

18<sup>th</sup> September 2017

**Re: Update to the Health Impact Assessment Undertaken for the Enviroparks Facility, Hirwaun to Reflect Changes in the Operational Performance Due to Design Improvements**

**Introduction**

GF Environmental Ltd (GFE) has undertaken a number of health impact assessments to assess the risk to the health of people living and working in the vicinity of the Enviroparks facility to be developed on land at Hirwaun in South Wales. Detailed atmospheric dispersion modelling of emissions from the chimneys associated with the Enviroparks facility was undertaken using the ADMS atmospheric dispersion model to predict increases in pollutant concentrations at nearby sensitive receptors such as residential properties, farms and other locations where people may congregate for significant periods of time. The health impact assessments have been updated periodically, as the final design of the Enviroparks facility has been refined. The most recent update took place in August 2017.

Short term acute effects for exposure to NO<sub>2</sub>, SO<sub>2</sub> and PM<sub>10</sub> were assessed in line with COMEAP procedures and showed that increases in background pollutant concentrations at nearby residential properties were low and would not have a significant impact on the health of people living and working nearby. Similar conclusions were drawn for other pollutants with short term, acute effects (HCl, HF and CO). Process contributions for pollutants such as VOCs and heavy metals were also low and their potential health effects screened out as insignificant in relation to health-based air quality standards and relevant EALs recommended by Natural Resources Wales.

The US EPA Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities was used to assess the potential risk to health of people living and working in the vicinity of the Enviroparks facility due to emissions of dioxins & furans, PAH and PCBs. The assessment considered the potential health risks associated with the intake of dioxins due to the consumption of potentially contaminated foodstuffs due to emissions to atmosphere from the chimneys of the Hirwaun Enviroparks facility. The assumptions used within the assessment were conservative and therefore the study was undertaken on a pessimistic worst case basis. The results from the HHRAP assessment indicated that the risk to the health of the local population due to exposure to dioxins in emissions from the Enviroparks facility was likely to be low at nearby residential receptor locations, with exposure levels well below the UK Committee of Toxicity's recommended Tolerable Daily Intake (TDI) of 2 pg/kg.

**September 2017 Update**

Since the most recent health impact assessment, undertaken in August 2017, discussions have taken place with alternative technology providers to identify further opportunities to reduce emissions from the Enviroparks facility. Of particular concern was the need to reduce the significance of the impact of process emissions, at nearby Special Areas of Conservation (SACs), in relation to Critical Levels and site-specific Critical Loads. As a consequence of further modifications to the proposed process technology, significant benefits will be achieved in relation to a reduction in the emissions profile of the Enviroparks facility.

The following table shows a comparison in the results for Receptor No. 3, the nearest residential property at Penderyn Reservoir, from atmospheric dispersion modelling undertaken in February, August and September 2017, which reflects recent modifications to the design of the Enviroparks facility.

Parameter	February 2017	August 2017	September 2017	Percentage Change*
Annual Average NOx as NO2 (ug/m3)	2.6	0.4	0.4	15%
Maximum Hourly NOx as NO2 (ug/m3)	111.0	15.0	26.2	24%
99.79 Percentile Hourly NOx as NO2 (ug/m3)	24.4	4.0	4.5	19%
Annual Average 15 Minute SO2 (ug/m3)	0.6	0.01	0.1	19%
Maximum 15 Minute SO2 (ug/m3)	23.2	0.32	6.7	29%
99.9 Percentile 15 Minute SO2 (ug/m3)	6.4	0.10	1.5	24%
Annual Average SO2 (ug/m3)	0.6	0.01	0.1	19%
Maximum Hourly SO2 (ug/m3)	22.8	0.32	6.6	29%
99.73 Percentile Hourly SO2 (ug/m3)	5.8	0.09	1.4	23%
Annual Average 24 Hour SO2 (ug/m3)	0.6	0.01	0.1	19%
Maximum 24 Hour SO2 (ug/m3)	4.2	0.06	1.0	23%
99.18 Percentile 24 Hour SO2 (ug/m3)	4.0	0.05	0.9	23%
Annual Average 24 Hour PM10 (ug/m3)	0.1	0.07	0.03	39%
Maximum 24 Hour PM10 (ug/m3)	0.6	0.40	0.3	49%
90.41 Percentile 24 Hour PM10 (ug/m3)	0.3	0.21	0.1	42%
Annual Average PM10 (ug/m3)	0.1	0.1	0.04	39%
Maximum Hourly PM10 (ug/m3)	3.7	2.4	2.1	56%
Annual Average PM2.5 (ug/m3)	0.12	0.10		0%
Maximum Hourly PM2.5 (ug/m3)	5.1	3.4		0%
8 Hour Rolling Average CO (mg/m3)	0.001	0.0005	0.0001	13%
Maximum 8 Hour Rolling Average CO (mg/m3)	0.01	0.004	0.001	20%
Annual Average VOC (ug/m3)	0.1	0.1	0.1	73%
Maximum Hourly VOC (ug/m3)	5.6	3.7	6.5	117%
Annual Average Hg (ug/m3)	0.0007	0.0005	0.00001	2%
Maximum Hourly Hg (ug/m3)	0.03	0.02	0.001	3%
Annual Average Cd / Tl as Cd (ng/m3)	0.7	0.5	0.0004	0.1%
Maximum Hourly Cd / Tl as Cd (ng/m3)	29.8	18.5	0.03	0.1%
Annual Average Heavy Metals as Pb (ug/m3)	0.01	0.01	0.0001	1%
Maximum Hourly Heavy Metals as Pb (ug/m3)	0.3	0.2	0.004	2%
Annual Average HCl (ug/m3)	0.1		0.003	2%
Maximum Hourly HCl (ug/m3)	4.2		0.1	3%
Annual Average HF (ug/m3)	0.01	0.01		0%
Maximum Hourly HF (ug/m3)	0.5	0.3		0%
Annual Average Dioxins (ug/m3)	1.31E-09	1.01E-09	1.6E-11	1%
Maximum Hourly Dioxins (ug/m3)	5.57E-08	3.70E-08	1.1E-09	2%
Annual Average 24 Hour Dioxins (ug/m3)	1.24E-09	9.66E-10	1.5E-11	1%
Maximum 24 Hour Dioxins (ug/m3)	8.65E-09	6.10E-09	1.3E-10	1%
Annual Average PAH (ng/m3)	1.30E-02	1.01E-02	2.0E-03	15%
Maximum Hourly PAH (ng/m3)	5.53E-01	3.70E-01	1.4E-01	25%
Annual Average PCB (ug/m3)	6.51E-05	5.08E-05	6.0E-08	0.1%
Maximum Hourly PCB (ug/m3)	2.77E-03	1.85E-03	4.1E-06	0.1%
Annual Average NH3 (ug/m3)	0.1	0.001	0.001	1%
Maximum Hourly NH3 (ug/m3)	4.3	0.03	0.05	1%

Note: \* Percentage change relates to the difference between the September 2017 and February 2017 data.

Values in red show where there is an increase in the Process Contribution from the September 2017 modelling, relative to the August 2017 results. However, in all cases the September 2017 data are considerably lower than the corresponding values from the February 2017 modelling.

The results from the September 2017 modelling show an approximate threefold reduction in NO<sub>x</sub>/NO<sub>2</sub> and SO<sub>2</sub> process contributions, with the corresponding PM<sub>10</sub> process contributions reduced by about 50%. As a consequence, the associated health risks for people living and working in the vicinity of the Enviroparks facility will be proportionately lower.

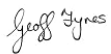
Due to no volatile organic compounds having been detected during emissions monitoring at similar sites, the modelling work in September 2017 has incorporated a total organic carbon release as VOCs. In reality, the sum of the laboratory Limits of Detection for VOCs would equate to approximately 2 % of

the TOC release. Hence the suggestion of an increased impact of VOC contributions is overly conservative, and in reality, the contribution from modelled Limits of Detection would actually equate to less than 4 % of the results from August 2017.

The results from the September 2017 modelling show even greater reductions in process contributions for pollutants such as dioxins and furans, where as a result of the latest design changes, emission concentrations are expected to be below the analytical Limit of Detection, with process contributions that are ~1% of the corresponding values from the February 2017 modelling. Due to no dioxins having been detected during emissions monitoring at similar sites, the modelling work assumed a release which equated to the sum of the laboratory Limits of Detection. With reductions in process contributions of this magnitude, the resulting health impact predictors will be at least an order of magnitude lower, than those reported in the August 2017 report.

On the basis for the revised dioxin emissions profile for the Enviroparks facility, the results from the September 2017 modelling show that the intake of dioxins and furans by both the dietary and inhalation routes, represents a value that is <1% of the Tolerable Daily Intake of 2 pg kg<sup>-1</sup>, and can be screened out as insignificant. Similar conclusions can be drawn for other receptor locations included in Table 19 of the August 2017 health risk assessment report.

Accordingly, the most recent improvements to the design of the Enviroparks facility will result in lower pollutant exposure levels, and a significantly reduced risk to the health of people living and working near to the facility.



Via e-mail  
Geoff Fynes