Joint Radio Company Ltd

Procedure for coordination with wind energy developments

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JRC is a wholly owned joint venture between the UK electricity and gas industries specifically created to manage the radio spectrum allocations for these industries used to support emergency and safety critical operations. JRC also represents gas and electricity interests to government on radio issues.

<www.jrc.co.uk/about.shtml>

JRC is an ISO9001 Accredited Company

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1 Summary

(1) This document explains the process to be used by JRC in assessing the potential for wind energy systems to cause disturbance to operational radio links used by the gas and electricity industries for management, safety and control of their networks. Our intention is to protect the operation of these links from interference which might be caused by proposed wind energy developments.

(2) Where the potential for interference is predicted, this document explains the measures which can be taken to explore the possibilities for co-existence of the wind energy systems with utility radio links, the cost of which would be met by the wind developer.

(3) The overall objective is to achieve co-existence of wind energy and utility radio systems in the most cost-effective manner. JRC does not have any remit to promote or hinder wind energy, but simply to reflect government priorities, which are designed to foster the growth of renewable energy systems but without detriment to telecommunications or any adverse impact on the efficiency and security of energy supplies to consumers.

2 Background

(4) JRC manages 48 channels of UHF radio spectrum allocated by the UK Communications Regulator Ofcom to the UK fuel and power industries for telemetry and telecontrol of their networks. JRC holds the Wireless Telegraphy Act Licence for these channels and assigns frequencies to UK energy companies on an individual basis to operate designated radio links. JRC is responsible for the assignment of these frequencies, their protection and first line interference resolution.

(5) JRC provides a number of other radio services to the electricity generation, transmission and distribution industry, plus similar services to the gas production, transmission and distribution licence holders. A number of other critical radio spectrum users also take advantage of JRC's services.

(6) Within JRC's portfolio of services, JRC is contracted by a number of companies to protect their microwave fixed links from interference, and this includes the potential for harmful interference by wind turbines.

(7) To assist the wind energy industry understand the potential for detrimental impact of wind turbines on radiocommunications links, JRC publishes a range of documents on its web site <www.JRC.co.uk/windfarms>, and has developed the procedures outlined below to expedite the coordination process.

(8) JRC's core funding is derived from subscriptions from the UK gas and electricity industries responsible for delivery of services regulated by the British energy regulator Ofgem (and its equivalent in Northern Ireland). Costs legitimately attributable to the wind energy sector must therefore be borne by that sector as it would be inequitable for JRC costs attributable to renewable energy policies to be subsidised by energy consumers.

3 Procedure for evaluating wind energy proposals

3.1 Scanning Telemetry Links

(9) Since 1 January 2005, JRC has adopted the following approach:

- Initial applications are sifted to ascertain whether any part of the wind energy development encroaches within a distance around any utility radio infrastructure or link path as defined in the table below:

Coordination Zones for JRC assets (Modified 10/09 for medium turbines)

Asset Type	Turbine Type	Coordination Zone
Base Station Sites	>30m rotor Ø	1000 m
	<30m rotor Ø	1000 m
	<2m rotor Ø	See 4.1 below
UHF Link	>30m rotor Ø	1000 m
	<30m rotor Ø	500 m
	<2m rotor Ø	See 4.1 below

- If any part of the wind energy development falls within the coordination zone then JRC will undertake an initial technical interference assessment. If our assessment is that the development will affect JRC services then the applicant is notified that JRC, as the licence holder, objects to the scheme, and will sustain that objection in respect to any planning application related to that scheme. JRC will advise the operator of the affected link(s) of the objection, and where instructed so to do, JRC will also object on behalf of the JRC member company concerned.
- In those circumstances where, in spite of the proposed development impinging on the coordination zone, the initial technical assessment indicates that there will not be a conflict, the application may be cleared.
- In advising the wind farm or turbine applicant of the coordination failure and likely planning objection, two services are offered to assist the applicant which will be chargeable to the applicant:
  - **Detailed coordination** of each interfering asset to ascertain the precise path profile and potential interaction with the utility radio service(s).
  - Consultancy advice to liaise with the affected JRC member to explore **mitigation options** to enable the wind energy development to co-exist with the utility radio link(s) in a manner acceptable to both parties.

3.2 Microwave links

(10) For microwave fixed links, a similar process will be followed with the following exceptions:

- The separation distance between wind energy system and radio link with which an objection is triggered is reduced to reflect the shorter wavelengths at which microwave fixed links operate, as given in the table below:

Coordination Zones for JRC SHF assets

Asset Type	Turbine Type	Coordination Zone
Base Station Sites	>30m rotor Ø	500 m
	>30m rotor Ø	300 m
	<2m rotor Ø	See 4.1 below
SHF Link	>30m rotor Ø	500 m
	<30m rotor Ø	300 m
	<2m rotor Ø	See 4.1 below

- Since JRC is not usually a licence holder in respect of the microwave fixed links service, the objection is raised only behalf of the operator of the fixed link(s).

3.3 Satellite links

(11) In general terms, because satellite systems use a highly directional antenna and use an inclined path, the potential for interference between wind energy developments and satellite links is small. Where requested to evaluate the potential for harmful interference to a satellite link from a wind energy development, JRC will assess the compatibility on a case-by-case basis.

3.4 Grid connections

(12) Wind energy developers are reminded that where a wind energy development is connected to the electricity distribution network, the electricity distribution company may require additional telemetry and telecontrol points for monitoring and control. Since the additional control points may be required to be monitored using a UHF telemetry link, it would be wise for this link to be included in any evaluation at the proposal stage.

3.5 Timescale

(13) JRC aims to respond to initial coordination requests within 20 working days.

4 Modifications to the procedure

4.1 Concessions to exclude small turbines from coordination requirements

(14) No coordination will be required for small turbines if:

- The turbine is building-mounted: where the tip height is no greater than 4m above the prevailing roof line; or
- If pole mounted: where the hub height is no greater than 10m above the prevailing ground level and the supporting pole is less than 20m from the external wall of a significant building (considered to be one in respect of which planning consent would be required for its construction).

NOTE: For the purposes of this document, 'Small Turbines' are considered to be those where the rotor does not exceed 2m in diameter (equivalent to a swept area of less than 3.5 square metres).

5 Processes to investigate coordination failure

5.1 Detailed coordination

(15) Were an application fails the initial coordination assessment; it is possible that the objection may be lifted if it can be shown from a more detailed analysis that the potential for interference is minimal.

(16) For **all telemetry links and microwave links operating at frequencies below 3 GHz,** the criteria against which such an evaluation will be conducted is contained within the document 'Calculation of The Clearance Zone', the current version of which is always available on the wind farms area of the JRC web site.

(17) For **microwave links operating at frequencies greater than 3 GHz**, the criteria used are defined in the document published by the former Radiocommunications Agency 'Fixed-link wind-turbine exclusion zone method' (the 'David Bacon' method), a copy of which is contained on the JRC web site for convenience.

(18) For **satellite links**, JRC will investigate each link on a case by case basis.

(19) The **fee chargeable** for a detailed coordination will be quoted in advance and based on the time required to undertake the work.
Note that in order to fully assess all the parameters with sufficient precision to undertake an accurate detailed coordination, a site visit may be required.

(20) Undertaking a detailed coordination enables the interaction between wind turbines and radio links to be more precisely defined, but does not guarantee in any way to diminish the potential for interference. Thus, having undertaken a detailed coordination, it is possible that the original objections may be sustained.

(21) Using data obtained from the detailed coordination, JRC will, on request, supply a map of the proposed wind energy development showing exclusion corridors for the radio link(s). If the wind farm developer is able to modify the plans in such a way that no part of any wind turbine impinges upon the specified corridors, then the developer may wish to submit a revised proposal. If it is confirmed that the turbines no longer intrude into the exclusions zones, then the objections can be lifted.

(22) JRC will endeavour to produce the data for a detailed coordination within 20 working days of receipt of a purchase order.

(23) If a detailed coordination of a wind development covers links that are operated by more than one operator it may be released in more than one part to protect the confidentiality of each operator's data.

(24) A detailed coordination will include:

- Listings of the basis that the wind farm is evaluated on. Turbine sizes, turbine locations, micrositing and verification of the link parameters.
- A layout showing the position of turbines with relation to JRC managed radio infrastructure.
- A table consisting of two dimensional clearances of all turbines with respect to all links that are within coordination distance.
- Three dimensional clearance diagrams if relevant.
- Diagrams that show the predicted path losses of all paths using ICS telecom.

- Reflection diagrams that show the geometry of the turbine(s) with relation to the link(s).
- The frequency bands, antenna types, polarisation and heights in use for all links.
- The maximum 'Radar Cross-Section' (RCS) of the turbine used in the calculations, at the reflection angles required for all turbines and all links.
- The calculation of the wanted/unwanted ratios for individual turbines and combined for all links within coordination distance.
- An appendix will show all figures used in the calculations for both the JRC method and ITU-R BT805 method for calculation of wanted/unwanted ratios.

(25) This information serves two purposes

- The developer can see in detail any potential problems highlighted and can if required duplicate the calculations.
- With the developer's agreement it is recommended that the report should be released to the operator of the link so they have enough information to;
  - confirm the basis on which the coordination has been carried out;
  - duplicate the calculations if required; and
  - comment on any recommendations JRC may have made regarding maintaining or withdrawing of any objections.

(26) In conducting an evaluation, JRC seeks to act as an independent arbiter and, whilst having power to remove any of its own objections to an application if it considers them to be no longer necessary, individual JRC member companies will make their own judgement based on the findings and cannot be bound by any JRC decision.

5.2 Mitigation studies

(27) A mitigation study will generally follow when a detailed coordination reveals that the potential for interference between the wind energy development and radio link(s) exists, and the wind energy developer wishes JRC to undertake an in-depth study to identify options which may exist for mitigating the interference potential.

(28) JRC will then appoint a project manager to prepare a proposal to submit to the wind energy developer identifying the proposed schedule of work, cost and timescale for identifying mechanisms whereby the wind energy development might be made compatible with the radio links, or the telecommunications schemes modified to avoid the conflict.

(29) This work has to be undertaken in collaboration with the link operator as ultimately the solution will usually require adaptation of the telecommunications system to overcome the conflict. The final outcome will normally take the form of an agreement between wind energy developer and link operator for a schedule of work to be funded by the developer if the scheme proceeds.

(30) In conducting a mitigation study, JRC acts as an independent arbiter and, whilst having power to remove any of its own objections to an application if it considers them to be no longer necessary, individual JRC member companies will make their own judgement based on the findings and cannot be bound by any JRC decision.

6 Related matters

(31) JRC's assessments are based on research reports and experiments, both published and unpublished. JRC has also undertaken its own tests and research programmes, and welcomes proposals for collaboration in further research activities to understand the interaction between wind turbines and radio links more fully.

(32) Within the wind farms area of JRC's web site is information illustrating some of the problems which have been found to exist.

(33) JRC is investigating whether it is possible to develop a map which can be published on the web site enabling wind farm developers to see areas where a substantial amount of JRC managed radio infrastructure already exists, and therefore wind energy developments would have an onerous task to meet JRC coordination requirements, but this is not possible at this point.

(34) JRC is working with the industry to investigate whether there is the potential to relax the requirements described in the assessment document "Calculation of Wind Turbine Clearance Zones, used by JRC for 460 MHz Telemetry Links, when turbine sizes and locations are accurately known" for telemetry links designed to operate at lower availability than primary links and have intermittent duty cycles.

(35) All assessments are carried out on the basis of location data currently available (unless verified by a site visit or other means as part of a study). This data is largely historical, and was not recorded with the level of accuracy necessary for wind farm coordination, hence uncertainties have to be included in all calculations to reflect prevailing operating environment.

7 Confidentiality

(36) Data provided by JRC in response to an enquiry is done so on a **confidential** basis and may not be disclosed to a 3rd party or used for any purpose other than for the evaluation of the interaction of the wind development and the radio infrastructure covered by the response.

(37) In particular, data provided by JRC to a developer **must not** be disclosed to a local authority (including a planning application) or any other public body without express permission from JRC.

(38) Data provided by the developer to JRC will be regarded as **confidential** and will not be distributed to any 3rd party without the agreement of the wind farm developer (except as detailed below).

(39) When an initial wind farm enquiry is forwarded to JRC, JRC's response will routinely be copied to the utility network operators in the area concerned **unless** specifically requested by the enquirer. This is necessary because although JRC maintains the database of operational radio links, network operators may have alterations, decommissioning or construction of new infrastructure in progress of which JRC will not be aware. This procedure has been implemented in order to avoid the situation where preliminary wind farm enquiries do not reveal any conflict, but by the time a subsequent planning application is submitted, new radio links have been installed which give rise to an objection. Conversely, it is also possible that an existing radio link is scheduled for decommissioning and thus will not present a conflict on the timescale envisaged for the construction of the wind farm.

(40) Once the local utility network operators have been advised of the initial wind farm application, any further information provided by the developer for the purposes of detailed co-ordination will not be forwarded to the utility network operators, and will be accorded the confidentiality process described in this document.

(41) Information concerning wind turbine developments provided to JRC by other authorities, most commonly Ofcom and Local Authorities will be accorded similar confidentiality status, but such data is governed by separate confidentiality rules.

(42) The exercise of these confidentiality rules in respect of 3rd party data may in some circumstances result in an apparently irrational outcome to a JRC technical study where the study reflects technical constraints available to JRC under confidentiality agreements but such information is not in the public domain.

(43) JRC's confidentiality rules are applied strictly on an organisation by organisation basis, such that where more than one developer has an interest in a given site or locality, JRC will maintain confidentiality of data between all the parties involved.

(44) JRC's confidentiality rules are also applied to individual utilities and link operators such that an electricity network operator will not be advised of the status of the communications links for the gas network in the same area, etc.

(45) JRC will store all data, including both electronic and paper formats, in a secure environment to reflect the sensitivity of the material.

END