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Attention: Deanne Pitts

Re: Review – Human Health Risk Assessment, Appendix O, Environmental Impact Statement, The Next Generation, Energy from Waste Facility, Honeycomb Drive, Eastern Creek

1.0 Introduction

Environmental Risk Sciences Pty Ltd (enRiskS) has been commissioned by the NSW EPA to review the Human Health Risk Assessment (HHRA) (provided as Appendix O of a revised EIS), for the proposed Energy from Waste Facility, Honeycomb Drive, Eastern Creek. The report was prepared by Fichtner Consulting Engineers Limited on behalf of The Next Generation NSW Pty Ltd.

A previous version of this risk assessment was reviewed for adequacy in November 2014. The review highlighted a large number of issues with the risk assessment that made it inadequate for the assessment of the facility. The previous risk assessment:

- did not use Australian guidance in relation to risk assessment
- used a proprietary black box model making it impossible to check the calculations
- used default assumptions in the model which were based on UK or US experience
- did not include in the report any description of the conceptual site model or the reasoning behind the choice of receptor types
- miscalculated the risk estimates in terms of Australian guidance.

A revised risk assessment has been prepared which was expected to be quite different to the original version given the comments provided. enRiskS was not asked to review the new version of the risk assessment for adequacy prior to it being placed on public exhibition. The revised EIS has now been put on public exhibition. The exhibition period runs from 27 May 2015 to 27 July 2015.

2.0 Acceptability of the Risk Assessment

The revised risk assessment is effectively the same as the original risk assessment. A few extra appendices have been added and some additional text in one or two places but otherwise the report and its conclusions are the same as they were in late 2014.

It was noted in 2014 that this assessment did not comply with Australian guidance and was, therefore, not acceptable. This remains the case.

An example of an appropriately undertaken risk assessment for a waste incineration facility in an urban area is available as Appendix H of the EIS for the Orica CarPark Waste Encapsulation Remediation Project available at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=18 . Such assessments will always have points of discussion but this example provides the type of approach that would have been expected for the human health risk assessment for this facility. An ecopy of this example HHRA will be provided along with this letter.

3.0 Detailed Assessment

3.1 Section 1

Section 1.1 is the same in both versions of the report.

Section 1.2 is the same in both versions of the report and says that it describes the approach taken for the assessment. The only addition in the 2015 version is a couple of references in footnotes.

This section discusses Australian guidance from enHealth and includes some general information about the framework for risk assessments. It then includes one paragraph noting that the assessment has used the USEPA IRAP package to estimate exposure and that modifications have been made to the default inputs to account for the differences between the Australian and US lifestyles. This section does not contain

- Any detail of the philosophy of the USEPA IRAP model
- The general outline of the modelling process adopted by this model
- How the model can be related to the enHealth guidance
- A list of the actual modifications that were made to the model inputs to make it more Australian.

As far as a description of the approach taken in a risk assessment this is quite inadequate. The rest of the report focuses solely on the USEPA model and does not return to any consideration of Australian guidance. As a result, this section does not provide an appropriate description of the approach taken in this assessment.

3.2 Section 2 – Issues Identification

Section 2 is the same in both versions of the report with the addition of a reference in a footnote in the most recent version.

Section 2 addresses the first step of a risk assessment – issue identification. This section is supposed to outline the issues related to the facility that may pose a human health risk and need to be assessed. It is usual to include:

- a description of the project including the technology involved (operational and pollution control) and how it will work at this facility
- identification of chemicals of potential concern and the sort of information available to use in estimating exposure to these chemicals
- a description of the location of the plant including land use at neighbouring properties, the locations of sensitive receptors, summary of meteorology that might affect dispersion of emissions from the plant (it is usual to include maps).

A risk assessment should be a standalone document to some extent so, while it is not expected that all the detailed information about the project description from the main report or the meteorology from the Air Quality Impact Assessment would be included in this report, it is usual to include a summary in a risk assessment so that the reader has sufficient information/understanding to assess the appropriateness of the assumptions used. This document fails in this regard.

This section includes discussion of the chemicals of concern but does not include any other information. The level of detail provided does not allow any assessment of whether the right chemicals of concern have been identified.

Section 2.1 flags a wider range of chemicals than is listed in Section 2.2. It flags that the air quality impact assessment covers the chemicals listed in the Ambient Air Quality NEPM which are listed incorrectly in this section as NOx, SOx, CO, particulates and hydrogen fluoride (HF). HF is not covered by the AAQ NEPM at all so it is not clear where any assessment of this chemical has been undertaken. Also the list in section 2.1

includes ammonia and there is no indication as to where it has been assessed in the EIS. Also not all the metals listed in Section 2.1 have been included in the list in Section 2.2 but there is no discussion about why they no longer need to be considered or where else they might have been assessed. It is not clear whether there has been sufficient consideration of NOx, SOx and particulates in line with the latest guidance from WHO and other guidance sources. NSW Health now require a much more detailed assessment of potential health risks from particulates than a comparison with the AAQ NEPM standards provides (see the HHRA for the NorthConnex tunnel available at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6136) where a proposal is a significant source of particulates to the Sydney air shed. Depending on the types of pollution control equipment included at this facility, this additional assessment may not be required for this proposal.

Section 2.1 also flags that dioxin-like substances (dioxins, furans and PCBs) and heavy metals can accumulate in the environment so need to be assessed using a multiple exposure pathway analysis. However, this report only appears to undertake such an analysis for dioxin-like substances (or at least the discussion section only refers to dioxin-like substances when discussing some of the pathways). PAHs should also have been included in the list for multiple exposure pathway analysis. Section 2.2 also appears to indicate that all of the listed chemicals have been assessed using a multiple exposure pathway analysis but if this has occurred it is not obvious at all in the report. If the same process has been applied for all the chemicals then tables similar to Table 7.1 and 7.2 should also have been included for all the substances.

3.3 Section 3 – Hazard Identification

Section 3.1

This section discusses Australian guidance in regard to dioxin-like substances. It is effectively the same in both versions of the report with the exception (in the more recent version) of a note that there are no other significant sources in the area and the addition of a reference for the information in Table 3.1 which is incorrect.

The NHMRC TMI for dioxin-like substances is the correct reference for the acceptable intake of this group of chemicals for the Australian population. A discussion of background intakes for these substances is also essential when assessing them. The actual reference for the mean monthly intakes quoted in Table 3.1 is Technical Report 12 from the National Dioxin Project (http://www.environment.gov.au/protection/publications/dioxins-technical-report-12) not the NHMRC report as cited (National Dioxins Program 2005).

The note about there being no other significant sources of these substances in the vicinity of the facility but provides no evidence/discussion of the basis for this conclusion. These chemicals are formed during all combustion processes including motor vehicle emissions, emissions from bushfires, other fires, cigarette smoking, wood heaters and other industrial facilities with thermal processes (e.g. cement furnaces). Also the movement of air (and the chemicals it contains) in the Sydney airshed means that such facilities do not necessarily need to be close to the existing facility. No evidence has been provided in this assessment to support the statement that there are no significant local sources nor is there any discussion of measured levels in the Sydney airshed (http://www.environment.nsw.gov.au/air/dopahhm/index.htm) nor the estimated levels in the more recent emissions inventory (http://www.epa.nsw.gov.au/air/airinventory.htm). However, while the assessment has not made a case as to the lack of significant sources of these chemicals in the vicinity of this facility, the assessment has considered the mean background exposure of people living in Australia to these chemicals. It should be noted that exposure from cigarette smoking is not included in the mean monthly intakes used in this assessment and such exposure can add significantly to background exposure (see discussion in NDP Technical Report 12).

Section 3.2

This section discusses the hazard posed by the rest of the chemicals identified as CoPCs for this facility.

Current Australian guidance about how to undertake risk assessment for chemicals is outlined in the latest version of the Environmental Health Risk Assessment Guidance from enHealth. Referencing a draft NHMRC document from 2010 is not considered relevant for this assessment. This document would have been a supporting document prepared as part of the process for updating the enHealth guidance document. The revised version of the enHealth document was published in 2012 and would have incorporated whatever was relevant from the draft supporting documents. The recommendation for target risk levels is provided in section 5.10 in the enHealth document and these should have been used in this assessment.

The quotes from the Risk Criteria for Land Use Safety Planning are not relevant for this risk assessment apart from in consideration of the potential risks posed for fires, explosions and other safety issues relevant for major hazardous facilities (if this facility falls into such a category). An assessment of acute safety risks has not been included at all in this risk assessment so these values cannot be used for comparison to any of the risk estimates calculated in this assessment. Long term chronic risks posed by normal operation of this facility (such as calculated in this assessment) need to be assessed in terms of the enHealth document only.

Section 3.2.1 is pretty much the same in both versions of this report and is not relevant in Australia. The exceptions are:

- Section 3.2.1.1 includes a note that only risks posed by the emissions from the facility need to be considered which implies no consideration has been given to background exposures or cumulative risk in this assessment. As noted above some consideration has been given to background exposure for dioxin-like substances but it would appear no other chemicals assessed have included consideration of background exposures (or at least whether or not a particular chemical has significant background exposure that should be considered in this assessment). It is a normal requirement of risk assessment to include such a discussion.
- Section 3.2.1.3 includes an additional paragraph justifying only using USEPA IRIS as a source of toxicity reference values for individual chemicals. This is not in line with Australian guidance and is frowned on by local health authorities. It is likely to have been the approach adopted due to the use of the USEPA model which may not allow any change in toxicity reference values by the user. **Table 1** shows the differences between the USEPA IRIS values and those recommended in Australian guidance.

Table 1 – Review of Table 3.2 from Assessment

Chemical	Oral Reference Dose (mg/kg/d)	Inhalation Reference Concentration (mg/m^3)	Oral Slope Factor (per mg/kg/d)	Inhalation Unit Risk (per μg/m^3)
Hydrogen chloride	0.00571	0.02	0	0
Benzene	0.004 ✓	0.03 ✓ (0.01 would also be relevant)	~~0.055~~ 0.035	~~7.8x10^{-6}~~ 6x10^{-6}
Benzo[a]pyrene	0	0	~~0.73~~ 0.233	~~0.0011~~ 0.087
Elemental mercury	8.57x10^{-5}	0.0003	0	0
Mercuric chloride	~~0.0003~~ 0.0006	~~0.0011~~ 0.0002	0	0
Methyl mercury	~~0.0001~~ 0.00023	~~0.00035~~ 0.0008	0	0
Cadmium	~~0.0004~~ 0.0008	~~0.0002~~ 0.000005	~~0.38~~	~~0.0018~~
Thallium	0.0046	0.0034	0.017	0.012
Antimony	0.0004	0.0014	0	0
Arsenic	~~0.0003~~ 0.002	~~3x10^{-5}~~ 0.001	~~1.5~~	~~0.0043~~
Chromium III	1.5	5.3	0	0
Chromium VI	~~0.003~~ 0.001	~~8x10^{-6}~~ 0.0001	0	~~0.012~~
Lead	~~0.000429~~	~~0.0015~~	~~0.0085~~	~~1.2x10-5~~
Nickel	~~0.02~~ 0.012	~~0.0002~~ 0.00002	0	~~0.00024~~

A quick review of readily available Australian (and Australian preferred) guidance shows the differences in preferred toxicity reference values listed above. Some of the highlighted values are higher than those provided in the model and some are lower. The guidance documents used included:

- Assessment of Site Contamination NEPM Schedule B7 Appendices A1 and A2 (NEPC 1999 amended 2013)
- CRC CARE Technical Report 10 Part 1 Appendix B (CRC CARE 2011)
- WHO Air Quality Guidelines for Europe (WHO 2000).

The USEPA develop cancer slope factors for chemicals that Australian health authorities do not consider to be genotoxic carcinogens. It is not appropriate to assess potential cancer risk using linear extrapolation for chemicals that are not genotoxic carcinogens. The USEPA continue to do this due to some historical anomalies in their technical policies and regulations.

The latest WHO and Australian guidance for lead have reported the withdrawal of reference doses and reference concentrations given the most recent health effects literature. Detailed assessment of lead is to be undertaken based on blood lead modelling approaches using a blood lead goal for Australians of 5 micrograms per decilitre (updated value released in May 2015). It is not appropriate to continue to use the old reference doses/concentrations for lead except in some limited circumstances.

Additional assessment of the chemicals listed that have not been checked has not been undertaken but can be if required.

Table 3.3 lists the toxicity reference values for the dioxin-like substances. These substances are not considered to be genotoxic carcinogens by Australian health authorities and should not be assessed using slope factors or unit risks. All assessment should be undertaken using the tolerable monthly intake only. The value listed in this Table does not correspond to the TMI recommended by NHMRC (i.e. $1x10^{-9}$ mg/kg/d USEPA compared to 2.3 $x10^{-9}$ mg/kg/d NHMRC TMI converted to TDI) even though the earlier sections of this assessment imply that the calculations use the NHMRC value.

3.4 Section 4 – Conceptual Site Model

A conceptual site model is supposed to be a representation of relevant site related information regarding chemical emissions that can arise from a facility. It should document sources of chemicals (e.g. description of facility and how these chemicals are present in any emissions to air, water or land from the site), the receptors that may be affected by the emissions (where people might be located in relation to the facility location), what environmental processes may affect the concentrations that people will be exposed to (dispersion due to wind etc) and the pathways by which people may be exposed.

Figure 1 shows, for the first time in this report, the philosophy behind the USEPA model. It illustrates the generalised approach the USEPA has developed applicable to all hazardous waste incinerators. It is a comprehensive approach that covers all aspects that should be thought through at a site. However, there is no site specific information included in this Figure or in this section about the relevance of each step in the process for this facility and how each step in the process will be assessed for this site.

Section 4.2 discusses the omission of exposure pathways including dermal contact, movement of the chemicals into groundwater or surface water. These pathways have been omitted on the basis that they are expected to contribute negligibly to the overall risk estimate. However, it depends on the assumptions made in the calculations and the toxicity of the chemical as to whether they contribute negligibly or not.

Figure 1 shows that it is more likely that dermal contact (and perhaps movement to groundwater) has been excluded from this assessment simply because the pathway is not included in the USEPA model so the calculations could not be simply undertaken in this package. In the example multi exposure pathway risk assessment flagged in **Section 2.0** above the contribution of the dermal contact pathway was quite similar to the contribution via ingestion for at least some of the chemicals assessed as can be seen in **Table 2**.

Table 2

	Hexachloroethane			Pentachlorobenzene			Hexachlorobutadiene		
	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib
		0.001			0.01			0.0002	
inhalation	1.70E-08	1.70E-05	19.27	2.00E-09	2.00E-07	94.22	5.60E-06	2.80E-02	90.84
ingestion	8.30E-10	8.30E-07	0.94	1.80E-12	1.80E-10	0.08	3.20E-09	1.60E-05	0.05
dermal	3.90E-10	3.90E-07	0.44	8.40E-13	8.40E-11	0.04	1.50E-09	7.50E-06	0.02
ingestion of plants	7.00E-08	7.00E-05	79.35	1.20E-10	1.20E-08	5.65	5.60E-07	2.80E-03	9.08
		8.82E-05			2.12E-07			3.08E-02	

	Hexachlorobenzene			Octachlorostyrene			Dioxin-like substances		
	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib
		0.00016			0.00031			2.3E-09	
inhalation	5.30E-08	3.31E-04	94.02	7.00E-09	2.26E-05	1.87	4.10E-13	1.78E-04	96.55
ingestion	5.00E-11	3.13E-07	0.09	5.20E-09	1.68E-05	1.39	2.60E-16	1.13E-07	0.06
dermal	2.30E-11	1.44E-07	0.04	2.50E-09	8.06E-06	0.67	3.70E-16	1.61E-07	0.09
ingestion of plants	3.30E-09	2.06E-05	5.85	3.60E-07	1.16E-03	96.08	1.40E-14	6.09E-06	3.30
		3.52E-04			1.21E-03			1.85E-04	

The percent contributions in **Table 2** also show that if the contribution from dermal contact is to be considered negligible the same could apply to the ingestion pathway. The enHealth guidance requires these pathways to be considered in order to provide a comprehensive picture of the relevance of different pathways and to check overall risk and help focus pollution control measures. The calculations in **Table 2** also show that the pathway that contributes most to the health risk can vary – in some cases it is the inhalation pathway and for others it is the pathway for ingestion of plants grown in the affected soil.

The popularity of the use of rainwater tanks in Sydney has increased significantly over the last decade and in many areas it is a Council requirement that they be installed when constructing new dwellings. While it is not intended that the water collected in the tanks be used as a potable water source, there is no mechanism by which this can be checked or controlled so it is possible that the water in these tanks is occasionally or even regularly consumed by some people. Such tanks definitely do not have treatment systems on them to remove contaminants prior to use. Whether such tanks could be a significant source of the chemicals in emissions from this facility to people consuming water depends on a number of things including:

- Toxicity of the chemical
- Whether the chemical is attached to particles or in vapour form
- Level of emissions of particles from the facility
- Solubility of the chemical in tank water
- Availability of the chemical from the particle
- Meteorology in the area (determining if and when particles from the emissions will deposit)

Consequently, this pathway should have been assessed to determine its relevance. Also it is noted that the Minchinbury Reservoir is quite close to the facility (neighbouring site). This reservoir consists of two large tanks which are used in many locations across Sydney to assist in managing line pressure in the distribution system. The potential for emissions to affect the water stored in this tank should have been assessed (a field observation may have been sufficient to determine if there was any chance particles falling onto the tank could get into the tank).

3.5 Section 5 – Sensitive Receptors

This section does not provide an adequate description of the sensitive receptors in the area. It does not provide a map showing land uses or sensitive receptors – a copy of the one from the air quality impact assessment would have been sufficient.

As noted in the air quality impact assessment, the NSW EPA defines sensitive receptors as any locations that may be affected by the facility where people are likely to work or reside (NSW DEC 2005). So it is not appropriate to leave out the industrial estate to the northwest of the facility when considering the risks posed by the facility.

This section flags that the risks posed by the facility have been assessed based on the predicted annual mean concentrations under normal operations. Risks have not been assessed for a worst case under normal operations nor have they been assessed under upset conditions. The approved methods manual for modelling and assessment of air pollutants requires that peak concentrations for criteria pollutants and ground level concentrations for individual pollutants averaged over 1 hour be compared to impact assessment criteria in an air quality impact assessment (NSW DEC 2005). While it is not necessary to repeat this assessment in the human health risk assessment, such assessments give the opportunity to expand the understanding of the potential risks posed by such a facility and the underlying principles in the regulatory guidance should influence the choice of scenarios used in the risk assessment.

3.6 Section 6 – IRAP Model Assumptions and Inputs

Much of Section 6 is the same as it was in the original version of the risk assessment as it is a brief description of the assumptions used in the USEPA model to calculate environmental concentrations in various media.

A concern in regard to this model is the assumptions that need to be made for the values of the large number of parameters. While the overall approach of a multiple exposure pathway assessment is supported by the scientific understanding of how exposure to emissions from such facilities can occur, robust literature to support each of the values assumed for the many parameters used in this model is not so readily available. Also climate and other environmental conditions here in Australia can make a significant difference to how such understanding might be applied (e.g. having droughts that can run for a decade (limiting the potential for loss of deposited contaminants) or flooding rains that carry particulates (and attached chemicals) across great distances).

A full check through the extensive Appendix E (scanned copy of chapter 5 of the USEPA manual for this model) to determine whether appropriate choices have been made has not been undertaken but some examples of the issues arising with the use of this model are provided below. Also many of the values for chemical specific parameters are listed in parts of the USEPA manual not provided with this report so it is not possible to check them without obtaining the full manual which has not been undertaken given the overall issues with this assessment but can be undertaken if required.

Some examples of issues for consideration for each media include:

- Air

It is assumed that the air quality modelling undertaken in Appendix L of this EIS would be relevant for use in determining vapour phase and particle phase concentrations to feed into the IRAP model. The report does not definitively state that this is what was done nor does it include a table listing the values determined in Appendix L that were used in this assessment. The IRAP model appears to include the USEPA ISCST3 air dispersion model so it is also possible that it was used instead to determine concentrations in air. Given the output pages included in Appendix D of this risk assessment, it seems likely that this model (ISCST3) was used to estimate air concentrations. The ISCST3 model is a similar model to AERMOD/AUSPLUME but no information is provided about how it was set up (including things like met files). This would all need to be checked to be confident that the results are acceptable. It should be clarified which approach was adopted and it would be preferred that the modelling from Appendix L of the EIS was used if this has not occurred.

- Soil

In regard to soil, the model assumes the following values in its calculations:

  - Bulk density = 1.5 g/cm^3
  - Available water (precipitation + irrigation – runoff – evapotranspiration) – with US sources being recommended for use in determining appropriate values for runoff rate
  - Soil volumetric water content = 0.2 mL/cm^3
  - Soil mixing depth – 2 cm untilled land; 20 cm tilled areas

Comment by Julie Cattle might be useful in considering the appropriateness of these values for Australian conditions.

Concentrations in soil are determined from vapour phase and particle phase deposition (wet and dry) of the various CoPCs to soil. Once these concentrations have been added to the soil the model then considers loss via leaching, erosion, runoff, degradation and volatilisation. The soil loss constant (ks) is calculated as:

$$ks = ksg + kse + ksr + ksl + ksv$$

Where

ksg = loss constant due to degradation (based on half-life for each chemical)

kse = loss constant due to soil erosion (set to zero as conservative assumption)

ksr = loss constant due to runoff (uses equation based on annual runoff (BOM data), volumetric water content of soil, mixing depth and soil bulk density (US assumptions) plus soil water partition coefficients for each chemical)

ksl = loss constant due to leaching (uses equation based on rainfall, irrigation, runoff and evaporation (BOM data), volumetric water content of soil, mixing depth and soil bulk density (US assumptions) plus soil water partition coefficients for each chemical)

ksv = loss constant due to volatilisation (uses equation to estimate volatilisation of chemicals from the soil surface – bulk density, particle density and volumetric water content use US based assumptions, the rest of the parameters in the equation are chemical-specific)

A significant number of assumptions about parameter values need to be made to undertake these calculations. While this approach is theoretically correct, the robustness and the applicability of the parameter values used in the model for Australian conditions have not been evaluated. For example, in Australia runoff and leaching can be negligible during droughts which can extend for many years. It would have been better (and conservative) to set the soil loss constant for all potential pathways of loss to zero for this assessment or to only use loss due to degradation of each of the chemicals (given that many of the CoPCs are metals which don't degrade even including this may not be appropriate).

- People

The soil ingestion rates used in this assessment are the assumptions used in the US even though the Australian values are lower (leads to lower risk estimate so is conservative). Body weight for children is higher than recommended by Australian authorities (correct value would result in higher risk estimates so it is not conservative). They should have been adjusted to those recommended in Australian guidance.

Intake of produce should have been adjusted for Australian recommendations. The total diet survey documents from Food Standards Australia and New Zealand as well as the enHealth Exposure Factor Guidance are sources of such information. A simple adjustment can be made to the recommended values which are listed in g fresh weight per day to convert them to the values required by IRAP (kg fresh weight/kg body weight per day). The values listed in Australian guidance can be converted from g fresh weight per day to kg fresh weight/kg body weight per day by dividing by 1000 (g to kg) and body weight (per day to per kg bw per day) (i.e. divide by 70000 for adults and 15000 for children (using 15 kg body weight for child – value recommended in Australia)) (enHealth 2012; FSANZ 2003, 2008, 2011, 2014).

Assumptions in regard to breast milk used in the assessment are listed in Section 6.4.2 as:

- Exposure duration of infant to breast milk = 1 year
- Proportion of ingested dioxin that is stored in fat = 0.9%
- Proportion of mother's weight that is stored in fat = 0.3%
- Fraction of fat in breast milk = 0.04%

- Fraction of ingested contaminant that is absorbed = 0.9%
- Half-life of dioxins in adults = 2,555 days
- Ingestion rate of breast milk = 0.688 kg/day

There has been an error in how these assumptions have been listed (or the values used are not correct). For example, the fraction of fat in breast milk is 4% (or a fraction of 0.04) not 0.04% and the fraction of ingested contaminant absorbed by the child from the milk is 90% (or 0.9 fraction) not 0.9%. Also, according to the National Dioxins Program risk assessment, the ingestion rate of breast milk assumed for Australia is 0.75 kg/day and the half-life of dioxins is assumed to be more than 4,000 days (National Dioxins Program 2005).

A complete assessment of the calculations undertaken in the model and the impact of the assumed values for each parameter compared to the values recommended in Australia has not been undertaken but could be if required.

Section 6.6 and Tables 6.4 and 6.5 outline how the emission rates for each chemical were determined. The emission rates are based on the emission limits in the stack, however, they are based on European requirements for stack limits not those listed in the POEO Clean Air Regulation which is what the facility must comply with here. A quick check of some of the Group 6 requirements for scheduled premises indicate that some of the levels assumed in this assessment may be too high for a facility in NSW. The assessment should be redone using the relevant NSW limits as the starting point for estimating emissions (NSW Government 2010).

3.7 Section 7 – Risk Characterisation

Section 7 discusses the results of the risk assessment and estimates risk. Given the many issues discussed above, a detailed assessment of this section has not been undertaken. Matters that have been identified in a short review include:

- Slight changes in estimated risks between the original version and this more recent version – presumably this is due to changes in the air quality modelling but it is not possible to determine why these changes have occurred. For dioxins in breast milk the risk estimates at the point of maximum impact for resident and farmer have been reversed – it is not clear which is correct.
- Annualised risk estimates for cancer – the only place annualised risk estimates are used in NSW is the land use safety planning guidance where it is used to establish limits on fatality and injury risk estimates for fire, explosion and other safety incidents. It is not appropriate nor is it compliant with any guidance about assessing risk for cancer in Australia. The lifetime risk estimate is the only relevant parameter to use in assessing whether cancer risk at the facility is acceptable. As a result, the cancer risk estimated for the farmer at the point of maximum impact is not acceptable for this facility and the cancer risks estimated for residents at the point of maximum impact and in the surrounding suburbs are within 2-10 fold of the acceptable value. Such a small margin of safety might require additional pollution control measures be considered.
- Upset conditions – as already discussed it is normal to consider, in some fashion, the potential for risks during upset conditions. In the example HHRA discussed above, a description of what could occur during upset conditions was included to provide some understanding of what impacts that may have on emissions from the facility. Also, an assessment of short term concentrations during upset conditions against emergency acute air guidelines (shown in Table 7-2) but no long term assessment was undertaken. Such an approach is likely to have been appropriate for this assessment.

3.8 Section 8 – Conclusions

Given the issues already outlined the conclusions cannot be accepted until the risk assessment is revised in accordance with Australian guidance.

4.0 References

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5.0 Limitations

Environmental Risk Sciences has prepared this report for the use of NSW EPA in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The methodology adopted and sources of information used are outlined in this letter report. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions.

This report was prepared in July 2015 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

If you require any additional information or if you wish to discuss any aspect of this letter please do not hesitate to contact Therese on (02) 9614 0297 or 0487 622 551.

Yours sincerely,

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