Application for Environmental Permit EPB3.5 (Version 4)

Buckles Farm, Kaber, Kirkby Stephen. Cumbria

Pre Application Ref.EPR/GP3001LP/A001

BF 7 Emission Reduction Plan

Site Location

Broxty Farm is situated in the upper River Eden valley close to its source, at an elevation of approx. 240m AOD. It lies to the west of the Pennines and consequently is in a high rainfall area. However given the elevation the area is less humid than further west in the Lake District which receives the majority of precipitation from weather fronts from the NW - SW.

The geology of the nearest part of the Pennine ridge, some 4 K to the east / south east, is predominantly limestone with only a thin covering of peaty soil but on the farm itself there is a more substantial drift soil structure and solid geology strata includes mudstone shale and sandstone over that limestone.(Appendix 9) The farm lies on the limit of where agricultural land has been improved, so fields on and around the existing and proposed poultry site are managed and productive whilst immediately to the east fields are of rough grazing and beyond, open moorland. The farm is in a ‘Less favoured area’. This brings with it challenges in profitable farming but the partnership has been able to encourage breeding success in priority bird species such as curlews and lapwings through appropriate land management.

Farm Business

The business to date has been predominantly sheep rearing and since 2013 has had a 32,000 bird free range egg unit.

 There has also been routine but variable over-wintering of beef stock from neighbouring farms, utilising the housing that exists on the farm. The infrastructure needed for continuity or development of this side of the business in in ‘abeyance’ pending this application for a second free range egg unit. The latter would provide long term security for both maintaining the sheep flock and providing a viable farming business for the partnership (including the owners’ two sons.); given the uncertainty of future support mechanisms. Developing the beef overwintering business (“B&B”)would require investment to bring structures up to modern standards. A second FRE unit of 32,000 birds would result in this present practice being terminated.(Presently up to 50 head from Oct to April – 6 months)

Existing poultry unit (2013)

The existing poultry unit, (houses 1a and 1b) were built in 2013 and commissioned early 2014, following discussions with both the Environment Agency and Natural England on the best options for ammonia prevention and exhausted air dispersion. At that time it was advocated that the nearest poultry house to the R. Belah SSSI should be provided with high velocity roof fans as a gable end arrangement would direct air flow towards the SSSI. For house 1b, a gable- end exhaust as chosen as this faced westwards and would disperse air into an area planted up with shrubs and trees to help disperse and degrade ammonia.

Both houses were built to an ‘aviary’ design with manure belts underneath nest boxes, perches and food / water stations. Consistent with BAT recommendations removal of manure has been at least 1x / week.

Modelling overview

Surveys

* Belah Woods and pastures SSSI – A bryophyte Survey of Unit 6 ( Mr A. McLay, Natural England) included as Appendix 14

Although the site is principally recognised for its base rich valley woodland, there is also reference to mosses in the citation. Because these, non- vascular plants, along with lichens are more sensitive to ammonia and because there is additionally an objective to protect them, this survey was chosen in preference to a ‘woodland survey’. In the report findings there are patches of mosses which could be affected by poor air quality but may also be the result of a recent dry period and a cold Spring.

The report confirms some sites where lichens and bryophytes were damaged need to be interpreted with caution as this could be a national phenomenon, and the impact was similar to other locations within the region.

There were observations of potential air quality impact but also observations of lichens and mosses that were present yet known to be N sensitive.

 The overall picture is therefore neither negative nor positive.

 Perhaps the greatest value is that there is now a survey with good data that can be compared to in later years to establish changes.

* Air Quality Impact Assessment – Broxty Farm Conducted by Ms. M Peasley Cogeo Ltd. (Included as Appendix 15)

An original modelling exercise recognising the existing arrangements and adding the potential impact of new houses was conducted and forwarded to the Environment Agency at pre- application stage for their appraisal. Since then a further report has been commissioned including all mitigation measures associated with the new build but also including the new heat exchangers presently being commissioned at the existing unit.

Existing site- Ammonia Minimisation Improvements

The existing house (1a and 1b)

The original house, built in 2013/14 was to standards that meet BREF criteria (BAT 2010/78/EU issued 2017.)

This is an aviary system with belt system removing manure to a channel at the end of the house from where it is further lifted via a covered incline to a trailer outside of the building.

 Since commissioning in 2014, there have been occasions in prolonged wet periods when continuous drawing of ‘damp air’ into the building has impacted on the litter dryness although little water is drawn in via the pop- holes because of the inclination of the pop-hole flaps and the extensive stone cover of the scratch area. With the knowledge that the key regulatory bodies regarded ammonia was an issue, the first mitigative improvement has been to purchase *heat exchangers*. These are now installed and presently being commissioned.

* They are air to air heat exchanger used to retain heat and warm incoming air drawn in to warm the house. The warm air is then blown in and jointly helps reduce moisture content of both floor litter and manure on the belts. It is not directed onto the belts but does raise the ambient temperature generally within the houses 1a and 1b. There are 10 x 100KW units on the outside of the house generating an improved air flow and raising the ambient temperature.
* The second mitigation is to increase the frequency of manure removal. Original EU guidelines suggest at least once / week but more recent information suggest significant emission occurs between 2 and 5 days. The frequency of running the belts has been amended to once / 3 days, with a view to considering once / 2 days.
* The high velocity roof fans serving house 1a are planned to remain, given original advice that immediate mixing would limit the risk to adjacent conservation sites. This advice may be contrary to present advice on the merits of high velocity dispersion. However, there is a reluctance to add actively to the background levels, and as part of the partnership philosophy to work towards a sustainable future, any future ammonia exhausted from new houses would be avoided in the first instance and only then considered for high velocity dispersion.
* There is a small capacity to store manure on the main farm site but this has largely been transient and all is quickly spread on own land or transferred to neighbouring farms and stored there prior to application onto fields. The farm is not included in the site boundary as this facility would be removed on the building a second pair of houses (2a and 2b). A new manure store in that location would provide better control overall and ensure manure was stored in dry conditions, (roofed). However the proposal would still be to transfer directly onto fields as the best option and then to adjacent farms for intermediate storage as 2nd option. The new store would therefore be largely a contingency facility, but designed to minimise ammonia generation and release.

Proposed extension- Ammonia Minimisation features

 Referring to BF 2.2 (ii), the new building would be to the west of the existing site and the modelling results suggest that ammonia contributions would be negligible from this source.

Again BREF guidance will be complied with. Key features mitigating against ammonia generation are:-

* Higher values of insulation to the standard 4 W/m2K
* All exhaust to go out through western gable end, a further 440m to the west.
* Exhaust outlets louvered downwards to deposit majority of dust on concrete pad from where it will be swept up or sluiced to the swale for treatment.
* Air heaters being installed on existing site will be able to supply heat to this site
* Houses will have photoelectric cells on roof as supply of energy needed to generate heat for houses.
* Air ducting will inject warm air directly onto manure belts.
* New tree plantation designed for addressing ammonia will be planted to the east of the existing buildings between it and the Coldkeld Beck section of the R. Belah SSSI . The design will follow the “*farmtreestoair*” guidelines and influenced by more recent work conducted by Natural England to maximise ammonia capture and metabolism.
* A similar tree belt will be placed to the west of the proposed new buildings (west) gable end.
* The free range, like the original site will be planted for birds but with progressive maturity will contribute to ammonia capture from the buildings and that deposited by ranging birds.
* The existing range plantation (8 yrs old) is now establishing canopy cover and will progressively provide biological absorption and metabolism of N species.
* Manure from the new building will be transferred by covered conveyor to a new bespoke manure store and manure stored at dry matter at approx. 65% (no run-off) on occasions when storage on site is necessary. Option to apply negative pressure to store being considered.
* Manure stored in “A” shape to minimise surface area/ volume ratio and consideration given to covering sections when storage is for any period.

Process steps towards an Ammonia reduction plan

In addition to the proposal seeking to duplicate the 32,000 bird unit that exists at present, there are additional proposals that will have wider benefits for the environment. The approach taken will assume those future proposals will be included.

Is farm Meeting BAT for diet?

Is farm Meeting BAT for housing?

Formerly little was stored on site and when done it was sporadic. Most taken to neighbouring farms within 5 miles where it was stored in a range of conditions before use. New site will include a new roofed manure store directly fed from House 2 but including material from house 1, where better control and less overall emission will take place. Priority to remove to field and other farms will continue.

Not known, but modelling suggests this to be the case. SSSI survey does not indicate significant and confirmed damage from air quality on mosses whilst modelling suggests there may be an increase of 16.8%, which is greater than their 1% increase on critical level objective.

Initiatives identified which go beyond existing BREF advice on “best practice”. These will be proposed as features in a possible Emissions Reduction Plan. Plan to be split into improvements through infrastructure and improvements through management practices.

Will BAT alone be enough to deliver required reduction?

Both existing and new houses meet BAT standards in construction and operation

Diet already tailored for flock need and changed twice during campaign to address necessary changes. Crushed limestone which is not metabolised will add value to fields when spread as excess Ca will be excreted by the birds.

Is farm Meeting BAT for manure storage?