TRANSPACIFIC Cleanaway Organic Composting Facility Proposal

July 2013.

Submissions on behalf of Resident Objectors

By

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I am Simon W Leake, agricultural, soil and composting scientist of SESL Australia. I have 28 years experience in composting of wastes and was on the AS 4454 Composts, Soil Conditioners and Mulches committee as technical expert for 12 years. I chaired the technical subcommittee of the last 2012 revision of this standard. I have provided expert evidence in several cases of both litigation and Land and Environment Court Appeals most notably the successful civil case of residents appealing against the Hornsby Council composting plant decision Northcompass vs Hornsby Council.

I have been asked previously, by a group of surrounding residents to provide an expert opinion on the EIS by David Gamble of GHD on behalf of Transpacific Cleanaway Pty. Ltd for a composting facility at 92 Paterson Rd Gerogery. I am being paid for this current commission in the capacity of expert scientist.

I declare that I have no fiduciary interest in this plant going ahead or not and that both Transpacific and GHD have been clients of mine in the past.

Specifically, I am asked to comment on two documents:
1. Letter from Blueprint Planning to Mr Brian Wild EPA Albury dated 13 June 2013. Ref 1234.
2. Report by Environmental Resources Management (ERM) Australia : Gerogery Resource Recovery Centre Odour Assessment Review. June 2013 Reference: 0208046RP1.

I refer also to my previous report of Oct 2013 on the EIS submission by the proponent. The subject of this report is focused on odour, its production and the likely implications for the odour strength testing and modeling performed by the proponent. I stress I am not an expert in odour measurement or modeling but do possess long experience of compost process control and the causes of odour in composting.

I will confine my comments to those areas involving discussions of compost chemistry, process control and formulations.

In summary it is my contention that-

- The odour measurements greatly underestimate the odour strength likely to result from what the proponent is proposing.
- This is due mainly to the unreasonably high proportion of food waste being proposed for composting at the facility.

- The proponent does not show an understanding of compost process chemistry sufficiently sophisticated to give faith in their abilities to understand or manage the composting process to effectively control odour.
- The odour modeling ignores certain likely major sources of odour.
- A composting plant in Seattle USA, using a very similar process was prosecuted and fined $119,000 US for 17 odour violations up to 3 miles away and had to spend a further >$4million US on plant upgrades that should have been foreseen.

Comments on Report of ERM.

Page 11/12 and Tables 4.1 and 4.2.

None of the comparisons used employed a compost containing 44% food and liquid organic wastes. In my experience food and liquid organics carry a very significantly higher odour potential than garden wastes and that potential increase with the content of such wastes.

That being so, it is apparent from Table 4.1 that SOER varies significantly over time. By way of illustration SOER is measured at 0.07 at week 4 and jumps to 2.0 at week three. It must be understood that wide fluctuations in odour product occur for a range of reasons including-
- Moisture content particularly the incidence of excessive rainfall
- Aeration
- Frequency of turning and time from last turning.

For example, odour can be quite low in a pile not having been turned for some time but will suddenly rise both during turning and for some time after turning. Odour sources from compost cannot in my view be seen as a static and predictable average quantity. “Average” odour production and modeling based on that fails to take into account the unpredictability of such biological systems.

4.6. I agree that aeration greatly increases the generation of odour, not, as is asserted by the proponent, decreases it.

4.9. I do not agree that “finished compost has a low residual odour.” In my experience even compost with only 20% food and organics has a lingering odour for many weeks, in fact up to 3 months. At 44% food and organics the compost will remain very active and malodorous for at least 3 months in my view.

This view is indirectly supported by one of the responses of Cedar Grove in Seattle to address its odour issues. At this facility they spent an additional $1,120,000 for Gore Covers for the Phase III compost process and $106,499 for covers for finished product storage areas (Cedar Grove Composting, Inc, v Puget Sound Clean Air Agency clause 89). In my view this is a tacit and reasonable admission that Phase III composting and finished product storage areas are significant sources of odour.

Odour will not be reduced as much as the author assumes after only 3 weeks under covers. With food waste present at such high levels odours can remain high for 6 and even up to 12 weeks. Phase III composting is greatly under-estimated as an odour source in the modeling and finished product stockpiles are not even considered in the models.

The impact of such high levels of food and Liquid wastes (44%) are not even considered either in the additional odour modeling provided by the proponent or by ERM in their review.

In conclusion the modeling uses odour generation fluxes from the comparisons given that will likely be significantly lower than that likely to be produced from compost that is 44% food and organic waste. Further, important sources of odour such as the Phase III and the finished product piles have been greatly under-estimated or, in the case of the latter, totally ignored.

Blueprint Planning letter to EPA

Points are raised in the order given in the attachments.

Attachment 1.

1. A ratio of 44% Food/liquid organics is to 56% green waste is far too high. Green waste will only hold around 20%, at the very most 30% (and only if added sequentially over about 3 weeks) rich organics like food and liquids. The consequence will be very wet and nutrient rich compost that is very likely to greatly exceed the odour flux estimates in the odour modeling.

2. The use of around 80/20 garden waste to food waste at Camden reflects long industry experience as described above. Adding old matured compost will not work as the labile carbon in such products is mostly used up in the first round of composting and the finished compost product will have a stable labile C to N ratio. The addition of more high nitrogen waste will result in excess N (low C/N) ratio and subsequent malodorous amine and ammonia type smell production. See also response to Attachment 2 point 5.1 below.

This whole section should place doubt on the proponents understanding of composting technology. For the proponent to advocate such high levels of food waste in the compost indicates what often happens in such plants, the commercial imperatives of high-income deriving food wastes override environmental considerations. It is typical of all composting plants that they are “gate-feee driven” ie they earn significantly more income from gate fees for waste disposal than from sale of compost.

It is my view that the odour production assumptions made have been grossly under-estimated if applications of 44% food and liquid organics are added to greenwaste. Further, that none of the odour production rates used in the modeling have any parallel to this operation.

3. It is my long experience from consulting to and operating food and green organics composting facilities that odour potential is directly related to the content of nitrogen and sulphur rich components typical of grease trap, food wastes and liquid organic industry wastes. The effect of adding any more than around 20% of such rich wastes is to unbalance the labile C/N ratio which results in deammination of protein and the production of ammonia and amine smells as well as sulphidic compounds if moisture content is too high.

4. In my experience, working with compost covers at Australian Native Landscapes facility at Coldstream (Lilydale) forced aeration without capture and scrubbing of the

expelled air actually results in greater levels of odour flux. Until air capture apparatus was added at the peak of the compost windrow, under the cover, and air drawn off with fans to biofilters, odour was not controlled in straight green waste compost from only the use of covers. This phenomenon can be expected to be much worse under low C/N ratio conditions where more than 20% food waste is added.

I do not believe it is necessary to consider “local conditions”. Composting chemistry is the same in Australia as it is in the USA and the experience of Cedar Grove Gore cover composting facility in Seattle USA composting food and green waste is a valid parallel for what is likely to happen in Gerogery. Attached is the judgement in a case of proven air pollution by the facility (Cedar Grove Composting, Inc, v Puget Sound Clean Air Agency clause 89). In Clauses 8 and 12 odour production by the facility was proven at residences 2 and 3 miles (3.2 to 4.8 klm) away. Such a case should act as a caution to those who would interpret theoretical odour modeling too literally.

Attachment 2.

The experience in Seattle USA suggests that the Gore system is not a panacea and is hardly “tried and tested” or “reliable” as stated here.

1-4 Collection and initial handling is not, in my experience the major source of odour although I would advocate the processing shed be subject to negative air pressure and the expelled air scrubbed.

5.1. This discussion on C/N ratio demonstrates a fundamental lack of understanding and one that is likely to result in excessive N gas production. Total carbon is not important, what matters is “available” or “labile” carbon. Woody lignocellulose for example is not an available form of carbon and largely persists through the composting process. Lower molecular weight forms of carbon such as sugars, starches, celluloses and the like are labile and take part in the composting process as an energy source for microbes. It is not therefore possible to use a naive total C to total N ratio to manage or understand composting. This is most succinctly stated in a commonly available textbook on composting:

“*Because lignin is the most recalcitrant component of the plant cell wall, the higher the proportion of lignin the lower the bioavailability of the substrate. The effect of lignin on the bioavailability of other cell wall components is thought to be largely a physical restriction, with lignin molecules reducing the surface area available to enzymatic penetration and activity.”*

Haug, R.T. 1993. The Practical Handbook of Compost Engineering. Lewis Publishers, Boca Raton, Fl. 717 pages.

There are ways of estimating how to correct the C/N ratio mathematically for lignin content and the proponent shows no understanding of this in their discussion of C/N ratio nor of the effects of particle size, chips of wood for example, may play almost no part in a short term composting cycle. The lack of expertise in simple composting technological considerations should give further unease regarding the use of 44% rich food wastes by the method proposed and the validity of odour source strength and subsequent dispersion modeling.

It is my view that the only way the public could have any degree of confidence in the process is if the proportion of garden to rich food waste is limited to 80/20 ratio.

5.8 In respect of the use of grease trap waste the proponent states "*Abiding by this 'recipe' enables good composting without the production of offensive odour".* I can state that in over 25 years of composting experience I have never seen a plant that composts grease trap waste that does not produce an offensive vomit-like smell regardless of mixing ratios or any other composting parameter or process control. The statement is not borne out by industry experience.

6.0 The Importance of Process Control.

It is stated by the proponent:

"*by remaining fully aerobic, obnoxious odours are not produced in the first place*".

In my experience the maintenance of aerobic conditions does not guarantee that no volatile odour molecules are produced, only that those volatiles associated with anaerobic conditions are not produced. Depending on available C/N ratio and the types of carbon present a range of free fatty acids, carboxylic acids, amines and amino-compounds are produced even in aerobic conditions.

"Justification of Specific Odour Emission Rates (SOER)….." Page 14.

In my view none of the comparison facilities and SOER's cited bare any comparison with the proposed facility. The facilities cited by the proponent in Table 5 (page 22) use between 15 and 20% food or grease trap waste and cannot be used to model a facility proposing to add 44% high nutrient food and liquid waste to 56% garden organics.

Summary of Opinion

1. The odour generation estimates and comparisons are seriously flawed and do not reflect what will occur with a compost containing more than twice as much rich food and liquid organic wastes as used in some of the comparisons.
2. The proponent and its advisors do not appear to understand the fundamental importance of "available" vs "recalcitrant" carbon and its effect on functional C/N ratio which is fundamental to managing excess odour product.
3. The manner in which it proposed to add 44% rich food and organic liquids to compost, by employing some component of finished compost, is likely to result in very low functional C/N ratios and attendant production of nitrogenous and other volatiles responsible for odour.
4. The Gore system is not a panacea that can control any amount of excessive odour from such rich compost.
5. Significant sources of potential odour, notably the Phase III and finished compost areas have been either greatly under-estimated or totally ignored.
6. The example of Gore composting from Seattle USA should act as a precautionary experience to regulators. To quote the Assessment Boards summing up:

"In the present case, the Board notes that there have been a large number of odor complaints associated with Cedar Grove's composting facilities. The odors emanating from the facilities have interfered with the reasonable enjoyment of life and property of a large number of surrounding residents. In that regard, the violations are serious, and have been ongoing and repetitive."

Recommendation

1. The odour modeling should be rejected as not reflective of what is being proposed.
2. Should alternative or improved modeling be accepted a limitation on the acceptance of food and liquid organic waste needs to be imposed preventing the application of more than 20% by volume to clean chipped garden waste, sawdust, high carbon straw or mixtures of these.
3. The use of finished compost to bulk out food and liquid organics should be prevented.
4. A limitation on the amount of “finished” compost that can be stored on site should be set to prevent gate-fee driven operation and the accumulation of excessive amounts of unsold product.

Simon Leake BScAg(HonsI)
Principal Scientist.

Documents Referred to:

Cedar Grove Composting, Inc, Apellant, v Puget Sound Clean Air Agency, Respondent. Before the Pollution Control Hearings Board State of Washingtons. PCHB NOS. 10-044, 10-045, 10-120, 10-130, 10-131, 10-132, 10-147, 10-148, 10-149, 10-150, & 10-154. FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER.

Letter from Blueprint Planning to Mr Brian Wild EPA Albury dated 13 June 2013. Ref 1234.

Report by Environmental Resources Management (ERM) Australia : Gerogery Resource Recovery Centre Odour Assessment Review. June 2013 Reference: 0208046RP1.