To the Inspectors, Rossendale Local Plan Hearing

I am Dr. Alan Heyworth, a botanist and pollen analyst, with very many years of peat workings and research.

In particular, I wish to comment on the importance of blanket peat, a major part of Rossendale's ecology.

SUBMISSION
(in conjunction with those from Dr. Falmai Bins)

WINDFARMS AND DAMAGE TO BLANKET PEAT

Blanket peat is an extremely important feature of the local moors, and is of great scientific and environmental interest. It can very easily be damaged and is usually impossible to repair. Blanket bog gets all its water and nutrients from the rain, and consequently it has only a limited number of species, which will survive only in very specific habitats. The bog is remarkable in that it continually makes its own habitat, the mosses and sedges growing in the preserved remains of their earlier generations, which are "pickled" in the very acid water produced by their own decay.
It must be remembered that that the blanket bog is not just the surface vegetation, but the whole section of peat down to bedrock. The start of peat formation and the subsequent maintenance of the exact conditions for its continued growth over 6000 years can be traced by examining the remains preserved in the peat.
Until about 6600 years ago the Moor was covered by dense birch woodland, rooted in a thin soil. The birch probably arrived almost 10,000 years ago, after the last ice had melted. Perfectly preserved branches of these trees, with their intact silver bark, can be seen at the base of the peat.
At shortly before 6600 years ago, something (details not certain) clearly happened which caused rainfall to increase and drainage to be impeded, so the whole moor became waterlogged, which quickly killed the trees. Equally quickly, conditions must have become very acid (pH 3) so that the tree remains were preserved.
From then on, until recent times, the year-by-year sequence of growth and preservation has continued, so that the peat now contains a continuous record of events over the last 6600+ years. This is a very fortunate and unlikely set of circumstances, and any proposal which might destroy the peat or threaten future damage should be preceded by a full archaeological survey.
The aim should be to ensure that the blanket bogs grow for another 6000 years.
As it is, the bog has much less protection than bats or newts.

Not only is the bog vegetation preserved, but also the pollen, both local and from the surrounding region. Pollen grains are perfectly preserved in these conditions, and every species is different. The grains can be extracted from the peat and identified under the microscope so that a record of the changing vegetation and environment over the last (in this case) more than 6000 years, can be produced.
The changes in the species are evidence, in particular, of climate change and human activity (early farming, peat extraction, industry, etc.).
Peat is also an ideal material for radiocarbon dating, which, in conjunction with the pollen, can give a very detailed record of events over the millennia.
The bog is a unique source of all this information: it is not recorded anywhere else and it is very important that the continuous year-by-year record should be preserved.

Radiocarbon dates from the base of the peat give an age of more than 6600 years before the present. (5830 +/- 50 B.P. uncorrected, 6639 +/- 68 cal B.P. corrected.

Damage to peat
The peat is held together by the interwoven preserved remains of the long-dead sedges and grasses, but its main protection is the surface skin of living plants. If this

is broken, the peat can dry out and shrink, or heavy rain can wash it away. A dry peat surface is much more susceptible to fire than a wet bog. In the hot summer of 1959, a grass fire burned through into dry peat, and continued for weeks. In the autumn heavy rain washed the charcoal and debris away, and created a large gully, which has never healed.
Any disturbance of the surface is likely to lead to erosion and the formation of gullies and cliff faces (sometimes overhanging) in the peat. Once a cliff face has formed it will not heal: it will gradually collapse and retreat as rain and wind remove loose material. Eventually it may become a sloping area of bare peat on which nothing can get a roothold. The only way to prevent this erosion is to ensure that there is no damage (even slight) to the surface vegetation.
The damage to the peat is caused by all the associated works. Probably worse than the turbine bases are the roads. Much of the spread of a blanket bog is due to the slow creep of the peat front across a horizontal or down a gently-sloping surface. The roads act as barriers completely stopping this growth.
Roads should be subject to the same restrictions as turbine bases, and banned from all areas of peat-forming vegetation (which would, in effect, exclude wind farms from these areas).
"Restoration" implies returning to its original condition. However, there is clearly no way in which the stratigraphy of a blanket bog can be re-created Churned-up peat from elsewhere can be spread on bare areas, and if it is not washed away by heavy rain it might be re-colonised by blanket bog species, and look, on casual inspection, to be an original bog, but it will not be. Once the whole "archive" structure has been destroyed it cannot be re-created.
Raising the water table by blocking drains and building dams might have some effect in areas of fen peat, where the reeds and mosses grow in standing water, and the level is very similar over large areas, e.g. the Somerset Levels, the Cambridgeshire Fens, Chat Moss. Here, the general water level can be raised by one sluice or pump, but this is not feasible in areas of sloping blanket bog, where a whole series of stepped dams would be needed.
There are some bogs where the damage has been done many years ago, and here, for various reasons, e.g. carbon-capture, it might be worth trying to re-establish the bog vegetation, but in cases where the damage has not yet been done (new wind turbines) it would be extremely foolish to go ahead with the scheme when there is no prospect of the site ever being acceptably restored. The sum set aside for restoration would make any such scheme uneconomical, and in any case restoration would, in practice, not be possible.
It is clear that previous wind farms have been planned and costed with no intention of even attempting to undo the damage. The operators have banked on the belief that the authorities would not pursue them for these costs.
There are many areas on the Moor where the peat cover is dissected, as a result of historic erosion caused by air pollution, fire, peat extraction, quarrying, etc. If these were included in an area damaged by turbine operations, it would not be sensible (or possible) to "restore" only the later damage, and the only source of funds would be the turbine operators. It should be made clear that the responsibility for any clearing-up work on a wind farm site lies with the operators, even if the problems pre-dated their involvement.

Peat thickness

It will now be accepted that no turbines should be erected where the peat is more than 40cm thick, but it should be made clear that this applies to all the works, including roads, plant storage areas, spoil dumps etc. and that no damage should be done to any peat more than 40cm thick.
The 40cm figure seems to have been inherited from the soil survey definition of thick peat. The reason to treat thick peat differently is that it is more likely to suffer peat slides, bog bursts and other unpredictable failure. It should not be taken as an indication that the thinner peat is less valuable.
If the peat is considered as a carbon sink the thickness is immaterial. Why should it be acceptable to destroy an area with active peat formation just because it has not

reached this arbitrary figure? It may well be that the vegetation is healthier and peat formation faster than in the thicker area.

It would be more logical to say that turbines should be excluded from all areas of active peat formation. A further problem arises in areas described as degraded blanket bog. These might be considered suitable for turbines, but there might already be a scheme to restore this bog. Should the restoration be stopped simply to allow the turbine proposal?

If turbines were banned from the skyline (a very sensible suggestion) this would exclude them from most blanket bog sites.

The blanket bog peat started growing 1500 years before the Great Pyramid or Stonehenge were built, when Stone Age inhabitants were hunting on the moor, and has grown continually ever since, keeping a continuous record of the ecology and environment. Every effort should surely be made to ensure that this continues.