



Gladstone Conservation Council Inc.

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14th July 2017

To: Department of Environment and Heritage Protection

Re: Amendment of Environmental Authority:
Queensland Curtis Liquefied Natural Gas (QCLNG) LNG facility, EPPG00711513

At its fundament, flaring black smoke is not just nuisance. It is symptomatic of incomplete combustion of its constituents leaving behind products that present a public health risk.

Why promise to install smokeless flares, if not to avoid harmful effects? If doing away with smokeless flares is inconsequential, prove it.

For some time GCC has tried to address the prospect that the flaring from the gas plants may represent an unspoken-of risk, due to associated PAH's. This has now been confirmed as a real potential^①(PAH risk and thresholds)

The world health organisation states "There is no evidence of a safe level of exposure or a threshold below which no adverse health effects occur" referring to particulate matter^②

Our struggle with carcinogens manifests in our investment in cancer research. There is little doubt about the role of persistent organic pollutants in this.

We already have the unfortunate condition in Gladstone, that we smudge our hands with black dust simply by running them over any exposed surface. Any resuspension of dust anywhere in the region exposes us to inhalable matter and potentially respirable dust originating from these emissions. Ultimately exposing the community to an enhanced carcinogen vector for as long as the pollutants persist. Is it reasonable to expect the community to accept an increase in the baseload of this type of dust? Especially where we were lead to believe that the flares would be without the smoke and its particulate emissions?

GCC has made the point that speciation of the flare's combustion products was not carried out at the time of the EIS which underpinned the approval of the project, because the flares were going to be smokeless. It would appear that the actual make-up of these emissions was unknown.

While we commend the gas company including a PAH component in their modelling, it appears to be based on a case study elsewhere. It is incumbent on them to establish beyond doubt the actual composition and the quantity of their emissions to enable the regulator to differentiate their contribution to regional cumulative impacts, as difficult as it may seem to them.

Somewhat belated expert advice summarises technical options to minimise or eliminate the incidence of visible smoke emissions^③. This advice should have been crucial input for the original EIS underpinning the project's approval, which at its core tendered smokeless flares as the principal mechanism to mitigate emission impacts. It appears that the more conventional smokeless designs are incompatible with the installed facility, as indicated by "No" under the heading "Effective". Some smoke mitigation options even technically unfeasible. It begs the question what was meant with "world class" design during the EIS process.



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The only effective smoke mitigation options appear to be a partial effective (90%+ reduction in events) requiring a \$200m investment and a near 100% effective multi point ground flare that would require \$350m. At some stage after the EIS was approved, the promise of investment of this type was pulled without the communities' knowledge or consent. No doubt it would have made a few project managers and financial controllers look good at the time, possibly bringing the project closer to budget, maybe even precipitating a few executive bonuses, but the legacy of that decision is the externalised cost of the consequences. A cost the community is now being asked to bear.

I understand from the company's briefing in Gladstone that the restrictions in the current environmental authority, to not (a) produce continuous visible smoke for 30 minutes or more; and (b) to not occur more than 14 times per annum, is too restrictive for them to carry out their designated operations. Note that these conditions are already a significant departure from their EIS commitment to smokeless flares and appear consistent with the operating parameters they have set for flaring in the EIS documents.

The summary of the flaring they think they need now^④ is not too dissimilar to the sort of lists produced in the EIS on which the current EA conditions appear to be based. Why is there now a requirement for more purging? Did they really understand their process when they told us it was world class and safe? What else did they not quite understand? To use a safety argument now for leverage to expand the flaring allowance is inappropriate. Our safety should not be held to ransom because they did not anticipate their operational needs properly.

I fail to see how, a 30-minute threshold below which visible smoke emissions should not be regulated^⑤, contributes to minimising environmental harm.

The adoption of perceived thresholds must be evidence based and subject to adaptation where our understanding is enhanced by competent scientific work. In the absence of clear and unambiguous scientific evidence it is imperative that a precautionary principle is enforced.

Where a company has been shown to be at odds with their commitments, it leaves the regulator little room to move. Rather than reject the yoke of their own making, the company would be better served by attempting to bear the burden of their obligation.

I also note the company mounting some sort of unfair treatment argument, that the regulation they are subjected to is more onerous than that of others. GCC do not suggest that non-uniform application of standards is appropriate, but suggest that if there are problems here, it may be an outcome of adaptive regulation responding to a need to deal with case specific risk.

It is inappropriate to try and drag down regulation to lower standards. Other operations should also aspire to lift their game. Regulations should reflect progress towards higher standards and uniform application of them across the industry. Let us be world class.

Sincerely,

Jan Arens
President – Gladstone Conservation Council



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PAH risk and thresholds

In the documents provided by the gas company in support of the amendment of the EA, they refer to modelling, <https://www.ehp.qld.gov.au/management/non-mining/documents/ar100538-part3.pdf>, ATTACHMENT 3: AIR QUALITY IMPACT ASSESSMENT starting on page 50.

On page 64, the modelling suggests compounds which include listed carcinogens and/or mutagens, viz:

Table 6 Emission factors for PAHs

PAHs	Emission factor (μg of pollutant per μg of particulate matter)
Naphthalene	1.0E-05
Acenaphthylene	3.5E-05
Acenaphthene	1.4E-06
Fluorene	3.4E-06
Phenanthrene	6.2E-05
Anthracene	8.5E-06
Pyrene	9.6E-05
Fluoranthene	1.2E-04
Benzantracene	2.7E-05
Chrysene	3.2E-05
Benzo(a)pyrene	6.5E-05
1,12 benzoperylene	3.0E-05

The emission rates of NO_x, CO, particulates and total hydrocarbons for each flare scenario are presented in Table 7. The emission rates of PAHs for each flare scenario are presented in Table 8.

I refer you to the below paragraph under the guidelines section of the WHO document:

http://www.euro.who.int/_data/assets/pdf_file/0015/123063/AQG2ndEd_5_9PAH.pdf, page 17.

Based upon epidemiological data from studies in coke-oven workers, a unit risk for BaP as an indicator in air constituent is estimated to be $8.7 \times 10^{-5} (\text{ng}/\text{m}^3)^{-1}$ which is the same as that established by WHO in 1987. The corresponding concentrations of BaP producing excess lifetime cancer risks of 1/10 000, 1/100 000 and 1/1 000 000 are 1.2, 0.12 and 0.012 ng/m^3 respectively.

It deals with scientific assessments of one of the most studied aromatic hydrocarbons *Benzo[a]pyrene*. The thresholds of risk are expressed in concentrations of parts of ng/m^3 . The air quality objectives assumed in the gas company's modelling (see cut of their table 10 below) for some of these compounds seems to baseline at 0.5 microgram per cubic meter, or 500 nanogram per cubic meter.



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Table 10 Relevant ambient air quality objectives and standards for hydrocarbons

Indicator	Environmental value	Averaging period	Air quality objective or standard ($\mu\text{g}/\text{m}^3$)	Source
Acenaphthylene (as acenaphthene)	Health	1-hour	1	TCEQ
Acetylene	Health	1-hour	26,600	TCEQ
Anthracene	Health	1-hour	0.5	TCEQ
Benzo(a)anthracene	Health	1-hour	0.5	TCEQ
Benzo(g,h,i)perylene	Health	1-hour	0.5	TCEQ
Chrysene	Health	1-hour	0.5	TCEQ
Dibenzo(a,h)anthracene (as acenaphthene)	Health	1-hour	0.5	TCEQ
Ethane	Health	1-hour	12,000	TCEQ

Extrapolating the above WHO guidelines, a $500 \text{ ng}/\text{m}^3$ exposure represents a 1 in 24 excess lifetime cancer risk. I would not consider $0.5 \text{ microgram}/\text{m}^3$ an acceptable threshold for these compounds.

There is an acknowledgement in the company's modelling, of an inherent connection between the PAH's and the particulate emissions generated, in that the modelling seems to assume PAH pollutant/particulate matter proportionality, see header of Table 6.

Table 6 Emission factors for PAHs

PAHs	Emission factor (μg of pollutant per μg of particulate matter)
Anthracene	1.05

The implication is that potential carcinogens could be weaponizing flare particulate emissions with persistent organic pollutants.



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References:

1. declares presence of Polycyclic Aromatic Hydrocarbons (PAH's) in flare emissions.
<https://www.ehp.qld.gov.au/management/non-mining/documents/ar100538-part1.pdf>
page 5
2. WHO statement about health impacts of PM₁₀ PM_{2.5}
http://www.euro.who.int/_data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf page 6
3. table summarising the evaluation of technical options to minimise or eliminate the incidence of visible smoke <https://www.ehp.qld.gov.au/management/non-mining/documents/ar100538-part3.pdf> starting on page 33
4. table summarising duration of flaring events <https://www.ehp.qld.gov.au/management/non-mining/documents/ar100538-part3.pdf> starting on page 38,
5. I note a substantial component in the document dealing with the wording of regulatory speak. I suspect in anticipation of compromise negotiations with the regulator. Where the company's behaviour has appeared sub-standard in the past, misaligned with their EIS commitments, while under very loosely prescriptive prevailing regulation, a consequential outcome is tightening of the wording by the regulator. In this case it provoked an objection by the company and starts a downward spiral of complicating the path to our common objective of committing no environmental harm. As an example, I refer to the passage on page 36 <https://www.ehp.qld.gov.au/management/non-mining/documents/ar100538-part3.pdf> :

"flaring event means an event where flammable gas is combusted through a flare which produces continuous visible smoke for a period greater than 30 minutes".

QGC's position is that visible smoke emissions of up to 30 minutes is unlikely to trigger a nuisance impact therefore should not be regulated under the EA.