales

It is understood that in addition to the proposed Biomass Plant on Woodham Road there is a proposal to operate an Energy Recovery Facility on Atlantic Road in the Dock Area (the proposed site is approximately 350 / 400m to the south of the proposed Biomass site across the dock.

As both plants will have an impact on the environment this note considers the combined effect for a noise point of view should both plants be approved.

From the report issued by AB acoustics dated 23 December 2008 background noise levels were measured at three locations – 1 Dock View Road / Castleland Street – 2 Cory Way and 3 Cei Dafydd (Y Rhodfa) with the following results (copied from our report dated 23 December 2009).

These levels are the calculated Specific Noise Level for the various locations – with respect to BS 4142 a +5 dBA correction factor should be added to the above figures to account for the tonal character etc of the noise – therefore the resulting Rating Levels are :

Location 1 : 37 dBA

Location 2 : 40 dBA

Location 3 : 32 dBA

These are the levels that are compared to the lowest measured background (L_{90}) at the various locations :

Difference to Rating Level

Location 1 : 41.6 dBA (00.25 / 00.35)	- 4.6 dBA
Location 2 : 40.1 dBA (00.55 / 01.05)	- 0.1 dBA
Location 3 : 40.1dBA (00.40 / 00.50)	- 8.1 dBA

Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

The following should be noted :

No roof lights should be fitted into the roof as these do not have as high an attenuation as the 'normal' roof panels.

If the internal level within the proposed plant is in excess of the specified 90 dBA (or is projected to be) then the attenuation of the panels forming the skin of the building must be increased to account for the increase in internal noise level – further details www.kingspanpanels.com

With respect to the predicted levels for the Biogen Plant (taken from Table 9.5 – page 128 - of The Environmental Statement for the Barry Energy Recovery Facility prepared by Parsons Brinckerhoff Ltd) it is seen that the predicted Rating Level at the two common locations is calculated to be :

- 1) St Mary's Avenue / Dock View Road) = 24 dBA
- 4Y Rhodfa = 28 dBA.

Therefore to calculate the overall level of noise should both plants be approved then both these calculated Rating Levels need to be added together :

$$\text{Location 1} = 37 + 24 = \mathbf{37 \text{ dBA}}$$

$$\text{Location 3} = 32 + 28 = \mathbf{33 (33.4) \text{ dBA}}$$

If these new calculated Rating Levels are then compared to the lowest measured background levels above the following results :

$$\mathbf{\text{Location 1} = - 4.6 \text{ dBA}}$$

$$\mathbf{\text{Location 3} = - 7.1 \text{ dBA}}$$

Therefore if the specified internal level of 90 dBA is achieved for the Biomass Plant then the external level from the proposed plant and the additional Biogen Plant at the two locations will be less than the measured background level – this is an indication that complaints about noise will not be received.

However in the acoustic report for the Biogen Plant a lower background level (measured at approximately 01.40 – Y Rhodfa and at approximately 03.40 – Dock View Road) was recorded : these are quoted as 29 (28.5) dBA and 30 (29.7) dBA respectively.

If these background levels are used then the combined effect of both plants operating with respect to background levels is :

Location 1 = +8 dBA

Location 2 = + 3 dBA

Location 1 therefore results in an increase in noise level that is between that which is considered of *marginal significance* and that which *could result in complaints* with respect to BS 4142.

Therefore the external level could be reduced by either reducing the internal level within the plant to 85 dBA (rather than the 90 dBA suggested in the report dated 23 December 2009) or by increasing the attenuation offered by the building envelope.

If a 5 dBA increase in attenuation is achieved then the increase in noise level from both plants will be below that which is considered to be of *marginal significant* with respect to BS 4142.

I hope the above is sufficient for your present needs, if however you require any additional information please do not hesitate to contact us.

Yours faithfully

Roger Leach

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