PROPOSED DORENELL WIND FARM

Inquiry
into an Application under Section 36 of the
Electricity Act 1989
to construct and operate a wind farm, near Dufftown, Moray

Matters on which further representation / information is requested by the Reporter

WRITTEN REPRESENTATIONS ON PEAT RELATED MATTERS

Response on behalf of
Dorenell Ltd: The Applicant

By: Dr Douglas Nichol
and Ms Beverley Walker

Contents

1. INTRODUCTION

1. This document provides further information / representations on peat related matters, as requested by the DPEA Procedure Notice for the 'Inquiry into an Application under Section 36 of the 1989 Electricity Act to construct and operate a wind farm, near Dufftown,' for the Dorenell Wind Farm, dated 29h July 2010.

1.1. Qualifications and Experience

2. The technical information has been provided by Dr Douglas Nichol, who was the appointed peat slide risk expert for the project and the author of the peat slide risk technical documents, provided as Appendix 13.A (Peatslide Hazard and Risk Assessment – Interpretive Report 12 February 2008) and Appendix 13.B (Peatslide Hazard and Risk Assessment – Factual Report – 12 February 2008) of the Environmental Statement. Dr Nichol's qualifications and credentials are supplied in Appendix 1.

3. Responses to representations by third parties, which are not related to peat slide risk assessment, have been provided by Ms Beverley Walker. Beverley Walker was the Project Director for the Dorenell Wind Farm ES, and her qualifications are included in Appendix 2.

1.2. Assumptions

4. The nature of matters raised in the Further Written Submissions Annex suggests that the Reporter has not been provided with certain documents and information which had already been provided by the Applicant to the Energy Consents and Deployment Unit (ECDU) of the Scottish Government. Accordingly reference is made to this information, which although nominated as a core document (s), is also supplied with this submission.

5. Documents included in the Core Document List and the Applicant's List of Documents for these Written Representations are cited in this statement and listed in Appendix 3.

2. BACKGROUND

It is noted that:

2.1 The peat slide risk assessment carried out for the project was intrinsically linked to the design of the wind farm layout, spanned several iteration stages, and led directly to the removal and/or relocation of certain turbine positions. Accordingly, with the avoidance of steep slopes, deep peat and other areas of relatively higher risk, the residual risk of peat slide on the Dorenell site and in the vicinity of the River Fiddich, resulting from the wind farm, has been assessed as *negligible to low*. The residual risks have been reduced to *negligible* through the use of standard engineering practices.

2.2 The peat slide risk assessment included a basis for the project's Geotechnical Risk Register. The requirement for a further Geotechnical Risk Assessment and Register to be embedded and updated during the construction programme is now a legal requirement for construction.

2.3 Any peat slide event is highly unlikely. However if it did occur, there are a range of early warning systems which would detect it as a consequence of regular monitoring over the construction phase. This is an essential element of the updating of the Geotechnical Risk Register.

2.4 Detection of any geophysical disturbance would trigger the implementation of well known methods which would be deployed singly or in combination, either to prevent peat masses from moving out of place or to protect sensitive sites by keeping any mobile peat masses from reaching a receptor.

2.5 The peat slide risk assessment was reviewed by two independent auditors, who had no disagreement on the technical conclusions of the assessment.

2.6 SNH initially provided a holding objection to the proposal and asked for further clarification in order to address the implications of a possible peat slide and its potential effects on the qualifying features of the River Spey Special Area of Conservation (SAC).

2.7 As stated in SNH's full and formal consultation response of 18th June 2009 (CD-K20):

Infinergy's response provides a comprehensive and clear response to each of SNH's points of objection and requests for clarification. Taken together with the detail within the Environmental Statement (ES), this further information and clarification supports and provides additional confidence in the ES's conclusions.

Most importantly SNH is now confident that the wind farm proposal, developed in the manner that has been set out by the applicant, will not create a risk to the water environment, and in particular to the River Spey Special Area of Conservation (SAC).

SNH is now therefore of the opinion that the proposal, submitted by Infinergy, with a commitment to implement all mitigation and philosophies presented within the ES, and the additional information subsequently submitted, will have no adverse affect on the integrity of the River Spey SAC'

3. FURTHER INFORMATION / REPRESENTATIONS

3.1. Responses to the points raised in the audit of the peat slide hazard and risk assessment undertaken by Macaulay Enterprises Ltd (Appendix 13.C of the Environmental Statement (CD-H4), particularly points 9 and 10.

General comment.

3.1.1 Macaulay Enterprises Ltd were engaged by Infinergy Ltd to provide an independent peer review of the peat slide risk assessment at Dorenell, particularly to identify major deficiencies or gaps, prior to submission in the Environmental Statement (ES). Macaulay refer to a set of Scottish Executive guidelines produced in 2006 for the assessment of peat landslide hazard and risk assessment (APPW-P1).

3.1.2 The author of the Dorenell peat slide risk assessment, Dr Douglas Nichol, is an internationally recognised geologist who, as early as 2004, had developed a methodology for peat slide risk in wind farms which has been peer reviewed (APPW–P2) and applied previously to over 10 wind farms. Whilst this methodology has been modified to align itself with the later Scottish Executive Guidelines, there are several non-material departures, primarily on reporting format and content rather than on technical accuracy or conclusions, which Macaulay queried. Dr Nichol has interpreted the Scottish Executive guidelines as providing guidance rather than being prescriptive, and as not intending to stifle innovation and prevent technical progress on the assessment of peat slide hazards. Macaulay's points were welcome in supporting the technical conclusions of the risk assessment but were not considered substantive enough to warrant amending the reports prior to inclusion in the Environmental Statement.

3.1.3 **A. Factual Report**

Q. A1 Macaulay note the lack of a "desk study summary plan' for the site, as recommended by the Guidelines, summarising all supporting mapping and observations" in the factual report.

A. A1 Departure from the format suggested in the guidelines applies in this instance because the information gathered during the desk study is presented in the interpretive report. In addition, a comprehensive list of references also appears in the interpretive report.

3.1.4 **B. Interpretive Report**

Q.B2 Macaulay note that certain terminology does not follow the Guidelines.

A.B2 The term "peat landslide" is used by geographers and geo-morphologists, whereas the term *peat slide* or *peat slide* is preferred by engineering geologists and geotechnical engineers. There is no material difference.

Q.B3 Macaulay note in the summary a mention that the desk studies and field surveys were carried out using the Peat slide Hazard Rating System (PHRS) to evaluate peat land stability at the Dorenell site. Macaulay appear to believe that this system postdates the guidance notes from the Scottish Executive and suggest it could be worth mentioning that PHRS is a standard or accepted system for such work. They also suggest that this minor improvement could be re-iterated within the report in two places.

A.B3 Macaulay are not correct in this instance, because publication of the paper on the PHRS system by Nichol (2006) at the British Wind Energy Association's Annual Conference on 10-12 October, 2006 actually pre-dates the publication of the Scottish Executive guidance notes (Scottish Executive, 2006) which were issued in December 2006. Not surprisingly, the Guidance Notes make no reference to the PHRS system. However, the PHRS methodology is based on long-standing practice (see APPW-P3), has been widely adopted for numerous wind farm projects (exceeding 20) in Scotland, England and Ireland and remains a preferred

and accepted procedure still being used at the present day. In contrast, the Scottish Executive Guidance Notes are to undergo extensive revision and will be reissued in due course.

Q.B4 Macaulay draw attention to the lack of a 'statement of precognition' outlining the experience of the author for comparison purposes in relation to the Guidelines.

A.B4 A Curriculum Vitae for Dr Nichol is provided in Appendix 1 to these representations, which confirms he is both a Chartered Geologist and a Chartered Engineer with extensive experience in conducting geo-hazard assessment. He also has extensive international experience in construction over peat.

Q.B5 Macaulay suggest that the report authorship should be extended to become multi-disciplinary.

A.B5 This is not necessary in this instance. See answer A.B4 above.

Q.B6 Macaulay suggest that scope exists to elaborate on previous work by others on the extent of peat deposits.

A.B6 An extensive literature review of relevant peat slide incidents, including those in Scotland and the region is provided in the Reference sections of both reports audited. Other, previous investigations of peat deposits in the area, conducted by others, are predominantly regional in context and were carried out for different purposes. Accordingly, the findings proved to be of limited value for the site-specific work carried out on peat slides in this particular project and are not referred to.

Q.B7 Macaulay note the lack of a reference to the relevant sources of information in section 2.32.

A.B7 Noted. The source documents are referred to in Chapter 13 Volume 2 of the ES (CD-H3).

Q.B8 Macaulay note the requirements of the Guidelines appear to have been exceeded in Sections 2 & 3.

A.B8 Departures from the Guidelines are considered appropriate to accord with the site conditions encountered and the nature of the project.

Q.B9 Macaulay suggest the need for further discussion of the historical / existing peat slides at Dorenell, the likely triggers and the overall stability conditions of the site.

A.B9 A study of existing peat slides was carried out at Dorenell as necessary background for the peat slide risk assessment. However, the areas identified as prone to peat slides were eliminated for development purposes during the early stages of the iterative design process. A paper on the principal peat slide at Dorenell was published from this information by Dr Nichol in the *Scottish Journal of Geology* (APPW-P4), and which is referred to below in Section 3.2 in addressing the scale of a potential slide on the site.

Q.B10 Macaulay note an apparent inconsistency between certain peat slide locations and a "low" susceptibility zonation.

A.B10 These peat slide localities involve events of strictly local significance and include exceedingly small failures associated with erosion as well as failures associated with the banks of streams at bends in their course and also failures associated with man-made excavations in peat. As such, they provide useful observational localities for geotechnical purposes but they constitute a poor indicator and unreliable guide to future slope movements in the immediate vicinity.

Q.B11 Macaulay confirm that mitigation measures and the risk register are fully covered.

A.B11 Noted.

Q.B12 Macaulay confirm that conclusions and recommendations are adequate.

A.B12 Noted.

3.2. Representations on the implications for water courses, including the River Fiddich (a Special Area of Conservation) and the Blackwater, other habitats and the area in general, if peatslides were to occur as a result of the proposals, and the possible scale of such peatslides.

3.2.1 This query is similar to Question 1.24 & 1.25 of SNH's queries of October 2008 (CD-K18). Infinergy provided a comprehensive and detailed response to peat slide risk issues, and Infinergy's response to these questions (CD-K19), as provided in the document, also apply (see also section 2.5 below).

3.2.2 In summary, the purpose of a peat slide risk assessment is to determine the likelihood of a peat slide arising from construction activities. This risk was assessed through examining geotechnical parameters at various locations throughout the site for the purposes of identifying areas where specific mitigation is required, and over the site as a whole.

3.2.3 It is notable that the report by the independent auditors appointed by the Scottish Government (Halcrow Ltd) states:

The site was visited on numerous occasions and the factual report contains very high quality and detailed records of the key areas of interest. There is evidence that despite the size, the whole site has been walked with significant features, photographed, described and recorded. Such evidence gives confidence in the findings of the report, demonstrating as it does that the site as a whole has been considered.

3.2.4 The peat slide risk assessment carried out for the project spanned several iteration stages, was intrinsically linked to the wind farm design and led directly to the removal and relocation of certain turbine positions. Accordingly, this has resulted in an assessment of 'low to negligible' risk of peat slides on the Dorenell site and in the vicinity of the River Fiddich as a consequence of the wind farm. These risks would be reduced to 'negligible' through the use of standard engineering practices.

3.2.5 The likelihood of a peat slide event occurring does not change whether the River is designated as an SAC or not.

3.2.6 Notwithstanding the observation in 3.2.5, the following information is provided to help understand the nature of a hypothetical peat slide.

a) From a ground engineering standpoint, peat slide events at the development site at Dorenell are unlikely and avoidable. However, consideration was given to the potential consequences associated with the three zones of a peat slide.

b) A peat slide *starting zone* (or zone of origin) is the location where unstable peat fails and begins to move. The backscar (or crown, fracture line, head, initiation point) of a peat slide defines the upper limit of the starting zone for each peat slide. While the lower limit of peat slide origin is usually ill defined, it is sometimes quite obvious. Consequences in the starting zone of a peat slide may include disruption of the ground surface, exposure of peat faces, loss of vegetation and habitats and reduction in lateral ground support.

c) The *track* (or zone of transition) is the slope below the starting zone that connects the starting zone with the zone where debris collects (*runout* zone). While the track is the major terrain feature for large peat slides, it is often ill defined in peat slides with a short run out distance. Peat slide speed attains its maximum value in the track but speed variations are smallest there. Consequences along the track may include disruption of the ground surface and watercourses, destruction of vegetation and habitats and damage to physical assets such as fences, forest plantation, buildings and roads.

d) The *runout* zone (or zone of deposition or accumulation) is the area where deceleration is rapid, debris is deposited, and the peat slide stops. An abrupt change in slope can mark the transition between *track* and *runout* zone, but this is often not the case. Consequences in the *runout* zone may include disruption of the ground surface and watercourses, destruction of vegetation and habitats and in particular, damage to fisheries interests.

e) The three zones vary and are specific for every individual peat slide. However, the size and speed of the slide is often a function of slope in combination with the roughness or smoothness of the underlying bedrock. The implications for watercourses involve the possibility of a surge of peaty sediment combining with turbulent water-flow to potentially affect aquatic habitats.

3.2.7 The geotechnical expert opinion is that there is a low to negligible risk of a peat slide event as a consequence of construction at Dorenell, with risks being reduced to negligible through the use of standard engineering practices.

3.2.8 In addition to implementing these construction practices, any peat slide event which might occur would be detected early on as a consequence of regular monitoring over the construction phase. The requirement for the Geotechnical Risk Register to be embedded and updated during the construction programme is now a legal requirement for construction.

3.2.9 Detection of a geophysical disturbance would trigger the implementation of various methods which can be deployed singly or in combination at any given point either to prevent peat masses from moving out of place or protect sensitive sites by keeping peat masses that do move out of place from reaching a target receptor. These include:-

- Limited duration improvements to remove loose blocks or masses of peat
- Earthworks to create interception ditches
- Minor modifications to track alignments to avoid difficult ground
- Drainage works to collect or divert uncontrolled water flows
- Installation of multi-rows of recycled plastic pin-piles (Loehr et al, 2000) (APPW-P5)
- Installation of arrays of plate piles (McCormick & Short, 2006[1])
- Gabion barrier walls to apply direct support to a peat face
- Rockfill buttressing to provide support for large masses of unstable peat
- Channel training works such as ditch deepening and reshaping to mitigate erosion

3.2.10 Although is extremely difficult to predict the scale of an unlikely event, helpful background information on this matter is also provided in the account of a natural peat slide that occurred in Glenfiddich in 2004 (referred to above APPW-P4). Since

[1] McCormick, W. & Short, R., 2006. Cost effective stabilization of clay slopes and failures using plate piles. In, Culshaw, M., Reeves, H., Spink, T. & Jefferson, I. (Eds), *IAEG2006 Engineering geology for tomorrow's cities.* Proceedings of the 10th IAEG International Congress, Nottingham, (6-10 September 2006), The Geological Society, London, Paper number 629.

this is the largest known peat slide to have taken place in the vicinity of the site, it also serves as a guide to the possible scale of any peat slides that may happen in the future.

3.2.11 It also serves to demonstrate that any peat slides that would occur appear likely to coincide with rainstorm activity which in turn gives rise to the rivers being in spate with fast and turbulent flow conditions that dilute and disperse the influx of peaty sediment and naturally mitigate any problems that may arise. In these circumstances, the potential impacts on the SAC qualifying interests would be minimised, although the visible effects might be seen for some distance downstream.

3.3. Representations on the implications for the proposals and habitats in the area of the statement at paragraph 13.114 of the Environmental Statement (chapter 13).

13.114 Outside the boundary of the wind farm site to the southeast, soft friable saprolite derived from deep weathering of gabbroic rocks has a very high potential for sediment transport and represents a potential pollution hazard. Although this ground lies outside the area of the wind farm proposal and it will be actively avoided, it poses a special and unusual problem that warrants further geotechnical investigation, monitoring and treatment.

3.3.1 As discussed in Chapter 13 *Geology and Peat Slide Risk* of Volume 2 of the ES (CD-H3), a major pocket of altered gabbroic rocks of the Black Water Intrusion outcrops to the southeast of the site in a road cutting on Stapler Road (see Plate 1 below). The golden-yellow alteration product consists of silt and clay minerals that readily disperse in water and stay in suspension for considerable lengths of time. The area is located in an intersection of existing estate tracks. However, the current land use of the estate and agricultural activities are likely to give rise to only minor disturbance of this area of saprolite (weathered rock). However, increased surface activities could cause new and additional disturbance to this water-sensitive material and lead to a significant pollution incident with excessive and unsightly silt loads entering watercourses.

Plate 1: Stapler Road cutting in saprolite derived from deeply weathered and altered gabbro (*Figure 13.6 of the ES*)

3.4. Responses to the Assessment Report completed by Halcrow Group Ltd (June 2008) on the Peat Landslide Risk Assessment contained in the Environmental Statement.

3.4.1 A full response to the June 2008 Halcrow Group Ltd Assessment Report (CD-K7) was provided by Dr Doug Nichol, and compiled by Royal Haskoning on behalf of Infinergy Ltd for the applicant, to Halcrow (Gordon Buchan) and Lorraine Brown of the ECU on 4th September 2009 (CD-K8).

3.4.2 This response is proposed as a Core Document but submitted here as a document supporting this written response.

3.5. Further details of the information provided to Scottish Natural Heritage to deal with the points they raised in their consultation responses.

3.5.1 A comprehensive response to the SNH letter of October 2008 (CD-K18), providing clarification on queries related to peat slide risk and sedimentation, with attention to protection of the River Spey SAC, was provided in June 2009 (CD-K19). This response (see 'Section 1 - Issues with the potential for negative implications for the River Spey SAC specifically relating to the Peat Slide Risk Assessment and construction and operation of wind farm tracks and turbines within the upland peat habitat') is proposed as a Core Document and is submitted here as a document supporting this written response.

3.6. Responses to the points raised in other consultations and letters of objection about the effects of the proposals on the peat land on site.

3.6.1 To the best of the applicant's knowledge, other interested parties, in addition to those mentioned above, which have submitted consultation responses or letters of objection regarding peat land and other issues are:

- River Deveron District Salmon Fishery Board
- Mountaineering Council of Scotland
- SOS Moray
- 3rd party submissions based on *pro forma* objections from SOS Moray or website
- Dufftown 2000
- Kate and AM Gordon - Rogers

3.6.2 River Deveron District Salmon Fishery Board expressed concern regarding damage to peat land, as an Annex II protected habitat, and the subsequent impact of high sediment loads on the fisheries of the Black Water, as headwaters of the River Deveron (CD-K3). Meetings and consultations with both the Spey Fisheries Board and the Deveron District Salmon Fishery Board resulted in the further development of an Outline Drainage Management Plan (Annex 1B of CD-K19), as well as a long-term Outline Fisheries Monitoring Plan (CD-H8), to alleviate concerns. Both Boards have withdrawn their initial objections to the proposal as a result of accepting these Plans.

3.6.3 The Mountaineering Council of Scotland expressed concerns regarding proposals for 'rewetting' blanket bog in terms of the length of time taken for improvement. This habitat management proposal is proposed as an improvement to the existing habitat on the estate, and efforts outwith the wind farm site to improve habitat can only be seen as a benefit. This issue is also addressed in the Wildlife and Ecology Issues (not including Ornithology) Written Submission for the Applicant by Dr Andy Mackenzie

3.6.4 A full response to the concerns of SOS Moray as identified on their website in 2008 was provided as an Appendix to the Non Technical Summary (NTS) of the ES (CD-H2).

3.6.5 To the best of the applicant's knowledge, these responses address other 3rd party *pro forma* submissions on all other issues raised, including those of the Scottish Wildcat Association as they pertain to peat lands.

3.6.6 Both Dufftown 2000 and representations by Mr and Mrs Gordon-Rogers raise issues in terms of excavating peat, the damage to the landscape, drainage and $C0_2$ payback times.

3.6.7 With regard to representations by the Gordon-Rogers, the following applies:

Page 7/19 refers to the vulnerability of river catchments particularly those with moorland peat, and the sensitivity of salmon and trout fisheries to sedimentation and water abstraction.

3.6.8 The measures to minimise sediment transport to the River Fiddich and Black Water through large setback distances, track and drainage design, construction mitigation measures, supervision and monitoring are described in 3.5 above. In addition to SNH withdrawing their standing objection to the proposal, both the Spey and Deveron Fisheries Boards are satisfied with the mitigation measures identified for the proposal.

3.6.9 Any water abstraction on the site for the project would require a license under the Controlled Activities Regulations 2005 which will set conditions on abstraction quantity and timing.

Page 7/19 suggests that carbon loss from peat land is understated and does not correlate with the findings of the Macaulay Institute's report - *calculating carbon savings from wind farms on Scottish peat lands a new approach* (2008).

3.6.10 The carbon loss from peat land was estimated for the ES using the guidance that was available at the time, namely the SNH Technical Guidance Note, 2000 (reproduced in full as Appendix 2B, Volume 3 of the ES) (CD-H4). The calculations are presented in full in Appendix 2A of Volume 3 of the ES, which made use of the carbon budget for a typical 3 MW turbine (Available at: http://www.vestas.com/en/about-vestas/sustainability/wind-turbines-and-the-environment/life-cycle-assessment--(lca).aspx)

3.6.11 The representation does not explain nor describe how the findings of the Macaulay Institute paper apply to Dorenell, nor what is deficient in the SNH methodology. However being a 'new approach', it is inevitable that the estimations using this methodology will be different.

Page 7 - 8/19 Flooding: This objection is based on assumptions that 'peat is the greatest natural mitigator of flood waters arising in the (Moray) river catchments' and the project will result in 'massive drainage' of the peat water store suggests that, and will have a negative impact on the alleviation of flooding.

3.6.12 These assumptions are in error, and in fact the opposite is true. Peat lands permanently hold water at or near the surface, which does not allow for significant rainwater infiltration. In other word, they present a relatively impermeable surface on which rainfall runs off rapidly and immediately, hence the term 'flashy' /flash flooding' catchments. As these moorland, unforested catchments have little or no capacity to retain water, they are frequently associated with rapid downstream flooding. This lack of nature flood mitigation is why Morayshire is spending significant sums of money on flood defence schemes. Replacing a natural impermeable surface with some man-made impervious surfaces, such as wind farm infrastructure, would result in little difference to the rate and quantities of rainwater discharge over the site and the catchment as a whole. In particular, the design philosophy for the drainage management on site is intended to mimic the natural water shedding process from the catchment (see response to Section 3.5)

3.6.13 Disturbance of peat lands does not cause 'massive drainage' of water, although it is true that some groundwater will be displaced by turbine foundations. The foundations will be dewatered and the discharge diffused over the peat land to drain away. However, the volume involved is insignificant when compared to the total catchment area and/or a rainfall event. Dewatering would also occur intermittently over the construction period, and would not influence critical flood volumes during heavy rainfall periods.

4. CONCLUSIONS

4.1 The concerns expressed by Macaulay Enterprise Ltd and Halcrow Group in their reviews of the peat slide risk assessments, related primarily to formatting and layout as indentified in recent Scottish Executive Guidelines. Importantly, there was no dispute with the technical conclusions of the reports.

4.2 The peat slide risk assessment carried out for Dorenell was an iterative process which influenced the design of the wind farm layout, such that any relatively high area of risk was avoided. Accordingly, the residual risk of peat slide occurring as a consequence of the wind farm is *low to negligible*, with risks being reduced to *negligible* through the use of standard engineering practices.

4.3 A detailed response to SNH requests for clarification was provided (CD-K19), which resulted in removal of the standing objection and any concerns regarding impacts on the integrity of the River Spey SAC (CD-K20). Extracts from the Summary of that Response, with regard to Peat Slide Risk are reproduced below.

Peat Slide Risk

SNH's concerns appear primarily related to the need to clarify the purpose, methodology and conclusions of the peat slide risk assessment, and to also provide more information on the proposed mitigation, control and management of sedimentation and runoff, particularly to the SAC.

In terms of peat slide risk, SNH's response suggests that there has been some misunderstanding by SNH regarding the purpose and objectives of a peat slide risk assessment and the meaning of the Peat Slide Hazard Risk scores. This has lead to misinterpretation of the data and the suggestion that some turbines should be removed because of slope instability.

Infinergy strongly disagrees with this suggestion. The peat slide risk assessment, which has been undertaken in alignment with Scottish Government best practice guidelines, states the opposite, namely that there is a negligible to low residual risk of peat slide occurring on the site as a consequence of wind farm construction. There are geotechnical grounds for SNH's concerns and hence there are no areas proposed for development which warrant removal of any turbines on the basis of peat slide risk. These conclusions are supported two independent expert reviews.

It is important to note that, outwith environmental concerns, the issue of slope instability and potential risk to turbine integrity is also of primary concern to Infinergy. Each turbine costs in the vicinity of £2million, with construction costs in the vicinity of £1million. Furthermore the turbine manufacturer will not provide a warranty or service and maintenance agreement if there is an issue with slope instability on site at each turbine. This factor will be independently audited.

Infinergy has a number of other sites in Scotland, and intends to develop in the future. Hence loss of public confidence is also an important factor that has been considered. In addition, the new Environmental Liability Regulations (APPW-P6) places an onus on the developer to remediate any damages occurring to European sites. Infinergy is well aware of these consequences, and is satisfied that the level of detail provided not only meets the requirements for 'adequate information' as required by the EIA Directive, but that the proposal as submitted can be achieved with minimal commercial and financial risk.

In conclusion, Infinergy believe that the risks and mitigation measures inherent in positioning a wind farm project within the catchment of an SAC have been comprehensively addressed throughout all stages of the project.

This is a true statement of my written evidence to the Dorenell Wind Farm Inquiry

Signed..... Douglas Michael .....

Date..... 07 September 2010 .....

This is a true statement of my written evidence to the Dorenell Wind Farm Inquiry

Signed.....(BEVERLEY WALKER)

Date.....8th September 2010

APPENDIX 1: QUALIFICATIONS AND EXPERIENCE: DR DOUG NICHOL – EXPERT ON PEAT SLIDE RISK

Dr Douglas Nichol — Curriculum Vitae

Current Position	Associate Consultant
Date, Place of Birth	21 June 1947, Glasgow, Scotland.
Nationality	British
Specialisations	Engineering Geology, Construction over Peat, Construction Materials, Geotechnical Engineering, and Applied Environmental Geology
Education	BSc(Hons), University of Glasgow, 1970 MSc Applied Geology, University of New South Wales, 1981 PhD School of Mines, University of New South Wales, 1988
Professional Affiliations	FICE Fellow of the Institution of Civil Engineers, 2003 FIMMM Fellow, Institute of Materials, Minerals and Mining, 1986 FGS Fellow of the Geological Society, London, 1983 FAusIMM Fellow, Australasian Institute of Mining & Metallurgy, 1975 FIHT Fellow, Institution of Highways and Transportation, 1993 Member of the International Peat Society, 2009 Member of the Geological Society of Glasgow, 1968
Professional Registrations	CEng - Chartered Engineer, 1987 CGeol - Chartered Geologist, 1991 EurIng - European Engineer, 1989 CPGeo - Chartered Professional (Geology), 2000
Biographical Listings	Who's Who in Science & Engineering (2-12th editions), 1994-2009 Who's Who in the World (11-26th editions), 1993-2009
Awards	1985 President Eisenhower People to People Delegate to the USA 1996 Churchill Fellow, Winston Churchill Memorial Trust to Canada 2006 TEG Award, ICE Wales Transportation Engineering Group
Committees	Institution of Highways & Transportation, North Wales Branch Committee; Member, 1996-1998; Vice-Chairman, 1998-2000; Chairman, 2000-2002; Hon. Secretary, 2002-2009. Quarterly Journal of Engineering Geology & Hydrogeology, Editorial Board Member, 2000-2005. CIRIA Steering Group, RP599: Contaminated land risk assessment: good practice guidance, Member, 1999-2000. Engineering and Physical Sciences Research Council (EPSRC) Peer Review College, Member, 2000-2006.

British Geological Survey - Wales Regional Advisory Panel, Member, 2002-2006 & BGS Regional Users Forum: Wales, Member, 2006-present.

Institution of Highways & Transportation, Council Member, 2004 - 2007, Transport Policy Board Member, 2004-2006, Network and Infrastructure Management Board Member, 2006-2007.

Wales National Transport Conference & Exhibition, Organising Committee, Member, 2005-2009.

Pen Profile

With 40 years experience, Dr Nichol is accomplished in many aspects of the engineering, construction and geo-materials industries from reconnaissance and exploration to project development and management. He has worked on a large number of highway, railway, energy, mining and wind farm projects set in different types of geological terrain and geographic regions. He has served in government institutions, multinational mineral corporations and universities and worked throughout Australia, North America, Middle Europe and Africa as well as the UK.

Dr Nichol has been involved with numerous site investigations for a wide range of development projects. He has also been directly responsible for numerous feasibility and evaluation studies and development plans. Special interests include construction materials, environmental geology and dealing with geohazards. Published papers exceed 120 in number and he has numerous conference presentations to his credit. His special strength lies in the application of his multi-disciplinary skills in science and engineering to provide practical, reliable and economic solutions to problems.

Construction over peat is a long-standing special interest and in 1996 he was awarded a Churchill Fellowship to study the subject for 3 months in Canada, a country with more peatland than anywhere else in the world. Since then he has provided advice on construction over peat and carried out peatslide risk assessments at numerous projects throughout the UK, including 11 wind farm projects. He has also stood as an Expert Witness in public inquiry, including advice on construction of access roads over peat for Duntanlich Public Inquiry, Perthshire (1993).

Relevant Experience

Borrow Pit and Construction Materials Survey: Standish Cote Wind Farm, Cumbria, England (2008)

Peatslide Risk Assessment: Dorenell Wind Farm, Moray, Scotland (2008)

Borrow Pit and Construction Materials Assessment: Dorenell Wind Farm, Moray, Scotland (2008)

Peatslide Risk Assessment: Glenconway Wind Farm, Co. Londonderry, Northern Ireland (2008)

Peatslide Risk Assessment: Baillie Wind Farm, Caithness, Scotland (2007)

Peatslide Risk Assessment: Tievenameenta Wind Farm, County Tyrone, Northern Ireland (2006)

Peatslide Risk Assessment: Belmore Wind Farm, County Fermanagh, Northern Ireland (2006)

Peatslide Risk Assessment: Calliachar Wind Farm, Perthshire, Scotland (2006)

Peatslide Risk Assessment: Solwaybank Wind Farm, Dumfriesshire, Scotland (2006)

Peatslide Risk Assessment: Drumderg Wind Farm, Perthshire, Scotland (2006)

Peatslide Risk Assessment: Dunbeath Wind Farm, Caithness, Scotland (2006)

Development of the Peatslide Hazard Rating System for Wind Farm Projects (2005)

Investigation and remedial treatment of a peatslide affecting the highway at A5 London to Holyhead Road at Llyn Ogwen, Capel Curig, North Wales (2005)

Peatslide Risk Assessment: Glenkirk Wind Farm, Invernesshire, Scotland (2005)

Peatslide Risk Assessment: Lewis Wind Farm, Western Isles, Hebrides, Scotland (2003 - 2004)

Site investigations for two highway improvement schemes over peat, A470 Llanrwst, Wales (2004)

Studies on peat deposits at Llyn Moelfre and Craig Gamhyll landslide dam, Powys, mid-Wales (2003)

Investigation of highway verge failures in peat at Rhydtalog, Llandegla Moor, North Wales (2002)

Advice on peat investigations at Derskelpin Moss for A75 Cairntop to Barlae, Dumfriesshire (2002)

Advice on highway widening scheme over peat at Chester Southerly Interchange, Cheshire (2002)

Peat consultant on design of Enterprise Corrib Gas Terminal at Co Mayo, Ireland (2001-02)

Design and construction of A5156 Llanypwll Link Road across Borras Bog, North Wales (1999)

Investigation of road subsidence over peat at Cadney Lane, Fenn's & Whixall Moss, Wales (1998)

Site investigations of peat deposits at A55 Llanfairfechan Bypass, North Wales Coast Road (1997-99)

Supervision of trials on wood fibre fill solutions to soft ground problems on equestrian trails (1997)

Churchill Fellowship study of construction over peat in Canada (Alberta & British Columbia) (1996)

Advice on effects of peatland for Lingarabay Superquarry Public Inquiry, Lewis (1995)

Investigation of settlement over peat on the A5 at Pant Dedwydd, Cerrigydrudion, North Wales (1994)

Advice on construction of access roads over peat for Duntanlich Public Inquiry, Perthshire (1993)

Study of organic soils in coastal swamps, Pebane to Quelimane, Eastern Mozambique (1989-90)

Environmental impact statement and review of commercial proposals for peat extraction at Cowerup Swamp, Lake Hart, Western Australia (1980)

Engineering characterisation of peat deposits along the coastal strip near Port MacDonnell, Mount Gambier Region, South Australia (1972)

List of Recent Publications

Nichol, D., 2009. A peat slide at Glenfiddich, East Grampian Highlands. *Scottish Journal of Geology*, **45**, 183-186.

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APPENDIX 2: QUALIFICATIONS AND EXPERIENCE: MS BEVERLEY WALKER – SUBMISSIONS ON OTHER ON PEAT RELATED MATTERS

Ms Beverley Walker

The Witness has been involved in the Dorenell project since June 2006 as the Project Director and principal author/co-ordinator of the Dorenell Environmental Statement (ES) and post submission responses on behalf of Infinergy.

The Witness has a BSc (1st Class Hons) Botany, University of Western Australia) and has over 26 years experience in the environmental sector, specialising in Environmental Impact Assessment (EIA).

In Western Australia, the Witness was an Associate Director of a prominent environmental consultancy (Bowman Bishaw Gorham – now RPS) which she left to spend five years in the Western Australian Government Department of Environmental Protection, Evaluation Division as a Manager of the Land Use Development Branch. In this role she was responsible for a team of 10 staff which undertook the evaluation of over 300 EIA and strategic advisory assessments under the WA Environmental Protection Act 1986. Core business included environmental impact assessment of proposals ranging over land, water resources and the marine and coastal environments. Other relevant experience includes:

- member of two Ministerial Select Committees with regard to catchment water resources;
- Independent assessor for the Australian Heritage Commission (biodiversity) (appointed by the Minister for Planning);
- input into statutory Environmental Protection Policies and involvement in the broader implications of Commonwealth Policies and National and International agreements and strategies, particularly ecologically sustainable development, biodiversity, greenhouse and state of the environment reporting as they apply to EIA, and their integration into planning and development strategies;
- provided critical review on behalf of the Environmental Protection Authority (EPA) to Water and Rivers Commission Policy (Standing Committee on Agriculture and Resource Management – joint committee of the Agriculture and Resource Council of Australia and New Zealand – ARMCANZ, and the Australian and New Zealand Environment and Conservation Council – ANZECC) with regard to Environmental Water Requirements (EWR) and Environmental Water Objectives (EWO).
- development of streamlined EIA screening and scoping guidelines for local authorities;
- conducted masterclasses on EIA for engineers.

In the UK, the witness has been actively involved in the Renewable and Energy sector for the past 8 years, specialising in the s36, s37 consenting process. She has been involved in the EIA of over 25 onshore wind farm projects, predominantly in Scotland but also in Northern Ireland, Wales, England and the Republic of Ireland, with an emphasis on peat hydroecology..

The witness is a nominated member of the Scottish Renewables Forum (SRF) Planning and Consenting Working Group, provided advice to support the Onshore Wind EIA Best Practice Seminar in April 2010.

The witness is a member of UKELA and is currently undertaking an LLM Masters in Environmental Law focusing on EU Legislation and integration into UK Law (Water Law, nature Conservation Law and the Law of Development Control), and has a particular focus on the implications of the Public Participation Directive to EIA practice.

APPENDIX 3: LIST OF DOCUMENTS FOR THE WRITTEN SUBMISSION ON PEAT AND RELATED MATTERS

CD	H	4	Dorenell Environmental Statement (ES) Volume 3: Appendices: Appendix 13.C of the Environmental Statement. Dorenell Wind Farm – Peatslide Hazard and Risk Assessment, 2008. Independent comments on Factual and Interpretive Report, Annexes and Appendices, carried out for Infinenergy Ltd (*sic*).By A J Nolan, Macaulay Research Consultancy Services Ltd, on behalf of Macaulay Enterprises Ltd).
APP	W	P1	'Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation Developments' (Scottish Executive, 2006).
APP	W	P2	Nichol, D., 2006. Peatslide hazard rating system for wind farm development purposes. Proceedings of the 28th Annual Conference of the British Wind Energy Association (BWEA28, Glasgow),
APP	W	P3	Clayton, C.R.I., 2001. *Managing Geotechnical Risk*. Thomas Telford, London.
APP	W	P4	Nichol D. (2009) A peat slide at Glenfiddich, East Grampian Highlands. Short Communication. Scottish Journal of Geology 45, (2), 1–5, 2009
APP	W	P5	Loehr, J.E., Bowders, J.J., Owen, J.J., Sommers, L. & Liew, W., 2000. Stabilization of slopes using recycled plastic pins. *Transportation Research Record: Journal of the Transportation Research Board*, TRB, **1714**, 1-8.
APP	W	P6	McCormick, W. & Short, R., 2006. Cost effective stabilization of clay slopes and failures using plate piles. In, Culshaw, M., Reeves, H., Spink, T. & Jefferson, I. (Eds), *IAEG2006 Engineering geology for tomorrow's cities*. Proceedings of the 10th IAEG International Congress, Nottingham, (6-10 September 2006), The Geological Society, London, Paper number 629.
CD	K	18	SNH: Consultation response. October 2008 (Ref: CNS/REN/WF/Dorenell). Including Annexes 1-5.
CD	K	19	Infinergy's response to SNH (April 2009) including Annex 1B: *Outline Development Management Plan (ODMP*
CD	K	20	SNH: Full and Formal Response.: Conditions proposed by SNH. Letter from David Bale, SNH Area Manager, to Lorraine Brown, ECU, Scottish Government. 18 June 2009
CD	H	3	Dorenell Environmental Statement (ES) Volume 2: Written Statement
CD	H	8	Dorenell Wind Farm Outline Fisheries Management Plan (oFMP). A document prepared by the Spey Research Trust, the Deveron, Bogie and Isla Fisheries Charitable Trust and Royal Haskoning (on behalf of Infinergy Ltd)
CD	H	9	Agreement between Dorenell Ltd and Spey District Salmon Fisheries Board and The Deveron District Salmon Fisheries Board and The Deveron, Bogie and Isla Rivers Charitable Fisheries Trust and Spey Foundation in relation to the protection and enhancement of the principal river catchments near to the proposed Dorenell Wind Farm
CD	K	7	Halcrow Group Ltd. Peat Slide Risk Assessment Report June 2008.

CD	K	8	Infinergy Response to Halcrow 4th September 2009
CD	H	2	Dorenell Environmental Statement (ES) Volume 1 Non-Technical Summary
CD	K	12	Applicant's Memo to Lorraine Brown ECU: Response to Issues raised by Mountaineering Council for Scotland; RSPB and Cairngorms National Park
APP	W	P6	Environmental Liability (Prevention and Remediation) (Scotland) Regulations 2008