

**ELECTRICITY ACT 1989 (SECTION 36 AND SCHEDULE 8)  
TOWN AND COUNTRY PLANNING ACT 1990 (SECTION 90)  
THE ELECTRICITY GENERATION STATIONS AND OVERHEAD LINES  
(INQUIRIES PROCEDURE)(ENGLAND AND WALES) RULES 2007**

**PUBLIC INQUIRY TO CONSIDER SECTION 36 ELECTRICITY ACT 1989  
APPLICATIONS BY:**

- (1) STEADINGS WIND FARM LIMITED FOR CONSENT AND DEEMED PLANNING PERMISSION TO CONSTRUCT AND OPERATE A WIND FARM AT KIRKWHELPINGTON, NORTHUMBERLAND (KNOWN AS STEADINGS)**
- (2) AMEC PROJECT INVESTMENTS LIMITED FOR CONSENT AND DEEMED PLANNING PERMISSION TO CONSTRUCT AND OPERATE A WIND FARM AT RAY ESTATE, NORTHUMBERLAND (KNOWN AS RAY WIND FARM)**
- (3) WIND PROSPECTS DEVELOPMENT LIMITED FOR CONSENT AND DEEMED PLANNING PERMISSION TO CONSTRUCT AND OPERATE A WIND FARM AT GREEN RIGG FELL, BIRTLEY, NORTHUMBERLAND (KNOWN AS GREEN RIGG WIND FARM)**

**JULIAN CHAFER  
REBUTTAL PROOF OF EVIDENCE  
IN SUPPORT OF OBJECTION BY  
MINISTRY OF DEFENCE**

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## **Rebuttal proof**

1. In this inquiry one or more of the developers have on occasions made statements inferring that the MOD has been obstructive, unhelpful and inconsistent in its approach to these wind farm developments. As part of that, my personal bona fides has been impugned. This rebuttal proof sets out the chronology of events surrounding the MOD's involvement with these applications. In so doing, this proof supplies important details that the MOD's critics have chosen to overlook in their attack on the Ministry.

### **The MOD's Approach to Wind Farms**

2. DE was first consulted about one of the proposed projects, Ray Estate, in 2001. Between 1996 and 2001, the MOD had been asked to consider fewer than 1,000 pre-planning consultations for proposed wind farms. In 2002, there was a sudden jump in the number of pre-planning consultations received – indeed, in that one year more applications were received than had been in the previous six. As the table below illustrates, since 2002 the number of pre-planning consultations which the MOD had been asked to consider has remained in the high hundreds each year:

<b>Year</b>	<b>Number of Pre-Planning Applications Considered</b>
2002	1030
2003	913
2004	714
2005	738
2006	806
2007	907
2008	Approximately 180 to date

**TABLE 1:** Number of pre-planning consultations considered by the MOD between 2002 and the present

3. The increasing number of pre-planning consultations put a strain on that part of the MOD that was assigned the task of considering them. In 2002 the MOD was unprepared, either organisationally or financially, for such an increase. The

MOD responded as constructively and quickly as possible, and the organisational steps we took are detailed below.

4. It should be remembered, however, that alongside the increase in pre-planning consultations, both the MOD's and industry's understanding of the effects of wind turbines on radar has grown and deepened over the last five years. This developing understanding has had to be fed back into the MOD's approach to planning applications, which has had to change to take into account the deepening knowledge. The key change, again detailed below, came from the realisation in 2004-2005 that the effects of wind turbines on both air defence and air traffic control radars was much more significant than previously believed.

5. It is also the case that the proliferation of both operational wind farms and proposed wind farms in the planning system has, of necessity, had an effect on the way in which the MOD deals with pre-planning consultations. Proliferation is both technically and operationally significant. As I relate in more detail below, the ATC side of the MOD has always taken the view that it can tolerate some degradation of radar coverage so long as that degradation does not have a material adverse effect upon safety. Proliferation has a clear impact on this. Although any one radar may have been designed with a safety margin, a succession of degradations to the performance of that radar will ultimately deplete that margin, so that a single further degradation take will take the radar over a tipping point such that the degradation in performance does have a material adverse effect upon safety.

*MOD's Organisational Response to the Need for Wind Energy*

6. From 1996, the assessment of wind farm pre-planning consultations was included in the portfolio of the Head of Safeguarding. Although that was the appropriate post for dealing with the kind of work involved in assessing pre-planning inquiries, it meant that the Head of Safeguarding was dealing with wind farms alongside his normal workload of statutory and offshore consultations. Statutory consultations number in the region of 2,000 per year

7. Significant recent steps have been taken by the MOD to address the increasing number of pre-planning consultations. In late 2007, Air Defence created a post dedicated only to wind farms. On the ATC side, a Squadron Leader post dedicated only to wind farms was created in January 2008. This reflects the MOD's belief that the cost, in both time and money, of dedicating an officer to this work is justified, given the importance of reconciling the need to increase renewable

energy output with the maintenance of current standards of safety of military air traffic control.

8. Also in January 2008, the Assistant Chief of Air Staff, a 2\* post, has been made the focal point of advice to ministers about wind energy.

9. The consistent outcome of this process has been that the MOD does not raise an objection to the majority of wind farm applications of which it receives notice:

<b>Year</b>	<b>Number of Applications to which no objection raised</b>	<b>Number of Applications to which objections raised</b>
2005	<b>72</b>	<b>9</b>
2006	<b>84</b>	<b>14</b>
2007	<b>68</b>	<b>21</b>
2008	<b>16</b>	<b>2</b>

**TABLE 2:** Number of MOD “no objections” and “objections” to wind farm planning applications

10. The level of objection has remained much the same despite the process used by the MOD to consider pre-planning consultations having become more robust over the years.

11. That process is as follows: Defence Estates acts as the single point of call for applicants. All pre-planning consultations go from Defence Estates to the Radio Site Protection team at RAF Henlow for LOS path profiles to be produced. Where applicable, they are also sent to the Officer Commanding Low Flying Operations Squadron at RAF Wittering which deals with the physical safety of low flying aircraft.

12. If it is determined that the proposed development is not in LOS of one of the MOD’s radars, then the MOD will inform the developer that it does not object to the proposal in its current form.

13. If it is determined that the proposed development is within LOS of one of the MOD's radars, then it is passed on for further operational assessment. I must emphasise that, on the ATC side, there has never been a policy of objecting to developments on the basis solely of their being in LOS of an MOD radar. On the Air Defence side, the heightened safety and defence concerns meant that, for a time, it was sufficient for a proposed development to be in LOS of an Air Defence radar for a concern to be raised. This is no longer the case.

14. The path profiles and general details about a proposed development found to be in LOS of an MOD radar are sent from RAF Henlow to the branch of the military which is responsible for safeguarding that radar. The vast majority go to the RAF, though some go to the Royal Navy and some to Defence Equipment and Supply (DE&S formerly Defence Procurement Agency (DPA)). The technical advisor for the radar concerned then analyses whether the airspace over the proposed development is operationally significant. Only if it is found that the area is operationally significant will concerns be raised.

15. This again is not the end of the story. The MOD has always been prepared to consider whether it can accommodate a degradation in radar performance. On the ATC side, where a proposed development is predicted to cause a small degradation in the radar service (i.e. excluding those where the degradation will self-evidently adversely affect the safe separation of aircraft), the MOD will examine whether this degradation is operationally acceptable. The aim here is to see whether, despite the degradation in the radar service, safe separation can still be maintained or whether flight paths can be modified to avoid the area of degradation. The MOD's overriding concern is with the safety of those military and civilian aircraft to which it provides ATS, and with the safety of people on the ground who might also be endangered by a mid-air accident. If the MOD can be sure that, despite the anticipated degradation of its radar coverage of a particular area resulting from a proposed wind farm, ATS could still safely be provided, then it will not object to that proposed wind farm.

16. The position is of necessity different for Air Defence radars. Because the very nature of air defence demands that their radars search for aircraft that do not want to be seen, there is very little room for accepting a degradation of radar service without prejudicing the very objective of those radars.

*The Development of the MOD's Technical Understanding*

17. The MOD carried out its first practical trial of the effects of wind turbines on radar in 1994, when a Sea King helicopter was flown over wind turbines close to the Royal Naval Air Station at Culdrose in Cornwall and was monitored on the air traffic control radar.

18. That trial proved turbines caused an effect on radar when in line of sight and as a result it was recommended that the MOD should be consulted about all proposed wind turbines within 60% of the maximum instrumented range of a radar. This was interpreted as 66km for ATC radar and 74km for AD radar.

19. Over the next ten years, however, it became clear that more robust evidence would be required for the MOD to be able to assess the predicted effects of proposed turbines, discuss those effects with developers and other stakeholders, and, where necessary, support objections to planning applications.

20. Wind farm developers were also questioning the MOD's relatively limited evidence and, in 2004, Professor Sir David Wallace CBE FRS FREng, vice President of the Royal Society, wrote to the Secretary of State for Defence to question the scientific rationale behind the MOD's assessment criteria.

21. As a result, three Air Defence radar trials and one ATC trial have since been conducted. These trials were organised by the MOD and carried out at MOD's expense

22. The first of these was conducted by Air Command and Control Operational Evaluation Unit (Air C2 OEU) to determine the effects of wind turbine farms on Air Defence radars. A scoping trial was held on 28 - 29 July 2004, and the full trial took place from 14 - 16 September 2004. The trial used the Llandinam (P&L) wind turbine farm in mid-Wales, and tested the effect of those turbines on a T101 radar deployed adjacent to the NATS radar site at Clee Hill. Sorties were flown by Hawk T Mk 1a, Tucano T Mk 1, Dominie T Mk 1a and a King Air aircraft.

23. The trial revealed that the effects of the wind turbines on the radar were more serious than had initially been thought, because primary radar returns from aircraft having a low radar cross section (e.g. Hawk T Mk 1a and Tucano T Mk 1) were lost when flying over wind turbines, regardless of the aircraft's height. The seriousness of this finding immediately prompted two further trials – one of ATC radar and a further Air Defence radar trial. A few months after it had received

them, the MOD made public the results of the trial in report AWC/WAD/72/652/TRIALS "The Effects of Wind Turbine Farms on Air Defence Radars" (6 January 2005).

24. The ATC trial began with a scoping exercise on 3-4 November 2004. The main trial was conducted from 23-25 November 2004, again using the Llandinam (P&L) wind turbine farm in mid-Wales. A Watchman Radar was deployed to site slightly south of the NATS Radar Site at Clee Hill. This deployment provided medium-range data from within the main beam of the radar. Another stage of the main trial was conducted during 13-14 December 2004, again using the P&L wind turbine farm but with the Watchman Radar on a soft-field site at Llanbister. This provided short-range data from within the auxiliary beam of the radar.

25. The results of this trial were made public in report AWC/WAD/72/665/TRIALS "The Effects of Wind Turbine Farms on ATC Radar" (10 May 2005). It confirmed that the effects on the radar occurred regardless of distance from the radar or the height of the aircraft. It also showed that an ATC operator would be unable to differentiate between returns from the turbine blades and those from real aircraft, and that the Probability of Detection of aircraft by the Watchman Radar was considerably reduced when aircraft were overhead, or in close proximity to, the wind turbines.

26. The further Air Defence radar trial was held between 29 March – 8 April 2005. Sorties were flown by Hawk T Mk1A, Tucano T Mk1 and Dominie T Mk1A, and all relevant permutations of significant radar set-up parameters were tested. The results of this trial were made public in the report "Further Evidence of the Effects of Wind Turbine Farms on Air Defence Radars" (12 August 2005). The trial confirmed the presence of a hole in detection at all levels overhead the wind turbine farm when in direct LOS of the radar antenna. It was also found that the use of a coarse Clutter Map together with sharing of Clutter Maps between multiple beams significantly exacerbated the problem.

27. Once the trials have been completed, the Royal Society was briefed by the MOD on their findings. It should be noted that the Royal Society accepted those findings, and also fully accepted the conclusions drawn and recommendations made.

28. Yet a further Air Defence trial was carried out in 2006, in which the radar at RAF Trimmingham was tested. The results of this trial remain classified because of the sensitive information it contains relating to an operational defence radar.

29. Throughout this period, those conducting the trials were analysing the results and passing these and their observations on them to the personnel dealing with wind farm applications. The MOD acknowledges that this process of information sharing and updating has not always happened as quickly or as efficiently as it should. The MOD also acknowledges that, as a result, the MOD has sometimes seemed to send out mixed signals. It has, however, always been the MOD's goal to ensure that it uses the most up-to-date information to make its decisions about the risk to ATS posed by any proposed wind farm developments.

30. The process of information sharing has now been made more efficient through the appointment of dedicated positions dealing with wind farms.

#### *MOD's Engagement with Wind Energy Developers*

31. The importance the MOD attaches to wind energy is reflected in the extent of its engagement with the various key bodies working in the area. Foremost is this is its involvement with the British Wind Energy Association (BWEA) which began many years ago. The MOD is an active participant in BWEA events, in particular its annual conference. The MOD has been attending this conference for a number of years (and paid for an exhibition stand in 2006), and high-level MOD officers have given presentations at the annual conferences since 2001.

32. A key achievement during the MOD's association with BWEA is its co-authorship, along with the DTI (now BERR), CAA and BWEA, of the CAA's Interim Guidelines. Officers from DE were responsible for drafting the sections of the guidelines dealing with military ATC and AD, using the input of the MOD's technical staff. The MOD is also currently involved in producing next edition of the Guidelines

33. The MOD has been a member of BERR's Aviation Steering Group (ASG) since its inception and is also a member of the ASG's Radar Subgroup and Strategy Subgroup. The MOD also gives presentations at the All Energy conference in May each year, and has done so for the last several years.

34. The MOD is currently chairing a NATO panel, formed in June 2007 to investigate the issues around radar and wind farms. In particular the panel will

assess studies, analyses, and field trials already conducted by the participating member nations to enable identification of gaps in understanding of underlying phenomenology; develop a co-ordinated approach to address these gaps and any other concerns raised by participants; and develop a co-ordinated plan to conduct the necessary studies, analyses, or field trials to obtain any additional data deemed to be essential to fully comprehend this issue

35. The MOD is also a member of the Euro Control Wind Turbine Task Force, and has attended meetings since September 2006, which involves air traffic service across whole of Europe working to define a common methodology for assessing and avoiding or minimising the potential impact of wind turbines on ATC surveillance systems.. Finally, the MOD also contributes to work of the International Energy Agency and gave a presentation at an IEA conference in Oxford in March 2007.

36. The extent of the MOD's experience in and engagement with this area was recognised by the US Department of Defence (DoD) in 2006, when the US Congress instructed the DoD to examine the operation of military radar installations in the proximity of "windmill farms". The DoD acknowledged in its report (exhibited at **Annex 1**) that the UK leads the world in this area, and referred extensively to the MOD's trials detailed above.

37.

38. Through the NATO panel, the MoD has retained the ties formed with the US DoD during its investigations for its report to Congress. There is active information sharing between the two countries, to the extent that two RAF officers were invited to witness a radar trial in the United States last year.

39. The MOD has also always tried to engage as openly as possible with developers. Indeed, DE used to organise regular regional wind energy seminars for developers. These were initially held every three months, but were then reduced to every six months and then stopped. The seminars were stopped because interest in them waned, and DE was given feedback by various developers that industry was generally clear about where the MoD was coming from.

40. The MOD is has also dedicated significant time and resources to work with developers on the development of mitigation measures. The MOD has made personnel, radars and aircraft available to developers to test mitigation technology, most notably in relation to the ADT mitigation being investigated by BAES and the

Sensis Corporation Single Processor Enhancement 3000 being investigated by SENSIS. The MOD gave BAES and SENSIS access to the infrastructure used in its 2005 trial on the effects of wind turbines on ATC radar.

41. In 2006, BAES and SENSIS approached the MOD and requested that another trial be conducted. Again, the MOD made available the required radar and personnel to operate the radar; aircraft and pilots to perform the flight trial and technical personnel to assess the trial results, all at the MOD's own cost. It was only at the request of the developers that the report has been classified commercial-in-confidence.

42. The MOD is also attempting to assist in the development of stealth technology. In September 2007, the MOD agreed to lift its objection to a proposed wind farm in Blyth, which was projected to impact on the air defence radar at Brizlee Wood, with the aim of allowing the development to be used as a pilot scheme for turbines constructed using radar absorbing materials. Although the scheme did not come to fruition because of the timescales imposed by the planning process, the MOD is more than willing to support a full-scale stealth turbine trial if a suitable site is identified.

#### **The MOD's Change of Stance in Relation to Green Rigg and Ray**

43. As I made clear in my original Proof of Evidence, the MOD acknowledges that it has changed its stance in relation to the Green Rigg and Ray proposals. This change of stance understandably caused concern to the proposals' developers. The MOD further acknowledges that the way in which the change of stance occurred was unsatisfactory and that this has aggravated the developers' concerns. The MOD regrets the resultant acrimony. It has since striven to ensure there will be no repetition in the future.

44. The chain of events in each case highlighted shortcomings in the MOD's internal procedures, particularly in relation to inter-departmental communication. To address these shortcomings, the MOD has significantly tightened and improved its procedures relating to pre-planning consultations. It is, of course, not possible to change what has happened in the past. But it is hoped that some solace can be found in knowing that the procedures that are now in place mean that it should not happen again.

*Ray Estates - AMEC*

45. The root of the MOD's change in stance in relation to Ray Estates is to be found in a mistake that the MOD made in July 2001. Initially, the Radio Site Protection team at RAF Henlow produced accurate path profiles using the correct grid references provided by the developer, which showed line of sight to the radar at Spadeadam. However, when these were passed to the RAF ATC TA, the grid references were inaccurately converted to latitude and longitude and the turbines were placed near Penrith.<sup>1</sup> Accordingly, although the development was assessed as being in LOS of the radars at Spadeadam, as it was considered that the turbines would not affect operationally significant airspace, no concerns were raised.

46. Although the Low Flying Operations Squadron at RAF Wittering had also correctly positioned the proposed development, it did not have any contact with ATC TA, and so did not know that ATC TA was working with a different location. The discrepancy was not picked up by DE, as the officers dealing with the wind farm consultation merely took the results of each assessment at face value, and did not re-check the specialists' reports.

47. At that time, when confirmation was given by the MOD that it did not have concerns with a development, that confirmation was very general – it referred to the name of the development, rather than the number and placement of turbines. It also did not specify that, should any changes be made to the specifications of the development, the MOD should be informed in order to assess whether its position remained the same. It should be noted that this system has changed significantly as a result of the experience with the current developments.

48. Also, some of the personnel dealing with pre-planning consultations took the view that, as long as a development remained substantially similar, further checks would not be made and it could be re-confirmed that there were no concerns. Again, this has been addressed.

49. As a result, the MOD's fundamental mistake was not picked up, even when another proposed development in almost exactly the same position as Ray Estates was objected to because of its interference with the Spadeadam radars.

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<sup>1</sup> See letter of 30 July 01 [STC/211030/12/1/ATC] **Appendix 2.**

50. Only in April 2007, when the Steadings Wind Farm Limited brought it to the MOD's attention that it had not raised concerns about Ray and Green Rigg, did the MOD investigate and discover that, as Green Rigg is only 16 nm from Berry Hill and 18 nm from Deadwater Fell, in the Newcastle-Otterburn corridor, and was was predicted to caused serious interference with those radars. As soon as this was realised, the MOD officer responsible for dealing with the development was told. That should have immediately prompted that officer to advise the developers that the MOD objected to the Green Rigg rig proposal. Inexcusably, that did not happen.

51. Indeed, that information did not reach the developers until a few days before the pre-Inquiry meeting, when the outline SOC was sent to BERR.

52. Without seeking to excuse the MOD's failure to immediately notify the developers of its objection, from what I have been able to piece together, it appears to have come about as follows. Between April and September 2007 there was understaffing in the office responsible for dealing with the day-to-day wind energy safeguarding work. Over that same period, the effects of this understaffing were compounded by significantly higher than average illness amongst staff in that office. It was over this same period that there was a breakdown in communication into and out of that office on a significant scale. A glaring instance of that breakdown was the failure in April 2007 (i.e. immediately the change in stance was known) and thereafter to inform the developers of the MOD's change in stance.

53. For me, this is particularly regrettable because, as AMEC's SOC correctly points out, I do have a good working relationship with Colin Ormston. I was under the impression that AMEC had been told that about the MOD's change in stance. It came as a great shock when I was informed at the pre-inquiry meeting that AMEC had not been made aware of the change in position.

54. Paragraph 21.3.5 of the SOC is incorrect when it states that I did not acknowledge the MOD's change in stance. I did so, both at the pre-Inquiry meeting and personally to Colin Ormston, to which I expressed the MOD's regret. I also told him of my shock that he and AMEC were unaware of the change in stance.

*Green Rigg – Wind Prospects Development Limited*

55. Unfortunately, I have simply not had the opportunity to scour the records of correspondence between the MOD and WPDL in order to extrapolate exactly how the MOD's change of stance came about. I shall continue to investigate, and will

make the Inquiry aware of my findings either at the Inquiry itself or by a supplementary proof of evidence if sooner.

### **The Provision of Information**

56. It should be stated at the outset that, unless precluded by classification, the MOD has always been prepared to provide the developers with whatever information they have requested. As with other inquiries, the MOD recognises the need to share the technical information relating to its radars with the developers, and willingly does so. It should be recognised, however, that collating the information and answering the developers' complex technical questions is not always a quick process.

57. It should also be appreciated that a particular procedure for requests for information has to be followed. The MOD has learned from its past mistakes. It has developed a procedure to ensure that all requests are dealt with and that they go to the technical person or people best suited to dealing with them.

58. Defence Estates is now the single point of contact for all requests. Once received, DE forwards the request to the best qualified technical person or people. The response is then sent back to DE, which then passes it on to developer. This process seems to be working well to prevent requests falling through cracks, even if it lengthens the turnaround time for requests

59. As best I can discern from looking through the significant volume of correspondence between the developers and DE, the only significant piece of information not provided before Christmas 2007 was the level of tilt of the two radars. By that stage, the developers had all the other technical details about the radars.

J CHAFER