

**Electricity Act 1989 – Section 37  
Inquiries Procedure Scotland) Rules 1997, as amended  
Proposed Beaully to Denny 400kV transmission line.**

**PRECOGNITION**

**on behalf of**

**STIRLING BEFORE PYLONS**

**By Caroline Paterson BA Hons, M.Litt, MA, Mus Dip  
with regard to**

**LOCAL HEALTH CONCERNS**

**Caroline Paterson is a mother with two young children living along the route of the Beaully to Denny 400kV proposal. Concern on this issue led to her submitting Petition PE812 to the Scottish Parliament on behalf of Stirling Before Pylons. She has also represented Stirling Before Pylons, and by extension Scotland Before Pylons, on the Stakeholders Advisory Group on Extremely Low Frequency Electric and Magnetic Fields (SAGE).**

## **1. Consultation**

1.0 I have already submitted some evidence on consultation as a rebuttal precognition to evidence led by Dr Keith MacLean at the Strategy session. Consultation with the public was minimal and haphazard, and amounted at best to a local road show and notification by the local community councils. At worst, there were residents who received no information about the *preferred* route, only to subsequently find themselves in close proximity to the *indicative proposed* route. The Applicants stated that “at this early stage there was still maximum flexibility, however, this would be more limited once the second stage had commenced” (StBP/7/38,5). The shunting of the line from one community to another would appear to severely disadvantage those affected by secondary routings, who in the case of Beaully to Denny were more often than not largely unaware of the proposals in the first place.

1.1 The pinch point at Logie was handled in a most unsatisfactory and undemocratic fashion and may well be representative of the “divide and rule” tactics employed by the power companies at other locations. However, the community did unite in unanimously rejecting the *indicative proposed route* on two main issues, namely *health* and *environment* (StBP /7/1, 29<sup>th</sup> July 2004). The public turn out at these meetings was large, and the concern on the health issue high.

1.2 Failure to engage in discussions with the public on the health issue, and indeed to misinform them on the science is unacceptable. On the grounds of massive local concern alone, the Applicants should have made public health a consideration, but with the then NRPB recommending a government review (SAGE) aimed at reducing exposure, together with the imminent (leaked) publication of the Draper Report it is inexcusable that the publics’ concerns were overlooked. Dr Keith MacLean’s open declaration that “public health had not been a consideration in the routing proposals” at SSE’s AGM in Pitlochry June 2005 was a shocking admission. As a result of the absence of dialogue with the Applicants on this topic StBP submitted PE812 to the Scottish Parliament in Dec 2004, as discussed more fully in my precognition for the Strategy session.

1.3 The Applicants' consultation, despite being voluntary, does not compare well with other proposals. By way of comparison, NIE, who are responsible for the current 85km single-circuit 400kV Tyrone-Cavan Interconnector proposal have sent information packs to all premises within 1km either side of the proposed route as part of their consultation process. To my knowledge, no information was sent to any premises along the Beaully to Denny route, despite the Rt Hon George Reid recommending "a mailshot to all households in the locality" (StBP /7/36).

1.4 Approximately 800 objections to the proposal appear to have been rejected on account of having been submitted prior to the proposal's submission. Again poor communications from the Applicants were largely responsible, though in the light of a total of 17,000 objections I will not elaborate further here – Appendix 1.

## **2. Public Awareness of the Potential Adverse Health Effects of HVOTL in Stirling**

2.0 I would not claim to be an expert in the field of power line electric and magnetic fields, and for that reason asked the applicants to address our expert witnesses at the Strategy Session with technical questions. However numerous scientific reports are now readily accessible to the public. Indeed, with the publication of the Draper report in 2005 members of the public along the proposed Beaully to Denny route were able to calculate the increased risk of childhood leukaemia associated with their properties. Many members of the public are aware that exposure to power line EMFs is potentially carcinogenic, though they may not be aware that IARC classified childhood leukaemia as a class 2B carcinogen in 2002. Since 2004 the association with childhood leukaemia has been internationally acknowledged from the WHO to the HPA, and accepted even by Dr W Bailey. The semantics of "association" versus "causal association" is not one which relieves the public of much, if any concern. If population studies consistently show that children living close to HVOTL are twice as likely to develop leukaemia, then that causes the public serious concern. The public

do not need to understand causal mechanisms, neither do they demand absolute lab-based proof of a causal mechanism to continue to be seriously concerned. If studies consistently show a link with adverse health effects, then the public, very reasonably, do not wish their children to grow up exposed to such a risk. When scientists universally concede that such an association exists, whether or not they agree on its cause, the time for precaution has arrived. Once a causal link with serious adverse health effects has been proven, the time for precaution has long since passed.

2.1 National media coverage of the adverse health effects associated with HVOTLs has raised public awareness. During our campaign several members of the public referred to a BBC Panorama programme from the early 1990s (StBP 7/13). I would urge the Reporters to watch this programme. Mr Studholme, who lost his son to leukaemia, wished he had known about the association between EMFs and leukaemia. His son's bed head backed onto the electricity meter and house alarm, and just across from the boy's bedroom was a substation. Extremely high readings were taken from these electrical installations, and this is what Ray was exposed to every night. Mr Studholme's story is not an isolated one, and there are similar ones associated with proximity to power lines. By campaigning on this issue we are trying to prevent unnecessary deaths being constructed into our transmission grid network. This is not alarmist, but precautionary.

2.2 I would also invite the Reporters to view the second Panorama programme from May of this year (StBP 7/13). Although this programme focuses on the health risks associated with WiFi technology, the absence of precautionary measures to protect against long term biological effects is held in common with powerline EMFs. Indeed the political/industrial background and many of the key players are familiar. The government's chief scientific advisor, Sir William Stewart, chairman of the Health Protection Agency, is an advocate of the precautionary principle. He describes those exposed to WiFi (many of whom are children as) "as the human canaries of the future". We know this is already the case with powerline EMFs, where children living in close proximity are twice as likely to get leukaemia, with some studies showing several fold increased risk of certain adult cancers, motor neurone disease, miscarriage etc in later life. In the light of this powerful evidence we hope Sir William will apply the same precautionary principle to powerline EMFs, and that government

will listen to his recommendations. In the meantime I would respectfully suggest it is the moral duty of the reporters to advise that a precautionary approach is adopted.

2.3 Information available at the Bridge of Allan road show referred to a small raised risk of childhood leukaemia (StBP 7/30). This was alarming in itself, but when this “small raised risk” actually transpired to be an internationally acknowledged **doubled risk** for all those children exposed to levels above 0.4 microtesla, (or living within 100m of HVOTL according to the Draper report) the public’s confidence was knocked. They were then not prepared to accept denials of any associated adverse health effects by the Applicants, such as the statement that “there was virtually no evidence of any link between power lines and health concerns” in the minutes of the University of Stirling meeting April 26<sup>th</sup> 2004, p.3, para 3 (StBP/7/38).

2.4 Another official claim that needs investigation is that even having accepted the association between HVOTL and childhood leukaemia, the number of children affected is very low, perhaps 1 or 2 cases pa for the UK. Childhood leukaemia is the UK’s largest child killer disease, and that despite an 80% recovery rate (though recovery is a relative term, as many children subsequently experience other cancers in early adulthood as a result of their gruelling treatment). Most people know or know of a child or children with leukaemia. Childhood leukaemia is on the increase, due to “environmental factors”, one of which is likely to be powerline EMFs, as more and more houses come into close proximity with HVOTL. In the US it is estimated that approximately 11% of childhood leukaemia cases result from exposure to electricity supply systems (Wartenburg 2001). If the same percentage were applied in the UK, and Prof Mike O’Carroll has presented evidence on this, there would be close to 60 new cases pa from exposure to magnetic fields from the electricity supply system, and not just 1 or 2 cases. However, whether the number of children affected is 1 or 60 the public perceive a need for immediate precautions to be adopted.

2.5 In addition to childhood leukaemia Prof Henshaw led evidence on the very real possibility that a range of serious adult conditions are also associated with powerline EMF exposure. The SAGE Report officially acknowledged this and presented the “California view” after the California Health Department 2002 publication, stating

that if this was found to be the case, then the cost benefit analysis would alter dramatically, since many of these adult conditions are commonplace.

2.6 Government policy on this issue has been under review since 2004, and is still under review at the time of writing. Although the topic of health was dealt with to some extent at the Strategic PI in Perth, several important documents have been published since then, all of them receiving coverage in the local and national press. Where accepted by the reporters we have submitted detailed written responses. However, for those bodies and individuals who did not receive these submissions I wish to give the following summary:

2.7 The stakeholder process, SAGE, was not as innovative a collaboration as some hoped it would be. SSE's representative, Dr Keith MacLean, threatened to leave the process and take other industry delegates with him (SAGE internal communication 30 Jan 2007) "if all his comments were not incorporated". SSE subsequently left the process, as did Ofgem (Feb 13, 2007). Serious dissatisfaction with the process was also expressed by a large percentage of active delegates (as opposed to government employees who declined to engage) in 250 word resumes, which can be found appended to the SAGE Report ([www.rkpartnership.co.uk/sage/](http://www.rkpartnership.co.uk/sage/)). It is difficult to imagine what weight the government can place on the recommendations to emerge from such a shambolic, undemocratic process, which failed to live up to Bruce Crawford's hope that: "It is vital that the recommendations of SAGE are able to stand up to the most intense scrutiny. Those recommendations must be rigorous beyond reproach and should in no way be unduly influenced by interest groups from either side of the argument" (StBP /7/11/ 234 11). Stirling Before Pylons' response to the PI on SAGE highlights how ill informed and undemocratic that process was, with the chief drafter coming from the National Grid and also having compiled Chapter 32 of the Applicants' Environmental Statement. John Swanson has subsequently stated that more work needs to be done on subjects such as undergrounding (ruled out as a mitigating solution), but up-to-date evidence on this topic was not admitted, making SAGE ill-informed and out-of-date even at the time of its publication. Despite this, SAGE did declare that "the best-available option for obtaining significant exposure reduction" would be "to stop building any new buildings for residential use (and some other uses including schools) within specified distances of overhead power lines, and

to stop building new overhead power lines within the same specified distances of existing buildings”. Stirling residents are aware that the B-D proposal gave no consideration to public health, and that instead of respecting a specified distance, the Applicants actually moved the line close to existing properties in some areas of Stirling.

2.8 The Westminster Cross-Party Inquiry Report (July 2007) made this very option its main recommendation, and quantified the building moratorium as at least 60m extending to 200m on the basis of childhood leukaemia alone. One of the MPs supporting this report, Michael Connarty, MP for Linlithgow and East Falkirk asked the House of Commons to engage in dialogue with the Scottish Executive over Beaulieu to Denny stating “It will be a 400kV grid and we are calling for a zone around it of 200m in which schools and houses should not be built” (StBP /7/19). Stirling residents are aware that there are some properties which could be within 60m of the B-D proposal, with many more potentially within 200m.

2.9 The third new document accepted by the Inquiry is the BioInitiative Process. This is a critical international study raising pressing concerns about the long term biological effects of HVOTL, including various cancers, motor neurone disease etc as opposed to immediate health and safety issues such as electric shocks and electrocution. The public health implications for long term exposure are much greater and affect many more people. The BioInitiative Report recommends an interim planning limit of 0.1 microtesla for homes near new lines, which in practical terms would equate with a building moratorium of at least 200m for HVOTL. Stirling residents are aware that UK guidelines currently allow significantly higher exposure (100 microtesla) for new power line proposals, and that yet again international scientists of the highest pedigree are urging precaution.

2.10 The adverse health effects debated in the strategy session, and subsequently through recent publications are critical to the Beaulieu to Denny proposal, because many homes and educational establishments in the Stirling area fall within distances at which serious adverse health effects have been reported. Informed common sense leads the people of Stirling to the conclusion that the Beaulieu to Denny proposal is not safe, and this alone is sufficient reason for the proposal to be rejected

### **3. Public Concern on the health issue in Stirling**

3.0 With regard to health, we know of hundreds of letters that raised this concern at every stage of the consultation exercise. It took time for the public to become sufficiently educated in this subject to make informed objections, but at the final count there were 13,941 objections which raised health concerns as a primary concern. A large proportion of these are from the Stirling area, where health is a major concern, with this being the most populated section of the proposed route.

3.1 We know of at least 4000 objections raising concerns about health from the Stirling area alone. A large percentage of these objections were pro forma letters but with individually appended comments, many of which expressed incredulity that public health was not being protected, let alone considered. The number of local objections is likely to be much higher, but analysis was done on postcodes alone and these were absent from a large number of Stirling responses, as StBP pro forma letters did not provide a dedicated space for postcodes.

3.2 Massive public concern over the health issue was reflected in the response of MSPs. All the local constituency and list MSPs raised serious concerns about the potential health impacts of the proposal and called for the precautionary principle to be upheld. They gave unprecedented cross-party support for the submission of PE812 (which was accompanied by over 1000 local signatures), and regularly updated the public on this topic in their weekly columns in the *Stirling Observer* (StBP/7/2). Some MSPs submitted individual objections to the proposal, including our constituency MSP, the Rt Hon George Reid (StBP/2/16), who as presiding officer was unable to voice his concerns within the Parliament.

3.3 “The submission of a substantial body of objection indicating a genuinely held concern for public health” was considered to be “a substantial material consideration” by the Council (StBP /7/2/ 4<sup>th</sup> May 2006). It was raised in several Environment and Planning Panel meetings, where “one of the main concerns raised was electromagnetic fields, with the request that SSE work to a 400 metres safety curtain” (StBP /7/2/26<sup>th</sup> Aug 2004 EV56). Ten community councils along the proposed route through

Stirling objected to the proposals, with health effects being raised as a prime concern (StBP /7/2/17<sup>th</sup> Oct 2005).

3.4 One recognised means of measuring public concern is media coverage. I do not regularly subscribe to Stirling's main local paper, *The Stirling Observer*, but the numerous articles, including several front page lead articles provide clear evidence for local concern on the health issue (StBP/7/2). This is also true of TV coverage and regular news briefings on the health issue on the local radio station Central FM.

#### **4. Local proximity issues**

4.0 A 132kV line already passes to the east of Stirling. To increase the voltage to a double circuit 400kV line presents a completely new scenario with regard to the health of those living in close proximity. Indeed, in England the National Grid identifies the former as a distribution line and the latter as a transmission line. There should therefore be no presumption in favour of following the existing line under such circumstances, particularly where the line passes through residential areas. The Holford Rules state that HVOTLs should be deliberately routed away from residential areas on grounds of general amenity. Indeed SSE and SP's *preferred* route differed from the existing through some areas, including the Logie area on account of the power companies' initial attempt to keep 100m distant from all properties (oral communication at Bridge of Allan road show). However, the Applicants subsequently reneged on this and brought the line closer to homes in some areas, potentially within 100m of nearly 20 homes and within 200m of many more.

4.1 The question of how many properties would be detrimentally affected is difficult to evaluate, as the power companies' have reserved for their contractors the right to move the line during the construction phase, with the width of this deviation corridor varying in different areas. However, the survey work referenced below (Appendix 2) shows vastly increased figures from those referred to by the Applicants and a significant increase on the properties listed in APL 5/7. All references to the numbers of properties that would be adversely affected are therefore approximate, as the various permutations of a deviating route are too numerous for us to evaluate.

4.2 Another significant factor not referred to by the Applicants is the blight such a HVOTL would have on future development in the Stirling area. Stirling Council has ambitions for the City of Stirling to increase dramatically in size, which would inevitably lead to development in some of the areas close to the City through which this proposal passes. Indeed some modest planning applications have already been submitted and others are in the pipeline. The few I know about include more houses at Cauldhame bringing the total at that site to 7 (300-600m), residential conversion of the farm buildings at Powis Mains totalling between 15-42 houses (100-200m) and expansion of the William Simpson Care Home, Plan to include residential care for alcoholics (300-600m). Such developments dramatically increase the numbers of homes at risk, and this major planning blight will certainly deter developers from a substantial corridor (as exemplified by the major secondary detour around Stirling Council's proposed Major Growth Area to the east of Stirling). George Wimpey, one of the UK's biggest house builders, has a policy that restricts building within 200m of HVOTL (Cross-Party Inquiry Report 2007, 13).

4.3 SSE's initial dismissal of proximity issues as only affecting a handful of residents was overturned with the cross-party motion led by Bruce Crawford in the Scottish Parliament on 22<sup>nd</sup> Feb 2006 (StBP/7/11). This debate was well attended by local people and raised yet further awareness of the health issue, with many MSPs calling for the precautionary principle to be upheld. The Applicants subsequently commissioned a survey by WSP Environmental – Jan 2007 (APL 5/7). This survey still has some failings, with approximately 10 individual properties missed in the Stirling area. Moreover, the document refers in footnotes only to multi-occupancy dwellings, with no reference to the status or numbers involved. In the Stirling area these include a University Hall of residence with 332 occupants and a Care Home. There is moreover no survey of lodged/intended planning applications for this area in the near future. It must have been an embarrassment to the Applicants to discover their preferred route went straight through a New Super Village proposal, but it illustrates quite clearly to the public how developer profits are being prioritised over the health and amenity of the existing population.

## **5. Potential health impacts to be imposed on Stirling residents**

5.0 Thanks to recent publications the Stirling public has been able to quantify how serious the health effects would be for their property. These studies are publicly available and have received both national and local press coverage.

5.1 For all properties within 200m of the proposal there is a 70% increased risk of childhood leukaemia (Draper 2005). This publicly funded study complimented the internationally acknowledged doubled risk of childhood leukaemia associated with average magnetic fields above 0.4 microtesla (Ahlbom, NRPB, WHO etc) and made the threat more accessible by quantifying the risk in distance from a HVOTL line. There are currently approximately 40 properties which would be within 200m of the line to the east of Stirling, though many more currently face this threat on account of the uncertainty posed by the deviation corridor. This figure will rise in the near future, as there is currently a planning application lodged with the council for the redevelopment of farm buildings for 15 houses, but with changes to Planning Policy SPP15 the owner is likely to want to increase this number, potentially to 42 dwellings within this critical distance of the proposed power line.

5.2 One of the existing properties within 200m of the line is my own family home. When being cross-examined by the Applicants I was pressed into agreeing that my property would not be within 100m. I would like to correct this now – with the deviation corridor at Powis standing at 100m there is every possibility that our home could be within 60m of the 400kV power line, with our neighbours opposite being immediately alongside it. My original statement was not exaggerated as claimed by the Applicant's counsel. However, to some extent this discussion is immaterial, as the difference between an increased risk of childhood leukaemia of 100% and 70% is not significant. Both are clearly unacceptable to any parent or grandparent, or responsible citizen.

5.3 The Alexander Court Hall of Residence at Stirling University could also be within 200m of the 400kV proposal. This university accommodation comprises 45 flats accommodating approximately 332 young adults. The Cross-Party Inquiry report afforded schools the same protection as homes, on account of the enforced exposure of young, physically more vulnerable people for lengthy periods of time.

5.4 There is a five fold increase in certain adult cancers for those who as young children (0-5) are resident within 300m of HVOTL (StBP /7/16: Lowenthal et al 2007). In Stirling there are approximately 100 individual properties within 300m of the B-D proposals, including the University Hall of residence already referred to. Special protection should also be afforded to those in care, yet the William Simpson Care Home at Plean could lie only 250m from the proposal.

5.5 The Draper Report recorded a statistically significant increased risk (23% higher risk) of childhood leukaemia extending to 600m from HVOTL. There could be approximately 600 properties within 600m of the proposed route, (including at least two large multi-occupancy institutions), depending on where within the deviation corridor the line would to be sited. The number of individuals adversely affected therefore runs into several thousand. The primary school at Fallin could stand at approximately 600m from the proposed line, and the new St Modans High School is currently being constructed approximately 1km away from the proposal. In the US, power lines are being rerouted (and undergrounded) away from schools, as a collaborative effort by schools and utility companies (StBP 7/13). It would therefore seem irresponsible to build new lines close to existing schools in the Stirling area, when our young people should be afforded full protection during their education.

5.6 From the above figures it can be concluded that there is no suitable overland corridor to the east of Stirling for this proposed 400kV power line. The route defies the key Holford Rule to avoid residential areas. Although the Applicants failed to consider health concerns, they do claim they have followed the Holford Rules in siting the lines away from homes on grounds of amenity. Why then has the line been brought closer to many homes (and within 100m of some) in the Stirling area (from the preferred to the indicative stages)?

5.7 The health threat posed by the Beaulieu to Denny Application is very different from that discussed at the Northern Ireland Interconnector Public Inquiry 1994-5 (APL 2B/1,.261). That was a 275kV line with a maximum capacity of 500mw, significantly less than the Beaulieu to Denny proposal. Back then there was no international acknowledgement of the association between childhood leukaemia and

HVOTL. Now there is, and the associated risk is quantifiable. No official body would now claim for the Beaully to Denny proposal that there is “no likelihood of exposing any existing property to electric and magnetic fields....in excess of those advised to the inquiry and which apply either in the UK, as derived investigation levels, or as standards or guidelines elsewhere in the world” (APL 2B/1, 261, 12.21). No report would now invoke international standards to defend their case, as several countries, including Sweden, Switzerland, and the Netherlands have adopted precautionary guidelines for new HVOTL which are 250 times more stringent than the UK. In the case of the Northern Ireland Interconnector no property was closer than 160m to the proposed route and there were only 7 within 200m of the centre line (one of which was ruined and another uninhabited) (APL 2B/1, 77, 4.17). Along the Stirling section of the route the closest property is c.70m from the centre line and there are c.37 homes within 200m of the centre line. However, many more, including 332 students at the University Hall of Residence could be within 200m of the line if it deviates within that corridor. The scientific evidence of the threat has been affirmed and the number of residents threatened just out with the City of Stirling is substantial.

In the absence of any policy advice it is essential that a precautionary approach is adopted. Such an approach must be firmly based on the latest scientific evidence and guided by the motive to protect public health. Indeed, in 2004 the NRPB recommended that the UK government consider further precautionary measures. Adverse health effects associated with HVOTL EMFs is an established scientific field and deserves to be acknowledged by the Reporters and given serious consideration with regard to this Application – the lives of the most vulnerable people of Stirling depend on it.

Appendix 1: 800 objections to the proposal were deemed inadmissible on account of being submitted following publication of the route (July 25<sup>th</sup> 2005 - with comments invited from the public and the Energy Consents address supplied) but prior to its formal submission, with no changes (September 28<sup>th</sup> 2005) – when StBP had been

informed that submission would follow “in the days immediately following publication”. Whether or not the 9 1/2 week separation between these dates was intentional or not, this confusion does not reflect well on the power companies’ communications with the public (StBP/7/37, /7/35).

Appendix 2: Stirling Before Pylon’s updated survey (Brian Jamieson) of properties in line vicinity attached as separate document.