

DPEA reference : WIN-370-2 Arecleoch Windfarm Extension

Inquiry Statement in Respect of the Assessment of Private Water Supplies

by Dr Rachel Connor

Public Inquiry Item 4.

Introduction

1. My name is Dr Rachel Connor. I am a retired medical doctor M.B. Ch.B, FRCR, with licence to practice from the General Medical Council.
I have a broad medical training which includes public health, organic chemistry, physics and bacteriology. I have worked as a NHS consultant in radiology for over 30 years.
2. I have been asked to act as a public witness by Mrs Susan Crosthwaite and other interested third parties in regard to the Private Water Supply Risk Assessment (PWS RA) submitted by Scottish Power Renewables (SPR), appellant to this appeal, as part of their Environmental Impact Report (ER), submitted to support their application for the proposed Arecleoch windfarm extension in South Ayrshire.
3. I have extensive personal experience of the impacts of windfarm development upon private water supplies and the risks to health associated with those adverse impacts upon PWS.
I have nine years of personal research and experience of investigating the effects and potential effects of windfarm development on water supplies (public and private) in Scotland. I have experience of helping third parties in regard to potential impacts on public and private water supplies from windfarm applications in Angus, Ayrshire and Dumfries and Galloway.
4. I live directly adjacent to the 215 turbine Whitelee windfarm and directly adjacent to the consented (in 2012), but not yet built Sneddon Law windfarm in East Ayrshire (which has not yet satisfied its planning conditions related to PWS).
I have had extensive exposure to the planning requirements and legislation related to those windfarms. I participated in the Whitelee windfarm Extension 3 Public Inquiry 2015, focussed largely upon potential impacts of that application upon private water supplies, four of which had already been lost during the construction period of the original Whitelee windfarm (2006-2009).
5. I have had many meetings with SEPA, Scottish Water and Scottish Ministers discussing various aspects of windfarm construction upon drinking water supplies, both public and private.

6. I am a member of Scotland against Spin (SAS), a lawful, voluntary organisation opposed to the Scottish Government's Policy of promoting onshore windfarm development at almost any cost. I continue to represent SAS at stakeholder's meetings with the DPEA, providing public opinion and input on various aspects of planning and appeal procedure.
7. The opinions expressed in this submission are my own, believed to be the truth and based on current environmental and planning legislation, as referenced, published guidance from statutory authorities and my own experience.
I have had no previous involvement with Arecleoch windfarm or Arecleoch windfarm extension and I have no conflict of interest.
8. I am aware of my duty to the Examination process.
9. The appellant provides the Private Water Supply risk assessment, conducted by its consultants SLR, as a technical Appendix 10.3, to Chapter 10 of the ER - Hydrology Hydrogeology, Geology and Soils.
Thirty five PWS (31 PWS sources) are identified by SLR as being within 1km or down gradient of the windfarm site perimeter and therefore potentially at risk, as mapped in SLR Figure 10.1.
10. An annotated PWS Figure 10.1 is provided by third parties which illustrates not only the SLR identified PWS, but identifies several additional PWS not included in the PWS risk assessment¹ which may be at risk. The PWS source types, provided by PWS owners and recorded in the third party questionnaire² are also mapped. Some of these sources were recorded as 'unknown' in the PWS RA.

Protection of Private Water Supplies

11. The United Nations (UN) General Assembly declared in 2010 that safe and clean drinking-water and sanitation is a basic human right, essential to the full enjoyment of life and all other human rights.³
12. The World Health Organisation (WHO) and the Scottish Drinking Water Quality Regulator recognise that waterborne diseases from private water supplies are still a major cause of morbidity and mortality. In the WHO European region alone, over ten thousand children under five die of diarrhoea every year⁴. Scotland is not immune from mortality arising from contaminated private water supplies. Both the number of PWS and the rate of illness attributable to PWS in Scotland is significantly higher than in England.

¹ 23.31 SCR 19 PWS sources SPR Fig 10.1 annotated

² 23.33 SCR 20 Third Party PWS Questionnaire

³ 23.30 SCRC17 WHO Guidelines for Drinking -Water Quality 4th Edition 2019. Preface e-19

⁴ 23.17 SCRC 3 Drinking Water Quality Regulator: Private water supplies Technical Manual - Risk Assessment Section 4 (2015) §4.1

13. Water, and drinking water in particular, is a precious and limited resource accepted by all civilised societies as a precious commodity which is vital for life and human habitation and which therefore requires protection.
As such, in the EU, the UK and Scotland, there is a raft, not just of guidance, or policy, but of legislation which exists to protect those water supplies regardless of whether they are public or private.
14. A private water supply is a supply of potable water which does not come from a licensed water supplier. (In Scotland, public water is provided by Scottish Water or its commercial arm, Business Stream.)
Private water supplies are very common in rural Scotland. Approximately 3% of the population, 200,000 people, are reliant on PWS in Scotland. (DWQR figures 2019) Most properties reliant on a PWS do not have alternative access to a public water supply which could be made available if their PWS fails for any reason. That is the case for almost all the PWS identified around this application site.
Local authorities have statutory duties for PWS which includes monitoring, risk assessment and screening out developments likely to adversely impact on PWS.
15. Rural communities and rural dwellers are inherently a disadvantaged group compared to urban dwellers, not only in relation to provision of public services, but in relation to connectivity and accessibility to information. The current coronavirus restrictions on public movements, but continued progression of industrial scale planning applications in rural areas which may affect critical water supplies has only served to highlight these inequalities. These factors are important when considering the WHO criteria of equity of rural dwellers to safe drinking water, their health and the importance of a creditable water safety plan to protect their water supplies.⁵
16. The consequences of PWS which have been lost or badly polluted by windfarm development are not only a serious risk to public health but may render a property uninhabitable. The devastating effects are recounted by one resident in a small community affected by this appellant's Cruach Mhor windfarm in Argyll.⁶

Applicable Legislation

17. This is an application made under *the Electricity Act 1989 (as amended)* and subject to *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017*⁷ (EWS).
18. Relevant Scottish Planning policy is set out in Scottish Planning Circular 4/1998⁸ and *Scottish Planning Circular 2017/1*⁹

⁵ SCRC WHO water safety planning guidelines 2019

⁶ 23.26 SCRC12 Cruach Mhor

⁷ 23.25 SRC 11 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

⁸ 23.18 CD 14.2 Scottish Planning Circular 4/1998

⁹ 23.24 SCRC10. Scottish Planning Circular 2017/1

19. This statement of case for Arecleoch windfarm extension sets out the perceived departures from applicable legislation in §17 and assesses whether the (unauthored) Scottish Power Renewable (SPR) PWS RA (Technical Appendix 10.3) meets the standards required by that legislation. The Statement of Case on this topic from SLR Consultant Mr Gordon Robb, entitled ‘*Hydrology and Private Water Supplies*’ which also partially updates the PWS RA. (October 2020 vs.2) has been taken into consideration.

20. Chapter 10 of the ER (hydrology, hydrogeology, geology and soils), refers to ER TA 4.1 for policies and legislation applicable to this section (which includes PWS).

TA 4.1 states that Chapter 10 (including the PWS assessment) has been carried out in accordance with the principles in the following legislation and guidance :

6.1 Legislation

- *EU Water Framework Directive (2000/60/EC);*
- *EU Drinking Water Directive(98/83/EC)*
- *Water Environment and Water Services (Scotland) Act 2003 (WEWS Act); and*
- *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.*
- *The Private Water Supplies (Scotland) Regulations 2006*

6.3 Guidance

- *Land Use Planning System SEPA Guidance Note 4, Issue 9 (September 2017);*
- *Land Use Planning System SEPA Guidance Note 31, Version 3 (September 2017);*

21. South Ayrshire Council’s (SAC) approved Local Development Plan (LDP) 2016 sets out their local plan policies for the Water Environment:

SAC LDP policy: water environment

We support the objectives of the Water Framework Directive (2000/60/EC). We will only allow development that meets these objectives and shows that:

- a. it will not harm the water environment;*
- b. it will not pose an unacceptable risk to the quality of controlled waters (including groundwater and surface water); and*
- c. it will not harm the biodiversity of the water environment.*

22. *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. (The Regulations 2017)* are key to ensuring safe standards for private water supplies across Scotland. They supersede the Private Water Supply (Scotland) Regulations 2006.

23. **The 2017 Regulations provide statutory requirements and standards for conducting a PWS risk assessment and for providing requirements for PWS monitoring and mitigation measures**, dependent on assigning a level of risk according to criteria approved by the Drinking Water Quality Regulator (DWQR), as stipulated by those Regulations:

“The assessment—(a) must be carried out in accordance with a method which is approved by the Drinking Water Quality Regulator for Scotland;” (The Water

Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 Part 3 s.10 (4))

Importantly, the Regulations impose different assessment and monitoring requirements dependent on information which is provided by an acceptable standard of risk assessment: the type of water source, the volume of abstraction of each water supply and its use and whether that use is commercial/public use or intended for entirely domestic/private use.

24. *The Town and Country Planning (Environmental Impact Assessment) (Electricity Works) (Scotland) Regulations 2017, (The EWS Regulations 2017)* are not referred to in the hydrology section (Chapter 10) of the ER or in the PWS RA, although this application is subject to those regulations.
25. As is well known, *the EWS Regulations 2017* define the content and level of expertise that *must* be met by developers in submitting an Environmental Impact Assessment and Environmental Statement (or Environmental Report-ER) in support of a development, if the planning application is categorised as requiring an EIA (as here). These Regulations implement EU Directive 2014/52/EU, which set required standards for Environmental Impact Assessments.
26. This is particularly pertinent when considering the environmental impacts of this particular windfarm upon surrounding PWS and whether the submitted ER (specifically this PWS RA) meets the requirements of that legislation.
27. *The EWS Regulations 2017* provide:
4.
 - (2) *The environmental impact assessment must identify, describe and assess in an appropriate manner, in light of the circumstances relating to the proposed development, the direct and indirect significant effects of the proposed development (including, where the proposed development will have operational effects, such operational effects) on the factors specified in paragraph (3) and the interaction between those factors.*
 - (3) *The factors are—*
 - (a) *population and **human health**;*
 - (c) *land, soil, **water**, air and climate; and.*
 - (4) *The effects to be identified, described and assessed under paragraph (2) include the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development, of **major accidents and disasters**.*
 - (5) *Unless paragraph (6) applies, the environmental impact assessment to be carried out in relation to the determination of an application for planning permission for EWS development **must** identify the likely significant effects of the proposed development on the environment **before a decision to grant planning permission for that development is made.** (emphasis and underlining added)*

28. It is not clear in Chapter 10 of the ER, or the PWS RA, where these requirements are addressed.
29. This is relevant, given that the October 2020 SLR Statement of Case for PWS indicates that planning conditions could update the PWS RA at some undefined future date – perhaps because deficiencies in the PWS RA are now recognised.
SLR proposes that these updates are to be submitted as part of the s. 36 consent process.
But that is not appropriate either; all relevant information must be before the decision maker before he/she/they takes a decision, as set out in Planning Circular *The Town And Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Circular 1/2017)* paragraph 4 and 6.
30. Provision of further credible supplementary Environmental Information (as defined under *The EWS Regulations 2017*) or update of environmental information, requires to be publicly notified, with appropriate time allowed (minimum six weeks) for public comment.
Applying planning conditions to remedy information missing in an EIA assessment is not appropriate and is *excluded by the EWS Regulations 2017 s.4.(5)*.
It is not appropriate or lawful to use conditions awarded after consent is granted to remedy deficiencies in the presented ER. That is not the purpose of planning conditions, as set out in Scottish planning circular 4/1998.¹⁰
- 23.15 Planning conditions imposed by Scottish Ministers may be changed later with an application under s.42 of The Town and Country Planning (Scotland) Act 1997 (as amended)¹¹.
Planning obligations, (s.75 of The Town and Country Planning (Scotland) Act 1997 (as amended)) may also be changed by either the applicant or the competent authority.
Neither of these mechanisms should be used to provide essential environmental information which underpin the risks to water supplies or inform schemes of monitoring and mitigation which should be available before a Decision grants consent. Both of these mechanisms promoted by the applicant as a ‘post script’ to allow consent to proceed can be disregarded or changed to the disadvantage of PWS owners in future.
The importance of drinking water as a basic Human Right is too important to be consigned to the vagaries of contorting Planning Law.
31. The purpose of a comprehensive Environmental Impact Assessment is to identify ,avoid and mitigate for serious adverse environmental impacts.
An Irish windfarm (Derrybrien) caused a major peat slide in 2003 which severely impacted the hydrological environment, causing devastation to rivers and fish stock. The windfarm application was found not to have complied with providing an adequate EIA by the European Court of Justice in 2008 and Irish authorities were fined 5 million Euros (and 15,000 Euros/per day until settlement) for failing to enforce EIA legislation before awarding consent. (Case C-215/06, Article 226 EC; failure to fulfil obligations).
32. Another peat slide took place recently at Meenbog in Co Donegal on 13 November 2020, also causing severe damage to the hydrological environment. The effects of that are still being assessed, whilst windfarm construction work has been halted.

¹⁰ CD 14.2 Scottish Planning Circular 4/1998

¹¹ 23.16 SCRC2. The Town and Country Planning (Scotland) Act 1997 (as amended)

It is evident that the implications for authorities in accepting an inadequate or incomplete assessment can have disastrous environmental and human health consequences.

33. ERs are complex and often very technical. *The EWS Regulations 2017* require that the Scottish Ministers ensure that they have access to sufficient expertise to critically examine the EIA Report for the purpose of determination of the application.

Adequacy of Environmental Information for Determination and Planning Conditions

34. Such is the importance of water and drinking water supplies in particular, that Scottish Ministers are *required* when making a determination under *The Town And Country Planning (Scotland) Act 1997, (as amended)*, s. 40 (4) to consider the effects of this development on the water environment in accordance with EU Directives and specifically, the Water Environment and Water Services (Scotland) Act 2003 (WEWS). WEWS largely transposes the Water Framework Directive (see below).

The Water Framework Directive, the Water Environment & Water Services (Scotland) Act 2003 and Local Development Plan.

35. Chapter 10 of the EIR (encompassing the PWS RA) references compliance with the principles of the Water Framework Directive (2000/60/EC)(WFD).
The WFD is an integral part of the adopted SAC Local Development Plan.
36. The WFD upholds the basis of environmental Law in Article 174 of the Treaty: ‘The Precautionary Principle’. [WFD (11)] In assessing developments that affect the hydrological environment; the WFD requires that environmental damage should be rectified at source and enshrines the tenet of environmental law that ‘The polluter pays’.
37. The aims of the WFD include improving the quality of water and in particular groundwater, and to ensure that measures are in place to prevent deterioration of existing bodies of water.
The WFD does not allow even for temporary deterioration of designated groundwater status.
38. Groundwater bodies used for drinking water and are afforded special status as ‘controlled waters’, with additional legislative protection and monitoring.
This development area is in a statutory designated groundwater drinking water protected area , which applies to both public and private water abstractions. It is therefore entitled to that protection under the law.
39. In compliance with WFD requirements, SEPA has assigned the current status of Groundwater at the development site as ‘Good’, and the site surface water catchments of the Water of Tig and the Duisk as ‘good’.
The WFD does not allow for deterioration in the status of surface or groundwater, except in exceptional and unpredictable circumstances.
40. The WFD also focusses on reducing and removing certain hazardous substances in groundwater (Hazardous substances as listed in Annex 10 WFD) and preventing pollution of ground water with new substances and hazardous substances in particular.

This is relevant in view of the appearance of significant levels of EU designated hazardous substances in groundwater monitoring which occurred at the appellant's site at Whitelee windfarm¹².

I say only that experience suggests that this unexplained occurrence, may have implications for conditions to be attached in regard to groundwater monitoring on this site, should consent be awarded.

41. Special measures are specified in the WFD (Article 7) for the protection and monitoring of water bodies where abstraction volumes *from a water body* are greater than 10 cubic metres/day, or where they serve more than 50 persons. This requirement of the WFD is transposed into s.6 of *the Water Environment & Water Services (Scotland) Act 2003(WEWS)*. This PWS RA does not provide either the abstraction volumes or the number of people (or numbers of livestock) which are dependent at upon any one PWS, or any designated water body.
At the very least, this failure to quantify abstraction does not allow for suitable provision for 'disaster management' mitigation, a requirement under *The EWS Regulations 2017*, in the event that the WSP fails to protect the water source.
42. A water body, as defined in the WFD (Article 2)(*WEWS* s28), is not the same as a single point of abstraction, as several points of abstraction may share the same groundwater resource, which of course requires protection as a whole.
This error is illustrated in the PWS RA. For example, in PWS 07 (Table 2.1 of TA 10.3), three separate PWS are assigned to the same point of abstraction, but counted as one PWS, but with no abstraction volume recorded for that or any other PWS which will be dependent on the same water body.
The rationale for defining effects upon a *water body* are that multiple individual points of abstraction may be dependent on one groundwater body. If that one 'controlled' water body is polluted, or is affected by diverted flows or loss of groundwater – perhaps by known risks to groundwater flows of dewatering in borrow pits or building large turbine foundations, then multiple PWS will be affected.
43. The WFD defines methodology and monitoring parameter requirements for those water bodies falling into the category of 'controlled waters' of a defined size, in the same way that PWS test parameters and test frequency for individual PWS are defined by *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017*- also dependent also on the quantity of abstraction, the people served and the use of the water. It is not possible for this PWS RA to comply with the requirements of the WFD (and therefore the SAC LDP) as this essential information is simply missing.

Standards for PWS Risk assessment

44. As described in §§19,20 above *the Regulations* now prescribe that risk assessments *must* comply with standards set out by the Drinking Water Quality Regulator (DWQR).
45. Current standards for water risk assessments (rather than unknown 'industry standards' referred to as the reference standard in the PWS RA) are now based upon the World Health Organisation's recommendations of a concept of a water safety plan (WSP) for small or private water supplies.
The DWQR now encompasses this concept for assessment and protection of PWS within its

¹² 23.23 SCRC9. Jacobs Ltd Whitelee Windfarm Post Construction Groundwater Quality Monitoring Report Nov 2009.

technical policies for risk assessing all types of PWS.^{13,14}

The WHO states in its guidelines that, “*The primary objectives of a WSP in ensuring good drinking water supply practice are the minimization of contamination of source waters.*”

The emphasis is therefore to avoid pollution or risk to water supply catchment areas as the primary objective.

The rationale for a WSP is that by the time drinking water at the source point, or point of consumption is found to be polluted or contaminated, it is too late. Not only are consumers likely to have been consuming that water for some time, but remediation or replacement of a water supply is often difficult and costly.

46. During the period of Whitelee windfarm construction, the Planning Monitoring Officer noted the significantly contaminated water (sediment, mineral, bacteriological and chemical) occurred involving multiple different types of PWS surrounding that windfarm site on all sides (surface, shallow and deep groundwater sources). Most PWS had been assigned a ‘low risk’ status in EIA reports¹⁵. (§§428-453)

The very high bacterial contamination may have been associated with the synchronous gastrointestinal illnesses affecting many adjacent residents and their guests over several years. Whilst adverse PWS monitoring test results were never reported to the local authority with responsibility for PWS and public health, and therefore never investigated as to the cause, , this illustrates that discovering that monitoring results fail to meet required standards for potable water is essentially shutting the stable door after the horse has bolted. Preventing damage to the water environment supplying a PWS catchment zone should be the priority.

47. This PWS RA fails to identify any water catchment zones. At a basic level, it cannot correctly assign a level of risk if PWS catchment zones and water sources are unknown and not mapped in relation to areas of windfarm ground disturbance or importation routes of hazardous substances.

48. The method of PWS risk assessment is laid out clearly in the DWQR ‘Section 4 Risk Assessment for Private water Supplies’ (23.22) and encompasses not only activities which may cause risk within water catchment zones, such as excavation and forestry, but includes consideration of additional enhanced risk factors in relation to potential hydrogeological pathways, soil leaching characteristics and groundwater susceptibility mapping. These elements of a risk assessment are particularly important when there is an activity with recognised risk to groundwater, such as the construction of deep turbine foundations, blasting below ground level and excavation within quarries/borrow pits.

Those elements of risk have not been identified or characterised in Chapter 10 or the PWS RA with regard to characterising the potential risk for groundwater dependent PWS.

49. Although the PWS RA purports to adhere to the principles in *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017*, it does not refer at all to Part 3 s.10 (4), “*The assessment—(a) must be carried out in accordance with a method which is approved by the Drinking Water Quality Regulator for Scotland;*”

¹³ 23.17 SCRC3. Drinking Water Quality Regulator: *Private water supplies Technical Manual Risk Assessment* Section 4 -

¹⁴ 23.18 SCRC4. Drinking Water Quality Regulator: *Private water supplies Technical Manual Risk Assessment* Section 5 -

¹⁵ 23.36 SCRC 23 Whitelee windfarm Ext 3 Appeal - Inquiry Statement -the Water Evidence

50. The DWQR sets out the basics for conducting a PWS risk assessment:
“The following list provides a suggested pattern to follow when undertaking a risk assessment investigation.
- (1) Identify the private water supply on which to undertake the risk assessment investigation.*
 - (2) Confirm with the relevant person or persons who will be an appropriate contact person.*
 - (3) Arrange with contact person identified from (2) a mutually agreeable date/time/location to meet and undertake the investigation. **Note that the risk assessment is principally based around the source of the supply.***
 - (4) Ensure that an appropriate premise will also be available for sampling and make necessary arrangements to take a sample of the drinking water.*
 - (5) Prepare risk assessment forms prior to site investigation completing all sections that require historic or archived data.*
 - (6) Ensure that appropriate maps (soil leaching potential and Ordnance Survey 1:50,000) for the likely area of the source are available and take to site investigation meeting.*
 - (7) Ensure that appropriate sampling equipment and containers are available and take to site investigation meeting.*
 - (8) Undertake site risk assessment investigation.*
 - (9) Undertake appropriate sampling activities at location(s) identified in (4).*
 - (10) Collate results of sampling activity into risk assessment form*
 - (11) Complete risk assessment form including any additional information requested at time of site investigation.*
 - (12) Record and file complete risk assessment form.*
 - (13) Send a copy of the completed risk assessment to the relevant person(s) for their records.” (23.22 SCRC8 Section 4. para 4.5)*
51. The content of Table 2.1 of the PWS RA (Technical appendix 10.3) can be compared against the DWQR standards for an acceptable risk assessment. The latter allows calculation of a creditable and standardised hazard score which can be applied to all PWS, regardless of the type of source. (surface, spring or borehole)
 This information required to produce a standardised hazard score/level of risk for each PWS is largely absent from this risk assessment.
52. A PWS questionnaire¹⁶ was sent by Mrs Crosthwaite to almost all potentially ‘at risk’ PWS, for this windfarm application, which sought to ascertain basic facts missing from the applicant’s PWS RA and corroborate the responses to the unknown SLR questionnaire published in Table 2.1.of the PWS RA.
53. This third party questionnaire was sent to 16 PWS with boreholes and 23 PWS with wells, springs or surface water supplies.
 The responses obtained¹⁷ show significant discrepancies from the SLR responses in Table 2.1 of the PWS RA.
 Only one property (Laggish) confirmed receipt of the SLR questionnaire.
 No property owners remembered a SLR PWS site visit (One owner didn’t know).
 This would suggest the PWS RA is almost entirely a desk based assessment with conclusions drawn from unpublished material from historic windfarm EIA’s and unknown information provided by SAC, rather than actual site based assessments, as required by ‘the 2017

¹⁶ 23.33 SCRC 20 Third Party PWS Questionnaire

¹⁷ 23.34 SCRC 21 Third party PWS questionnaire responses

Regulations’.

54. Table 2.1 of the appellant’s PWS RA summarises the PWS details of the 31 PWS ‘sources’ identified by SLR.
 At least six (19%) water source types are unconfirmed.
 Sixteen (52%) of the water source locations are either unknown/unconfirmed or approximate.
 No water catchment zones are mapped – even for those PWS which are considered to be at risk.
 Seven questionnaires were returned to SLR and one other PWS records comment from a resident, but without describing if this was within the questionnaire or in separate discussion.
 It is evident from the third party questionnaire responses that even PWS owners listed as being potentially ‘at risk’, had no contact at all with SLR.
55. At the conclusion of this PWS RA, four (13%) PWS sources and five (16%) PWS points of abstraction are considered to be at minimal risk, although given the departure from recognised components of the approved risk assessment provided for under *The Regulations*, and in the complete absence of any designated water catchment zones for those PWS, it is not clear how a level of minimal risk has been assigned.
56. The DWQR risk assessment requires direct consultation with PWS owners/users.
 No contact with PWS users/owners will *automatically* assign a high risk status to that PWS. For example, without speaking to PWS users, SPR/SLR will be unaware if the PWS has any effective water treatment and whether that is working, which may provide a degree of protection in the event of windfarm generated water pollution from both bacteria, sediment and minerals
57. Understanding the quantity of abstraction and its uses from a PWS is also essential to comply with both *the 2017 Regulations* and the WFD. That information cannot be obtained without dialogue with PWS users and owners.
 The November 2016 Sneddon Law Windfarm PWS RA¹⁸ by MacArthur Green (with named authors) is provided as an example of a comprehensive PWS risk assessment, approved at Appeal by a suitably qualified Reporter. Table 4.1 in that PWS RA describes the quantity and use of water by each PWS owner, Table 7.1 summarises effects before and after mitigation on each PWS and Figures A1 to A14 provide a water catchment zone for each PWS. This is all information which needs to be provided in a credible risk assessment.
58. The *results* of sampling at both the water source and at the point of consumption (as required in *the 2017 Regulations*) is of importance to both developer and PWS owner. If the PWS does not meet statutory standards for potable water throughout seasonal variations prior to construction, then it may be an intrinsic problem with the PWS rather than due to the effects of construction.
 The developer cannot understand its liabilities if credible baseline monitoring of PWS quantity and quality has not occurred prior to any earthworks or deforestation activity. It is also obvious that the required sampling at the point of consumption (see para 34 (4) above) cannot occur without dialogue and permission from PWS users.

¹⁸ 23.27 SCRC 13 MacArthur Green Sneddon Law windfarm PWS RA Nov 2016

59. In essence therefore, the PWS RA does not comply with *The 2017 Regulations*, even though compliance with the principles of those regulations is referenced in ER Chapter 10 for the PWS RA.

It follows that the Environmental Information required by *The Town and Country Planning (Environmental Impact Assessment) (Electricity Works) (Scotland) Regulations 2017* (The EWS 2017 Regulations) is incomplete (Regulation 5), and a decision may therefore NOT be taken (Regulation 3) without the required relevant environmental information.

Risks to Groundwater

60. The DWQR refers to exposed bedrock, particularly if it is fractured, as being a particular risk as a potential pollution pathway for surface contamination to reach deeper groundwater.

“Where vertical fissures occur or shattered rock is close to the surface, there is the potential for rapid flow of micro-organisms to groundwater and therefore a reduction in the ability of the soil and substrate to act as a barrier or filter.” (DWQR Section 4 Risk Assessment for Private water Supplies 4.6.1)

It is known that the necessary exposure of bedrock in turbine foundations and borrow pits, together with borrow pit blasting in particular, are a particular hazard for exposing deeper groundwater directly to surface water pollutants without attenuation by superficial deposits and soil.

61. TA 10.5 (Borrow pit screening assessment) describes the overall site geohydrology as being that of a low productivity aquifer, with groundwater confined to secondary fractures and in superficial weathered zones.

In low productivity aquifers, borehole abstractions often rely on these fractured zones which will preferentially conduct potentially contaminated groundwater.

Whilst the geology is described in 10.5, there is no cognisance of groundwater flow mechanisms or assessment of that risk in the PWS RA.

62. Technical Appendix 10.5 also describes, for example in Borrow pit one, already exposed fractured and weathered rock at the surface, with expected depth of excavation to 15m. With BGS bedrock contours and surface topography sloping from this and other borrow pit towards the cluster of PWS boreholes to the east^{1,23,19}, the concern would be that these fractured rock layers communicate with the same limited aquifers which provide deep groundwater to boreholes at a distance.

63. Borehole records for the application site and surrounding area, provide particularly valuable evidence of the rock structure and should allow the applicant to provide a site specific risk assessment for groundwater and PWS.

64. The appellant has previously conducted test boreholes on the site²⁰ near the proposed substation, which provides valuable geological information.

For example, there are descriptions of Listric folds/faults identified in the core samples as well as bedrock fragmentation.

The geology described in TA 10.5 (Borrow pits) describes secondary fractures trending SW to NE. To the lay person, these would also appear to be potential conduits from the development site which enhance fracture flow dependent deep groundwater to PWS boreholes at a distance, within the otherwise low productivity aquifer of the Kirkholme greywacke unit which extends across almost the entire site.

This would be similar to the appellant’s expert geohydrology opinion and description of

²⁰

²⁰ 23.31 SCR18 SPR Borehole Logs and Map

groundwater flows in the nearby Clauchrie windfarm, *which shares the same bedrock unit and which describes groundwater flows as being confined to superficial weathered zones and fracture flows*²¹

BGS maps and topographic reconstructions²² show bedrock contours sloping northeast and west to east from the windfarm site towards the Duisk river.

Are these Listric and other faults a potential conduit for polluted groundwater?

65. Do these faults account for previously recorded pollution events related to deep borehole supplies during the previous Arecleoch windfarm construction?

The outline SoC by SAC records previous borehole pollution events directly related to blasting activity within Arecleoch borrow pits 2 & 3 at a distance of over 2km from borrow pits to the Woodpark farm borehole.

Some of the same borrow pits used for Arecleoch would be utilised for this extension and should serve as a warning of the risk of adverse groundwater changes impacting upon PWS abstractions at a distance.

66. These are matters which should be addressed by the appellant's technical experts in this ER, to inform the risk assessment.

Altercannoch Windfarm

67. Altercannoch windfarm, an application for eight turbines 1 km to the south of Barrhill by Brookfield Renewable UK, was refused at Appeal on 1st March 2019.

That application is of relevance in that the Reporter considered that the applicant was too reliant on complying with SEPA guidance to demonstrate lack of risk to groundwater dependent PWS from built elements of the windfarm. (Some of those same PWS abstractions are listed by SLR in the Arecleoch Extension PWS RA) She considered that in regard to PWS, that this development did not comply with the SAC approved LDP. (References- Altercannoch windfarm Decision and Report CD 16.6, 16.7)

Compliance with SEPA LUPG -31

68. The applicant refers to compliance with SEPA guidance LUPG 31 2017²³, on shore windfarm guidance for groundwater.

LUPG- 31 guidance defines separation 'buffer' distances of windfarm excavations from PWS *sources* (not catchment zones) to ensure protection for PWS. Of course, this requires that PWS sources are accurately identified and mapped, which is not the case in this PWS RA. In essence, SEPA considers buffer zones of 100 metres from excavations less than 1 metre depth and 250 metres for excavations more than 1 metre depth, to provide adequate protection for points of abstraction.

69. The distances set out in LUPG 31 are underpinned by studies from the Macauley Institute and Robert Gordon University conducted in 1998 and verified by the Macauley Institute for the Scottish Executive in 2003.

The study assessed approximately 33 PWS in Aberdeenshire, assessing microbiological pollution in surface and superficial groundwater PWS, setting out margins of risk activity 50

²¹ 23.22 SCRC 8 Clauchrie windfarm PWS Report

²² 23.28 SCRC 14 Topography and Geology Relationship

²³ 23.19 SCRC5. Land Use Planning System SEPA Guidance Note 31 Vs3 2017

and 250 metres from defined water sources over a 12 month period.²⁴ Critically, this study did not assess either borehole PWS, or the impact of deep excavations upon deep or superficial groundwater supplies (eg, quarries, road or windfarm turbine construction) (¹¹ Table 4.1) or conduct studies on PWS in the different geohydrological and rainfall conditions in the West of Scotland (¹¹Figure 1).

70. LUPG 31 is applicable *guidance* for compliance with SEPA's groundwater interests, rather guidance which complies with relevant PWS legislation, "*The 2017 Regulations*", which prescribes requirements to adhere to the DWQR defined PWS risk assessment with adoption of water safety plans to identify activities which risk the catchment area.(see above §44)
71. Other UK PWS guidance and geohydrological authorities recognise the potential for ground water PWS to be affected at significant distance from the source of pollution, greater than the 'one size fits all' buffer zones adopted by SEPA.²⁵ (SCRC 24 Small water treatment systems manual. UK 2001 §3.3.3)
Such risks will be dependent on *site specific* geohydrological modelling related to site specific geological and soil characteristics, which have not been provided in this PWS RA.
72. The PWS groundwater monitoring evidence conducted by this appellant at its Whitelee windfarm and Whitelee windfarm extensions provided evidence of adverse change in both superficial and deep groundwater abstractions well beyond SEPA's defined buffer zones during windfarm construction.²⁶ (SCRC 23 Whitelee windfarm Ext 3 Appeal - Inquiry Statement -the Water Evidence. § § 427-521) Springwater PWS affected *more than 500m* from new access tracks built to construct the SW Scotland electricity interconnector, required replacement borehole supplies.(Evidence of R. Spernagel (Natural Power Ltd) to Sneddon Law windfarm Public Inquiry PPA-190-2054)
73. SEPA has no statutory responsibility for PWS.
For that reason, it is unclear why the applicant proposes in TA10.3, PWS RA paragraph 1.2 (Section 4) that SEPA should be responsible for agreeing a scheme of monitoring for PWS. SEPA has NO authority in this matter. The Local Authority, in this case SAC, has such responsibility.

Monitoring and Mitigation

74. The scoping responses to this application required potential effects of this development upon surface water, ground water and PWS to be identified and for the provision of informed, appropriate schemes of monitoring and mitigation.
75. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (*EWS Regulation 2017*) requires that the scoping responses should be answered and provided in the EIA (ER).
Regulation 5 of the *EWS Regulation 2017* sets out the information that is required to be provided in an EIA report.
That information includes baseline description (*EWS Regulation 2017* s. 3.), which by necessity, should include baseline monitoring test results and a scheme of monitoring which

²⁴ 23.29 SCRC 16 Microbiological Risk Assessment Source Protection for Private Water Supplies: Macauley Institute –Validation Study Scottish Executive 2003

²⁵ 23.27 SCRC 24 Small water treatment systems manual. UK 2001

²⁶

extends *through the construction phase into the operational phase*. (EWS Regulation 2017 s.7.) To allow assessment of potential impacts on Human Health (EWS Regulation 2017 4 (3)) A scheme of monitoring must be provided within an EIA, *taking into account the level of risk, the use and quantity of abstraction for each PWS* from the proposed development. The scheme of monitoring for each PWS in this PWS RA has not been defined, which is not surprising given that baseline information is not available.

76. Should Scottish Ministers be minded to grant consent subject to planning conditions for monitoring, then it is the responsibility of Scottish Ministers (not the local authority) to ensure compliance with those conditions attached to the consent. (EWS Regulation 2017 s. 22.)

Given the acknowledged failures of PWS monitoring for Whitelee windfarm¹⁵ (§555) and the consequent risk to public health, it would seem more appropriate that the local authority is given the necessary resource to ensure compliance with PWS conditions.

77. This PWS RA does not provide a recognised standard for a scheme of monitoring. It does not set out which test parameters are appropriate for each PWS defined by abstraction volume and use, or provide a recognised methodology for frequency and site(s) of sampling. Scottish Planning circular 2017/1 (§ 6.(d)) describes how information on monitoring requires to be presented before consent is issued.

78. At the outset, it is stated that this PWS RA complies with industry standards, but whatever they are, they are not referenced. It seems reasonable to ensure that those standards must be credible, transparent and at least as stringent as those set out in the legislation and ancillary DWQR technical appendices.

79. The notification of abnormal monitoring results (updated in the SLR Outline PWS SoC October 2020) does not meet requirements of *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017*.

A scheme for notification of monitoring results requires clarification, as a clear scheme for the rapid identification and notification of abnormal water quality results is a serious public health matter.

In short, people drinking that water need to know and know quickly if their water is polluted. Polluted drinking water is a disaster, and requires implementation of effective approved disaster management.

80. Stated mitigation measures in the PWS RA for provision and distribution of alternative water in the event of abnormal water monitoring results, appears to be inadequate and without substance.

As abstraction volumes and water needs and uses for each PWS have not been provided in the risk assessment, the proposition that a few bottles of water are held at the site management office as mitigation for only the five identified 'at risk' PWS in case of disaster is not satisfactory.

The DWQR allows for 200 litres water per day per person. (Excluding livestock or commercial use)

81. Further information is needed to understand what quantity of water may be needed for each household/business and for how long. These PWS users do not have access to alternative water supplies.

For example, it is well known that whilst surface waters are most susceptible to pollution, it is often transient (depending on the nature of the pollutant).

Contamination and pollution of groundwaters may last for months or years²⁷, depending on site specific geohydrological characteristics and modelling (which have not been defined) and the nature of the pollutant.

Planning for long term mitigation measures of polluted groundwater may be required, particularly with evidence of previous groundwater pollution from Arecleoch windfarm construction.

Sedimentation, dewatering or (permanent) diversion of fracture flow dependent groundwater by turbine foundations may causes loss of groundwater flow to dependent PWS either on either a temporary or permanent basis¹⁸ (risk factors identified in 23.27 SCRC 13 MacArthur Green Sneddon Law windfarm PWS RA Nov 2016. e.g. page 55 Tayburn borehole). Loss of *quantity* of water requires a mitigation strategy which will encompass the entire water demand for that property.

That has not and cannot be considered in this PWS RA as no water demand/abstraction volumes have been provided for any PWS.

82. Loss of *quantity* of water is not a theoretical consequence and impact of windfarm construction upon PWS..

Sedimentation effects probably caused the complete water loss to four groundwater (spring) PWS during construction of the Whitelee windfarm 2006-2007. All four ‘assigned low risk’ PWS were more than 1 km from any built element or excavation of the windfarm.

Because these four PWS were deemed to be at low risk, they were not monitored at all and there was no mitigation provided, even when water supplies disappeared. Three of the four PWS owners installed replacement boreholes after 3 months without water, at their own cost. (For the fourth PWS, significantly polluted water returned spontaneously after 3 months.)

It should not be the case that PWS owners are required to mitigate the adverse environmental effects of windfarm development at their own cost.

83. Providing adequate mitigation plans would, at the very least, enable compliance with the need for identifying ‘disaster management’ specified in *The EWS Regulations 2017. S.4 (4)*.

Conclusion

- This PWS RA does not comply with recognised standards for a risk assessment set out by the Drinking Water Quality Regulator, as legislated in *The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017*. The information provided by an unknown author is both incomplete and misleading; in effect, this risk assessment is deficient.
- The consequences of a deficient PWS risk assessment may have serious implications for human rights, public health, rural habitation, and rural businesses. There are more than 35 PWS identified in relation to this windfarm application which may be subject to either temporary or permanent risk to their water supplies.
- The information in the PWS RA does not comply with requirements for ‘controlled’ waters set out in the Water Framework Directive (or transposed

²⁷ 23.28 SCRC 25 Scotland’s aquifers and Groundwater bodies 2015 (BGS & SEPA)

legislation within WEWS)

- Because there is deviation from the principles within the WFD, there also appears to be non compliance with the SAC approved Local Development Plan.
- The PWS RA fails to comply with requirements of the *The Town and Country Planning (Environmental Impact Assessment) (Electricity Works) (Scotland) Regulations 2017*. The required environmental information is not before Scottish Ministers so that they can make a reasoned and informed Decision.
- Any deficiencies in the submitted information, required to make an informed EIA Decision by Scottish Ministers, cannot be remedied after the event with planning conditions or obligations.

Dr Rachel Connor MB.Ch.B. , FRCR

14 December 2020