07 June 2018

Jacfin Pty Ltd C/O Allens
Deutsche Bank Place
126 Phillip St, Sydney NSW 2000
Attention Bill McCredie

Our ref: 21/27116/LTR_Next gen response
Your ref:

Dear Mr McCredie

The Next Generation - Proposed Waste to Energy Facility (SSD 6236)

1 Introduction

GHD previously assisted Jacfin by providing an odour review in respect of the Amended EIS for the Next Generation (TNG) waste-to-energy proposal at Eastern Creek (SSD 6236) on land that adjoins Jacfin's land (March 2017).

After GHD prepared the report about the Amended EIS, Jacfin separately engaged GHD to provide review reports to include in its submissions to the NSW Parliamentary Inquiry regarding the waste to energy proposal. These reports being about odour and human health risks (August – September 2017).

GHD was then engaged in March 2018 to assess whether the Response to Submissions (RtS) and supporting documentation had satisfactorily addressed the issues identified by GHD, and assess if there were any new issues resulting from the RtS and supporting amended documentation in respect of the odour assessment, health risk assessment and air quality assessment.

Subsequently, the Department of Planning and Environment (the Department) has released its Assessment Report in respect of the proposed Next Generation Energy from Waste (EfW) Facility at Eastern Creek. The Assessment Report recommends that the proposed EfW facility not be approved. The Assessment Report took into account input received from a number of parties including the NSW EPA, NSW Health and independent expert assessments from EnRiskS and ARUP. GHD provided comments on these in our letter dated 16 May 2018.

Jacfin has now engaged GHD to undertake a review of the TNG submission responding to the Department's Assessment Report to provide to the Independent Planning Commission (IPC).

2 Scope of work

GHD was engaged by Jacfin to undertake a review of the Next Generation submission and advise whether there are any statements in the submission that are incorrect, or which misconstrue or misrepresent the conclusions in the Department's Assessment Report.

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3 GHD Comments on Responses

3.1 Documents reviewed

As part of the scope of works, GHD reviewed the following document in respect of potential human health risks posed by the facility:

- Urbis (2018) *Eastern Creek Energy From Waste Facility – SSD6236 – D510/18 Response to DPE Assessment Report* dated 21 May 2018 (the Next Gen Response) which included:
- Appendix A – MRA Memo
- Appendix B – HZI FerryBridge memo
- Appendix C Ramboll – FerryBridge Memo
- Appendix D Air Quality Response
- Appendix E Human Health Response
- Appendix F MRA – Resource Recovery Criteria
- Appendix G Community Consultation

3.2 Review comments – Waste composition

3.2.1 Urbis Sections 3 and 4.1.1

Statement:

In Section 3 Urbis states the following:

> *It is submitted that:*
>
> *6. The design fuel mix proposed with the inclusion of 'floc waste' complies with the resource recovery criteria within the NSW EfW Policy.*

However, Urbis Section 4.1.1 then states the following:

> *There are a number of inconsistencies and broad terminology used within the NSW EfW Policy, as detailed below:*
>
> *• The NSW EfW Policy is imprecise. This is demonstrated in the use of expressions such as 'same technologies', 'like waste streams', and 'similar jurisdictions'*
>
> *• The test of comparability in the NSW EfW Policy is thought to be capable of being complied with the use of the words 'same', 'like', and 'similar' are to be treated as synonyms and the word 'like' is not to be interpreted as 'identical'.*
>
> *• The NSW EfW Policy incorrectly assumes that nomenclature of waste is identical across all similar jurisdictions. Waste streams are therefore not capable of a direct comparison on that basis.*
>
> *• The NSW EfW Policy contains provision for the exclusion of specific materials on the basis that they are hazardous or restricted but contain no guidance as to materials which 'might' or 'could possibly' contain unacceptable materials.*

• *The NSW EfW Policy does not exclude 'floc' (being the waste generated from the shredding of motor vehicles and metal goods) as an eligible waste fuel. In response to an enquiry and at meetings between the applicant and the DPE and its experts, no suggestion was made in relation to the potential exclusion of floc as a component of the residual waste fuel stream.*

Comment:

It is inconsistent to first say that the fuel mix complies with the NSW EfW Policy, then point out that the policy itself is not clear on what it includes and excludes.

3.2.2 Urbis Section 4.1.2

Statement:

This section is about the operational reference facility. Urbis states that:

> *The DPE and their technical expert ARUP concluded that the reference facility at Ferrybridge qualifies as a fully operational plant and that the technology is identical to that proposed as part of this proposal. However, it was concluded that the design fuel mix is not comparable with Ferrybridge.*

Urbis makes the statement that:

> *The Ferrybridge Facility includes 50% of the input stream as C&I and 50% MSW (Appendix B). This is then mixed to create 'RDF'. At 50% MSW* (municipal solid waste) *and 50% C&I, the Ferrybridge facility would process 'like waste streams' to the proposed Facility. The characterisation by stream indicates that Ferrybridge inputs include all TNG input streams and all specific waste types (wood, timber, paper, plastic etc). The same material types present in the Ferrybridge feedstock will also be present in the proposed facility.*

Comment:

It is misleading to state that RDF is made by simply mixing MSW and C&I wastes together. This would mean that RDF contained a significant component of putrescible waste. RDF is made by extracting the high calorific fraction of these wastes (and others), and mixing them to create specific fuels.

Comment:

The Ferrybridge input stream appears to be a different waste stream to that proposed for the TNG plant. The TNG design fuel composition quoted on pages 57-59 of the Amended EIS includes the following components:

- C&D waste 29%
- Chute residual waste 24%
- C&I waste 17%

There is no MSW in the design fuel composition, however there are AWT plant residuals (7%), which are derived from MSW.

Therefore the following statement is misleading:

At 50% MSW and 50% C&I, the Ferrybridge facility would process 'like waste streams' to the proposed Facility.

It is not the case that, *At 0% MSW and 29% C&D and 17% C&I, the Ferrybridge facility would process 'like waste streams' to the proposed Facility.* The fuel mixes are quite different at each plant.

The reference to Appendix B is also confusing. Appendix B contains a report on air quality associated with the Ferrybridge facility, which this is clearly not referring to. It also contains a letter from Hitachi Zosen Innova (HZI), and a Multi Fuel Energy 2016 Annual report on the Ferrybridge Facility. None of these documents support the statement made, which is "*The Ferrybridge Facility includes 50% of the input stream as C&I and 50% MSW" (Appendix B).*

There is some doubt about whether shredder floc is now included as a waste source, as the ERM letter in Appendix D states the following:

The peer reviewer's reference to "uncommon waste streams" is unspecified, but may to relate to the proposed use of floc waste (the residue from the shredding of car and metal recyclables) as a fuel source.

I note that, given recent regulatory feedback, the proponent has voluntarily agreed to remove this "uncommon waste stream". In turn, this should remove the peer reviewer's perception that emissions are in some way uncertain as a result.

Shredder floc constitutes 14% of the design fuel composition stated in the Amended EIS, so it is not clear what effect removing this might have on the air modelling results.

Comment:

Appendix C contains a report from Ramboll, which compares the constituents of the TNG design and Ferrybridge Facility. They are clearly not "like" each other, even at a constituent level.

		TNG	Ferrybridge
		Design	Operation ›
Paper/Cardboard	%	11.82	14.22
Wood/Timber	%	31.16	7.41
Plastic	%	14.96	18.00
Metal (Ferrous and non-ferrous)	%	2.51	3.65
Organic (not wood/timber)	%	19.82	38.08
WEE (electronic waste)	%	0.00	1.02
Hazardous	%	0.00	0.14
Glass	%	1.24	3.67
Other* (including earth and building materials)	%	18.49	13.81
Total		100.00	100.00

Table 4: Composition in weight percent for February 2018

Comment:

The Ferrybridge Facility does not accept shredder floc, whilst the TNG plant proposes to accept 14% (as noted above). This also makes the fuel mix different between the two plants.

The Scotland Environmental Protection Agency (SEPA) guidelines attached to TNG response says in Table 5c, European Waste Catalogue (EWC) codes commonly used for outputs from fragmentiser/shredder operations are as follows:

- Fragmentiser residues (non-metal, non-hazardous) 19 10 04, 19 10 06
- Fragmentiser residues (non-metal, hazardous) 19 10 03*, 19 10 05*

  where * denotes Hazardous (special) wastes.

It is also noted that shredder floc waste is provided as an example of "Solid waste contaminated with prescribed waste residues (Waste Type N260) (Department of the Environment and Blue Environment 2014 - *Reporting hazardous waste under the Basel Convention – guidance to states and territories*, final report P459, 17 June 2014).

Thus some shedder floc can be classified as hazardous waste based on the EWC. As the TNG facility is not aiming to be a hazardous waste disposal facility, shredder floc would seem to be unable to be received as fuel at Ferrybridge unless it has been appropriately detoxified or characterised as non-hazardous based on a robust data set to account for the likely variability in the source.

After inferring that the TNG plant will be burning "like" feedstock to the Ferrybridge Plant, and discussing this at length without comparing it directly with the proposed feedstock from the revised EIS, Urbis states that the composition is unimportant anyway, by quoting from the attached MRA Consulting Group letter thus.

> *MRA concludes that:*
>
> *'the reference facility is capable of managing the input materials with no change in air emissions. This is the point of the reference facility test. The fact that the percentage characterisations are different is beside the point. It is the capacity of the facility to appropriately manage diverse and variable streams which is in question. Ferrybridge adequately shows that to be the case.'*

It is agreed that the overall performance is most important, however it is an approval requirement that it does meet the intent of the EfW Policy, which is that fuel needs to be "like" that being burnt by the reference facility in the UK. Clearly it is not.

3.2.3 Urbis Section 4.1.3

Statement:

This section is about floc waste, which is already discussed above. Urbis states that there was no reference to shredder floc being banned since the adoption of the EfW Policy, and that shredder floc is allocated to the category of 'Mixed C&I waste' and a metal scrap yard as a 'Facility processing mixed C&I waste', per Table 1 of the NSW EfW Policy.

Comment:

It seems to be a liberal interpretation of Table 1 to classify a metal scrap yard as a facility processing mixed C&I waste, when it is a fairly specific waste stream (metal scrap), and may not have the same characteristics as mixed C&I waste.

Also Urbis says that there is no further definition of 'hazardous wastes' nor any mention of shredder floc in the EfW Policy, and that the *Protection of the Environment Operations Act 1997* (NSW) contains the definition of hazardous waste, and that shredder floc is not mentioned as a stream that is explicitly defined as a hazardous waste.

The fact that shredder floc is not specifically excluded in the EfW Policy does not mean that it is automatically acceptable for energy generation. It is not on the list of approved fuels, and as mentioned above, the SEPA energy from waste guidelines included with the Urbis submission and mentioned above leave open the possibility that shredder flocs are classified as hazardous wastes in the UK. EPA Victoria[1] also regard shredder floc as being potentially hazardous.

The NSW EfW Policy states:

> *Energy recovery facilities may only receive feedstock from waste processing facilities or collection systems that meet the criteria outlined in Table 1. Proponents wishing to use waste or waste-derived materials for energy recovery that are not defined in Table 1 must contact the EPA to discuss their proposal. The EPA will consider any such proposals on a case-by-case basis in accordance with the energy from waste considerations outlined in this policy statement and the principles set out in the Protection of the Environment Operations (POEO) Act and Waste Avoidance and Resource Recovery (WaRR) Act 2007.*

Shredder floc is not included in Table 1, and therefore potentially falls into the category of being considered by NSW EPA on a case by case basis (as per this project approval). This is not to say that it cannot be used for energy generation purposes however conditions would need to be attached to any approval.

Thus the most likely scenario for shredder floc is that it needs to be considered on a case by case basis, and that incoming loads need to be tested before being used for fuel. Their composition would depend upon the extent of removal of potentially hazardous materials from vehicles (eg batteries) with a wide range of ages and appliances prior to shredding, which may vary between facilities.

Statement:

Urbis reports that the shredder floc comprises 58% inert "dirt".

Comment:

It is difficult to comprehend how floc waste from shredded motor vehicles and metal recyclables could consistently comprise 58% inert "dirt". The source of the "dirt" and the variability in the amount of dirt in floc waste are not discussed by Urbis.

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[1] Environment Protection Authority Victoria, November 2016, Waste Codes, Publication IWRG822.3.

This composition also does not align with a table in the Ramboll report in the Amended EIS, which shows that shredder floc typically contains between 10% and 20% fines, rather than 58%. They comprise paint particles and other substances, not general "dirt".

It is noted that Ramboll obtained this information from an EPA Victoria document, which in turn obtained it from an Australian Government publication from 2002. So the information presented by Ramboll on typical shredder floc compositions may not actually be current, given that motor vehicles have changed substantially over the past 17 years, which in itself will introduce potential variability in a shredder floc waste stream.

There would be some variability in floc composition, rather than little to no variation as Urbis states. The fact that Ramboll presented a table showing ranges of constituents supports this.

3.2.4 Urbis – Appendix A

Statement:

The inclusion of commentary from Hitachi Zosen Inova (HZI) in the Next Gen Response is notable. This commentary states that, '*Quite to the contrary, any application which would claim a 'wholly comparable' reference plant with the like for like technology, size and waste should be regarded as highly suspicious due to the very variability of waste over time and origin as well as evolving EfW technology'.*

Comment:

This does not support the applicant's position that Ferrybridge can be considered a comparable reference facility in terms of its waste stream feedstock. Further, it can be reasonably assumed that the waste mix will change over time, noting the references to the changes in waste policy in China and the implications of that on the potential waste for use as fuel at TNG.

3.2.5 Urbis - Appendix C

Statement:

Ramboll highlights that the main difference between Ferrybridge and the proposed TNG facility is the wood/timber content.

Comment:

This appears to be based on the fact that TNG is proposing to receive a lower proportion of municipal solid waste (MSW) which would be processed before receipt, so the organic content (not wood/timber) is lower, but wood/timber organics is much higher (by more than four times). As such, the waste streams are different.

3.3 Air Quality Assessment

3.3.1 Urbis – Section 4.1.4

Statement:

The proposed facility will operate at 850 degrees Celsius to meet the temperature requirements of the IED.

The resulting impact would be an instantaneous spike detectable in the emissions monitoring and shut down procedures initiated.

There is therefore a high degree of confidence that in respect of any single waste fraction and the waste in total as an average will not contain more than 1% chlorine.

Comment:

The lower temperature specification is only acceptable provided the chlorine content is kept below 1%. The performance of the crane operator "homogenising" the waste will be unknown – there is no quantitative demonstration of how the adequate homogenisation will be achieved merely by picking up waste from one site of the pad and placing it in another. The conclusion by Urbis that the applicant has *demonstrated and verified the mixing and homogenisation process* is considered to be unsubstantiated.

Further it is unclear how an instantaneous spike will be detectable in the emissions monitoring.

Live measurements of gases like O_2, CO_2 and for particulates do exist, but not for many individual toxic chemicals including dioxins and furans. Testing relies on sampling of gases from stack and sending to laboratories for analysis. Even if sampling was undertaken every day it would be at least 24 hours before exceedance was identified for some toxicants.

3.3.2 Urbis Section 4.2.1

Statement:

A statement has been prepared by ERM (formerly Pacific Environment Limited) who prepared the air quality assessment for the proposed facility, and is included at Appendix D.

In this section, ERM states that *the fuel mix does not directly correlate to the emissions of the facility.*

Comment:

Precisely, but this is what has been used to derive the emissions inventory. It all boils down to the performance guarantee from Hitachi Zosen Inova (HZI) that dioxin/furans (pre de novo reformation) are below 1 ng/m^3. They can demonstrate this for benchmark plants with MSW – "*all reference facilities are currently operating under the IED emission limit with varying fuel mix.*" But not TNG with an uncertain composition of waste derived from processed MSW and added floc.

3.3.3 Urbis – Appendix D

Statement:

The main defence presented by ERM appears to be the reversal (null hypothesis) of:

- *if the fuel source from a reference facility is not "wholly comparable", then the emissions to air (post-abatement technology) are somehow unknown.*

Comment:

Therefore, we know the post-abatement emissions because we have an emission inventory based on a 'wholly comparable' reference facility. Moreover, these are somehow fixed because the 'manufacturer's guarantee documentation' points to a 'constant outlet concentration'. We will not know this until the plant starts operating and stack testing is done.

The air quality impact assessment (AQIA) just assumes the emission values are inside the IED limits. There is an assumption that the CEMS can shut down the facility instantaneously in the event of any limits breach – we are not aware of a CEMS doing continuous measurements of toxicants such as mercury or dioxin/furans.

Moreover, particulate matter (PM) is usually (surrogate) measured as an opacity measurement (light extinction) – and one needs to know the conversion from opacity to PM fractions for your particular process.

Finally, ERM/PEL point out that the 'uncertainty' in the human health risk assessment (HHRA) is not due to the air dispersion modelling. Although this is true in that the EPA are generally satisfied that the modelling was broadly in line with the Approved Methods, GHD questions the suitability of this modelling. The key issue is the emission inventory – ERM/PEL have just assumed the 'manufacturer's guarantee documentation'.

3.4 Health Risk

3.4.1 Urbis Section 4.2.2

Statement:

These estimates are inherently conservative and when looked at collectively, they are likely to be representative of compounding conservatism within the risk estimates.

Comment:

While this statement is generally correct for risk assessments, the key is the magnitude of the margin of safety (MOS). If the MOS is within 10, then it accounts for uncertainties like differences in meteorology and uncertainty in exposure routes. But it will not cover large uncertainties like emission rates if feed stock or emission control underestimates by a factor of 10.

Comment: Scenario 4 represents the EU Industrial Emissions Directive (IED) based limits and represents when the plant will be shut down. It is good to know that the "shutdown" point is before unacceptable risks are reached, but the proponent still needs to prove that the facility will be able to meet these limits for the project to proceed. If these limits are exceeded, the applicant will need to provide the following information:

1. When would the plant be shut down;
2. What the testing process is;
3. What the testing frequency is and is it possible that the testing frequency for some contaminants like dioxins although it can be 24 hours it is generally longer such as a month, potentially resulting in residents experiencing unacceptable health risk for a month before the plant is shut down;
4. Who undertakes the testing (sampling and analysis) and is it transparent;
5. How high an emission would be expected during an upset condition if say the emission control system failed; and

6. The duration between failure and plant shutdown. This again would depend on the testing process and frequency. We do not consider it is possible that the CEMS incorporated by the proposed TNG Facility will be able to monitor all contaminants in real time. Therefore it is highly likely there will be a lag in which higher emissions will continue while laboratory testing is required to confirm an exceedance for some toxicants.

3.4.2 Urbis Appendix E

Statement:

The estimation of risk is based on the grid maximum concentration for all receptors regardless of the location. It is noted that the current location of the grid maximum is within an area zoned commercial/industrial surrounding the site and some distance from residential receptors and therefore the adoption of such a concentration for the estimate of risk exposure for residents is inherently conservative.

Comment:

While this may be true, consideration must be given to potential future expansion of residential area in the future.

Statement:

The estimates of soil concentrations from deposition modelling…Don't account for any building wakes of objects.

Comment:

Building wakes are only relevant if buildings are taller than 40% of the stack height, which is considered unlikely, given the height of the proposed stack (100 m).

Statement:

Given that particulate matter less than 2.5 micrometres ($PM_{2.5}$) are not readily affected by gravitational settling, to generate a non-zero outcome, deposition modelling was completed based on an assumption that all particulate matter is released within the 10 micrometre (PM_{10}) size fraction. This is considered conservative for deposition purposes.

Comment:

While this modelling may in fact result in conservative deposition rate it has the opposite effect on the inhalation risk. As the model simulates deposition (dropout) it also results in lower airborne particulate concentration as the plume moves downwind. So in fact the inhalation concentration may be underestimated if amplifying the deposition. A conservative model would have incorporated all particulate matter as PM_{10} for the deposition modelling, and all $PM_{2.5}$ for inhalation modelling.

Statement:

Scenario 4 is representative of the EU Industrial Emissions Directive Based Limits (IED) and will be adopted as the licence limits for the proposed EFW plant. Scenario 4 is therefore representative of the limits in which the plant would in theory be shut down.

Comment:

Emissions would likely have to exceed the limits before shutdown, not equal. The magnitude of the likely exceedance is not considered. The risk assessment correctly assumes that the plant can remain operational at IED emissions limits.

Statement:

In the unlikely event the IED limits were triggered it is considered that exposure would not be representative of chronic exposure (i.e. long periods of time - as has been modelled) based on the plant design, it would be minutes (rather than 30 years) of exposure whilst the plant was in the process of being shut down.

Comment:

We strongly disagree with this statement and consider it misleading. The only way that an exceedance is identified is if there was a way that in-stack testing was live, resulting in instantaneous results for all chemicals monitored. This technology does not exist for most toxicants. Live measurements of gases like O_2, CO_2 do exist. But not for most of the toxic chemicals modelled in the risk assessment, including dioxins and furans. Testing relies on sampling of gases from stack and sending to laboratories for analysis. Even if sampling was undertaken every day it could be some time before an exceedance was identified for some toxicants. As flagged previously by GHD, the Applicant's risk assessment fails to take into account the additional contribution to chronic health risk from higher emissions (in excess of IED limits) resulting from upset conditions. The concept of instantaneous shutdown if IED limits are exceeded is also inconsistent with the Applicant's health risk assessment report (AECOM 2017) which states that *In accordance with a design to the requirements of the EU IED, such upset conditions shall under no circumstance occur for more than four hours uninterrupted where the emission value exceed the limits and no more than 60 hours per year.*

4 Odour

4.1.1 Urbis Appendices B and C

Statement:

We don't have waste composition analyses but in general our RDF comes from around 50% MSW and 50% C&I.

Comment:

We note the waste type proposed to be received by TNG includes processed waste from MSW (potentially classified as putrescible waste in NSW) and it appears that Ferrybridge receives unprocessed MSW (classified as putrescible waste in NSW). Processed MSW could also be odorous.

We note from the email from Multifuel Energy Limited (Appendix 3 of Appendix C) that the Ferrybridge site claims to receive around 50% MSW and 50% C&I waste.

Statement:

MSW is either from a Renewi MBT plant with c15% recyclates extracted after drying or from plant where MSW is shredded/screened to -50mm and an overband magnet. The upshot of that is that we really don't get odour issues.

Comment:

Multifuel Energy Limited claim (email in Appendix 3 of Appendix C) that they *really don't get odour issues* at the Ferrybridge site. We note that none of the odour assessment work for TNG has considered potential odour from the receipt of processed MSW. This is a source of odour that has not been considered by TNG's odour assessment.

Statement:

4 complaints during the year. 3 odour complaints and 1 light pollution complaint.

Comment:

We also note in Appendix B (Ferrybridge MFE Ltd EPR/SP3239FU Annual Report 2016) that in the 2016 there were three odour complaints received at the Ferrybridge Facility. Two of the odour complaints were due to the tipping hall door not working or being left open for an extended period. It is not clear whether the Ferrybridge site is associated with a landfill and other waste recovery activities, and therefore may not be encumbered by the risk from cumulative odour impacts from other sources as is TNG.

5 Summary and conclusion

GHD has conducted a review of the Next Gen Reponses by Urbis (2018).

GHD considers that the issues raised in the Department of Planning and Environment as grounds for refusal of the application have still not been adequately addressed in respect of waste composition, odour, air emissions and human health risk.

6 Limitations

This report: has been prepared by GHD for Jacfin Pty Ltd and may only be used and relied on by Jacfin Pty Ltd for the purpose agreed between GHD and Jacfin Pty Ltd as set out in Section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Jacfin Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Sincerely
GHD Pty Ltd

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