NSW EPA

Your reference: SSD 6882
Our reference: EF13/5564; DOC15/10470-17
Contact: Jason Price 6969 0700

The Team Leader
Industry Assessment
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Thomas Piovesan

Dear Ms Bakopanos

Re ProTen poultry production complex at Euroley – additional information requested

Thank you for your electronic mail dated 19 May 2015 to the Environment Protection Authority (EPA) requesting a submission about the State Significant Development application (SSD ID No 6882) received by the Department of Planning and Environment (DPE) for the proposed poultry production complex at Lots 1, 41, 42, 44, 45 and 54 DP 750898 and Lot 1 DP 105604 Sturt Highway Euroley.

As foreshadowed to your Thomas Piovesan the EPA has reviewed the information provided and determined that we require additional information to clarify the potential air quality impacts of the proposed development. This additional information is detailed in Attachment 'A'. We have discussed this request for additional information with the applicant and provided a draft copy of Attachment 'A'.

Please note that provision of this information for our review is important for our ongoing support of the proposal and once provided we expect to be able to provide the EPA's formal submission to DPE for the proposal.

If you have any further enquiries about this matter please contact Jason Price by telephoning 02 6969 0700.

Yours sincerely

8.7.2015

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ATTACHMENT 'A'

Background

ProTen Holdings Pty Ltd (ProTen) is proposing to develop an intensive poultry broiler production farm, known as the Euroley Poultry Production Complex (the Project), within a rural property near Euroley in south-western NSW. The development site is located approximately 26 kilometres north-west of Narrandera and 48 kilometres south-east of Griffith.

The Project comprises the development of five poultry production units (PPU), where broiler birds will be grown for human consumption. Each PPU will comprise 16 tunnel ventilated fully enclosed climate-controlled poultry sheds. Each shed will have the capacity to house a maximum of 49,000 broilers at any one time, equating to a PPU population of up to 784,000 broilers and a total farm population of 3,920,000 broilers. The project also includes the construction of ancillary infrastructure (eg generator shed) to support the poultry production operation.

The proponent proposes to construct and operate the Euroley Poultry Production Complex in accordance with industry best practice guidelines (DPI, 2012)[1]. The Project will operate 24 hours a day, 7 days a week. The production cycle length is approximately 9 weeks, comprising a maximum bird occupation of 8 weeks and a cleaning phase of 1 week. Isolated residential dwellings surround the project site, with the nearest residence located 2.1 kilometres to the north of the northern most PPU.

An air quality impact assessment for the proposed Euroley Poultry Production Complex has been prepared[2] as part of the Environmental Assessment for the Project[3].

Current position and summary of issues

The EPA has reviewed the air quality assessment completed for the Euroley Poultry Production Complex. PEL (2015) predicts the Euroley Poultry Production Complex will comply with the adopted odour and particulate impact assessment criteria at the surrounding sensitive receptors.

The EPA has, however, identified the following issues with the air quality impact assessment which are detailed below.

1. No information regarding emergency standby diesel generators;
2. Worst case odour emissions have not been estimated;
3. Modelled shed particulate emission rates have not been provided;
4. Sources of particulate matter were excluded from the assessment;
5. Representativeness of year 2010 meteorological data is not demonstrated;
6. Modelled meteorological data input parameters are not presented for verification;
7. Modelled meteorological data is not evaluated;
8. Project odour criterion should be 5 OU;
9. Assessment of cumulative particulate impacts not in accordance with the Approved Methods;
10. No feasible mitigation measures that could be implemented should odour impacts occur once operational have been provided; and
11. The proponent has not assessed the odour risk of their project.

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[1] DPI (2012) *Best Practice Management for Meat Chicken Production in New South Wales – Manual 2- Meat Chicken Growing Management, Sydney*: Department of Primary Industries.
[2] PEL (2015) *Air Quality Impact Assessment – Euroley Poultry Project*, Proten Holdings Pty Ltd, 22 April 2015.
[3] SLR (2015) *Euroley Poultry Production Complex SSD 6882, Environmental Impact Statement, Main Report, Volume 1, SLR Consulting Australia, May 2015.*

Resolution of the issues in the additional information requested below may change the predicted odour and particulate impacts at the surrounding sensitive receptors such that the project no longer complies with the EPA's assessment criteria.

It is therefore important that the proponent provides the additional information requested below and considers the project odour risk and their responsibility to comply with section 129 of the *Protection of the Environment Operations Act 1997* (POEO Act).

Additional information requested

1. No information provided regarding emergency standby diesel generators

The proposed development includes emergency standby generators for when the power from the electricity grid is lost. The generators will be appropriately sited and housed to minimise noise emissions. No information is provided in PEL (2015) regarding the capacity of the emergency diesel generators, the level of air emissions from the generators and their compliance with the relevant emission standards in the *Protection of the Environment Operations (Clean Air) Regulation 2010 (*POEO (Clean Air) Regulation).

The EPA requests the following information regarding the proposed emergency standby diesel generators.

- *Capacity and location of diesel generators;*
- *Expected frequency of use, including regular testing for maintenance; and*
- *Assessment of compliance with the relevant emission standards in the POEO (Clean Air) Regulation.*

2. Worst case odour emissions have not been estimated

PEL (2015) estimates odour emissions using a model based on data from a variety of meat chicken farms in Australia and theoretical considerations[4]. Hourly varying odour emission rates are generated from the following data.

- Number of birds, which varies later in the batch as harvesting takes place;
- stocking density of birds, which is a function of bird numbers, bird age and shed size;
- ventilation rate, which depends on bird age and ambient temperature; and
- design and management practices particularly those aimed at controlling litter moisture.

A number of assumptions are also made in developing the hourly varying odour emission rates as follows.

- the value of 'K', which is a scaling factor between 1 and 5 where a value of 1 represents a very well designed and managed shed operating with minimal odour emissions and 4-5 is a shed with serious odour management issues;
- production cycle length; and
- bird placement date.

The EPA has identified the following issues with the above assumptions.

- A K factor of 2.2 was assumed as recommend in the Queensland best practice guide. Whilst it is acknowledged that this number is recommended in the best practice guide, it would be prudent to explore the sensitivity of the odour impact assessment results to the assumed K factor. This will demonstrate the robustness of the predicted odour impacts.

[4] Ormerod and Holmes (2005) *Description of PAE Meat Chicken Farm Odour Emissions Model, Brisbane*: Pacific Air & Environment.

The EPA requests a sensitivity analysis to determine the impact on the odour assessment results of assuming a K factor of 2.0, 2.5 and 3.0. Further, information on the different shed management practices that correspond to a K factor of 2.0, 2.2, 2.5 and 3.0 must also be provided. This information will contribute to determining the odour risk of the project (see issue 11).

- A 52 day batch with a 10 day clean out was assumed for the production cycle length. Table 1.1 in SLR (2015) states a maximum bird occupation of 56 days and a cleaning phase of 1 week. Odour emissions during the clean out phase are assumed to be zero. A worst case odour assessment assuming maximum bird occupation and minimum clean out time has therefore not been conducted.

  The EPA requests a revision of the odour assessment to assume a 56 day batch and 7 day clean out.

- It was assumed that all sheds in all PPU's were placed on the same day. It is noted that this is a conservative assumption as in reality the placement is likely to be spread out over a number of days. However, it is unclear if this bird placement date results in a prediction of worst case odour impacts which would occur when worst case odour emissions coincide with worst case meteorological conditions. A sensitivity analysis needs to be conducted to determine the worst case start date for day 1 of placement.

  The EPA requests additional odour modelling with the start date of day 1 of placement offset by 2 weeks and then a further 2 weeks to determine the worst case odour impacts for the project.

3. Modelled shed particulate emission rates have not been provided

PEL (2015) states that the particulate emissions were estimated based on data from meat and chicken farms in NSW and Queensland as well as theoretical considerations. The approach generates hourly varying emission rates from each shed based on the following factors.

- The total weight of all birds, which varies later in the batch as harvesting takes place;
- Ventilation rate, which depends on bird age and ambient temperature; and
- Design and management practices.

It is unclear how design and management practices are accounted for in the estimation of hourly varying emission rates. There does not appear to be an equivalent to the 'K factor' for odour in the equations to estimate hourly emission rate.

The EPA requests clarification of how design and management practices are incorporated into the estimation of hourly particulate emission rates.

The hourly varying emission rates appear to have been estimated largely from the 'Mirrabooka 2002 data'[5] with adjustments made for ventilation rate. The estimated emission concentrations (mg/m^3/1000 birds present) were compared to more recent monitoring data which shows the estimated emissions data is conservative. The hourly varying shed particulate emission rates assumed in the modelling, however, have not been included in PEL (2015) and need to be presented.

The EPA requests a presentation of the modelled hourly varying shed particulate emission rates for a grow out cycle.

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[5] Mirrabooka, 2002 *"Silverweir" Broiler Farm Development Approval Application, Air Quality Impact Assessment, Brisbane*: Mirrabooka Consulting.

4. Sources of particulate matter were excluded from the assessment

The project is estimated to result in 96 vehicle trips per day, 65% of which will be heavy vehicles (SLR, 2015). It is noted in PEL (2015) that given the size of the property, the extent of the internal roads may be significant with regard to particulate emissions.

The roads will consist of the following.

- Compacted clay base to 98%;
- 200 millimetre (mm) of road base as per below:
    - 120mm of 80mm Jawbone rock; and
    - 80mm of 40mm "DGS" gravel on top.

PEL (2015) considers that as the road will be 'constructed' as opposed to an unformed track, the emission potential of the road will not be significant due to a lower silt loading on the constructed road surface. It is further stated that should dust emissions become an issue, standard control methods could be applied such as internal speeds limited and the dusty areas of the roads watered.

The EPA considers the internal roads have the potential to generate significant particulate emissions. Therefore the dispersion modelling should be revised to include the internal roads as a source of particulate emissions. Further, the modelling can be used to determine the level of management measures (e.g. maximum speed and watering rate) that will be applied to control particulate emissions from the internal roads.

The EPA requests a revision of the dispersion modelling to include the internal roads as a source of particulate emissions and identify the management measures that will be applied to control particulate emissions from the internal roads.

5. Representativeness of year 2010 meteorological data is not demonstrated.

The dispersion modelling was undertaken for the year 2010. PEL (2015) states that year 2010 was selected for use in this project based on long term averages at Narrandera Airport. The year 2010 data was found to be consistent with long term averages. PEL (2015) does not include the results of this analysis to demonstrate year 2010 is a representative year.

The EPA requests provision of the results of the analysis demonstrating year 2010 is a representative year.

6. Modelled meteorological data input parameters are not presented for verification

The CALPUFF modelling system was used in the air quality impact assessment and consists of three main components as follows..

- CALMET: a meteorological model which develops hourly wind and temperature fields on a three-dimensional gridded domain;
- CALPUFF: a transport and dispersion model, which advects puffs of material emitted from the modelled source simulating dispersion and transformation along the way using the fields generated by CALMET; and
- CALPOST: processes the primary output files from CALPUFF of hourly concentrations or deposition fluxes at selected receiver locations.

The following meteorological data were used as inputs to CALMET.

- Synoptic scale meteorological data was processed in TAPM to generate upper air data; and

- Hourly surface observations from the Bureau of Meteorology operated station at Narrandera.

This methodology for incorporating the meteorological data in CALMET is referred to as the 'Observations Only Mode' in OEH (2011)[6] and is the model set-up which requires the most decisions and effort by the user. It requires the careful site specific assessment of seven critical parameters. These are: TERRAD, RMAX1, RMAX2, R1, R2, IEXTRP and BIAS. PEL (2015) does not present the assumed value of these seven critical parameters.

The EPA requests the proponent provide and justify the values assumed for these seven critical parameters.

7. Modelled meteorological data is not evaluated

It is important to undertake an evaluation of the CALMET modelling results as the CALMET module requires careful consideration of input data, modelling domain, grid resolution and the seven critical parameters. PEL (2015) presents an analysis of the 2010 CALMET data extracted for the project site. This includes presentation of wind roses, wind speed frequency, stability class frequency distribution and mixing height by hour of day. PEL (2015) does not, however, demonstrate the suitability of the CALMET generated data. An evaluation of the CALMET generated data is always important but particularly necessary given the 'Observations Only Mode' requires the user to make '*several critical choices which can significantly affect the final outcome of the model runs*' [6].

The EPA requests an evaluation of the CALMET generated wind speed and wind direction data to demonstrate it is suitable for use in CALPUFF.

8. Project odour criterion should be 5 Odour Units (OU)

An odour criterion of 7OU was assumed for the project. PEL (2015) acknowledge there are 13 receptors located within 5 kilometres of the site. These 13 private sensitive receptors are the community affected by this project. Assuming approximately 2.8 persons per household results in an affected population of 36 people. Using equation 7.2 in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, the odour performance criterion for project is 5 OU.

The EPA considers an appropriate odour performance criterion for the project is 5 OU. The EPA notes the project, as modelled in PEL (2015) marginally complies with an odour performance criterion of 5 OU. This highlights the need for the proponent to consider feasible odour mitigation measures that will be applied should odour impacts occur once operational (see issue 10).

9. Assessment of cumulative particulate impacts not in accordance with the Approved Methods

Cumulative 24 hour average PM_{10} has been assessed using a statistical approach (Monte Carlo Simulation), focusing on the nearest sensitive receptors to the development. The Monte Carlo simulation is not listed as a methodology to incorporate background concentrations in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.*

The EPA requests a revision of the cumulative assessment of 24 hour average PM_{10} concentrations in accordance with the methodologies listed in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW or provide detailed justification for adopting an alternate method.

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[6] OEH (2011) Generic guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Australia' March 2011, Prepared for NSW Office of Environment and Heritage, Prepared by Jennifer Barclay and Joe Scire, TRC Environmental Corporation.

10. No feasible mitigation measures that could be implemented should odour impacts occur once operational have been provided

Section 6.2 of DEC (2006)[7] lists the information to be included in an odour impact assessment report. This includes additional feasible mitigation measures that could be implemented if the facility emits offensive odour after it is operational. PEL (2015) recommends the following in addition to operating the farm in accordance with best practice -

> *'a vegetative buffer is to be established around the perimeter of each group of sheds to enhance the dispersion of air emitted from the sheds, and to assist in filtering airborne particles'*

The EPA notes DEEDI (2010)[8] concludes a vegetative buffer may be largely ineffective at improving the dispersion of odour released from poultry sheds -

> *'It was concluded that these technologies (wind break wall and short stacks) may help to improve dispersion in some situations but may be ineffective in critical situations (for odour impacts), such as highly stable atmospheric conditions'.*

More recently, Dunlop and Galvin (2013) conducted a study to evaluate the use of windbreak walls as an odour reduction strategy for meat chicken sheds[9]. The study concluded and recommended the following.

- *'Overall, this research showed that neither windbreak walls not short stacks consistently or substantially reduced ground level concentrations';*
- *'..even though short stacks and windbreak walls may improve dispersion under some conditions, they should not be regarded as a reliable means for reducing odour impacts'; and*
- *'....neither windbreak walls nor short stacks be regarded as the basis of an odour reducing strategy.'*

The EPA considers the literature shows a vegetative buffer will not reduce odour impacts from the project. The proponent must therefore identify, as required by Section 6.2a of DEC (2006a), other feasible odour mitigation options. As the proponent has an obligation to comply with Section 128 and 129 of the POEO Act it is imperative the proponent considers what mitigation measures will be implemented should odour impacts occur once operational. The EPA notes the Dunlop (2009)[10] study, including the recommendation that -

> *'to minimise operating costs and maximise the useful life of add-on technologies, treating a portion of the exhaust air or intermittent/cyclic treatment of exhaust air, at times when odour impacts at receptors are most likely, should be investigated'*

The EPA requests the proponent to investigate additional odour control options that could be implemented should odour impacts occur once operational.

11. Proponent has not assessed the odour risk of their project

There is considerable uncertainty inherent in an odour impact assessment. Compliance with odour assessment criterion is therefore just one tool that provides an indication of acceptable odour impacts. An

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[7] DEC (2006) Technical Framework: Assessment and management of odour from stationary sources in NSW, November 2006.
[8] DEEDI (2010) *Environmental science and the Queensland chicken meat industry*, Department of Employment, Economic Development and Innovation, April 2010.
[9] Dunlop, M and Galvin, G (2013) *Control of Odour and Dust from Chicken Sheds, Evaluation of windbreak walls*, RIRDC Publication No. 13/001.
[10] Dunlop (2009) *Control of odour and dust from chicken sheds – review of 'add-on' technologies*, March 2009.

understanding of the odour risk of a project enables the further assessment of the acceptability of any odour impacts.

It is important for the proponent to understand the odour risk of their project as it is the proponent's responsibility to comply with Section 129 of the POEO Act. Should odour impacts be experienced once a facility is operational the proponent will need to address these odour impacts and, if necessary, modify the facility based on actual operational outcomes. Addressing odour impacts retrospectively is likely to be more difficult and costly than incorporating such measures in the initial proposal.

An assessment of odour risk involves putting the impact assessment result into context through the consideration of additional information. This additional information includes the robustness and appropriateness of the assessment input data, degree of compliance with the odour impact assessment criteria, results of any sensitivity analysis, the proposed odour mitigation measures and availability of additional feasible mitigation measures.

Examples of additional information and how they inform the odour risk of a project are outlined below.

- *Level of compliance with the odour assessment criterion at existing and future sensitive receptors*: marginal compliance with the odour assessment criterion indicates there is a risk the odour impacts may be unacceptable.
- *Level of uncertainty in odour dispersion modelling results*: the use of the following data will increase the level of uncertainty in the odour modelling results -
    - non site specific meteorological data
    - non site specific odour emissions data
    - average instead of worst case odour emissions data
- *Results of any sensitivity analysis*: a higher risk of unacceptable odour impacts would be a facility where a small change in any assumptions in the impact assessment results in a significant change in the predicted impacts. The sensitivity of the dispersion modelling predictions to the following could be investigated: odour emission rate, modelled source type and meteorological data. The sensitivity analysis could also be extended to include the influence of the above on the determination of the appropriate odour assessment criterion.
- *Analysis of dispersion modelling predictions*: a statistical analysis of the predicted odour concentrations provides further information regarding the range and frequency of odour concentrations predicted to be experienced at nearby sensitive receptors. Statistical analysis that could be presented includes maximum, minimum, 99.9th percentile concentration, 95th percentile concentration and frequency distribution.
- *Likely reliability and performance of odour mitigation measures*: unreliable and poorly performing odour mitigation measures would indicate the proposed facility presents a higher risk.
- *Additional feasible mitigation measures that could be implemented if the facility emits offensive odour after it is operational*: a facility where there are no additional feasible odour mitigation measures is a high risk project compared to a facility where there are additional feasible odour mitigation measures that could be implemented once operational.

The EPA recommends the proponent evaluate the odour risk level of their project. The evaluation of odour risk must, as a minimum, consider the additional information example listed above. This information is important as it will demonstrate to the EPA the proponents' level of understanding regarding the odour risk of their facility and their obligation to comply with Section 129 of the POEO Act.