

# James Price Point LNG precinct

## Industrial Pollution Impacts

*An Environmental Health and Justice Perspective  
Alliance for a Clean Environment Inc*

# *Alliance for a Clean Environment Inc.*

**Promoting 'Community Right to Know' and Environmental Justice in WA  
since 1996**

- **Environmental Justice**
- **Environmental health protection**
- **Children's environmental health protection**
- **Chemical injury law reform**
- **Contaminated sites**
- **Pollution/ Air Quality impacts**
- **Pesticides/chemical impacts**
- **Industrial regulation**
- **Public Engagement**
- **Community Empowerment (CRTK)**
- **Waste management**
- **Environmental protection**

# *National and global networks*

## **National Toxics Network**

- International POP's Elimination Network (IPEN)
- Stockholm Convention
- Hazwaste
- Dioxin
- Ewaste
- Mercury

## **National Industrial Chemicals Notification Assessment Scheme (NICNAS)**

- Community Engagement Forum
- Existing Chemicals Review

## **Global Community Monitors**

- WA Bucket Brigade

# Community Right to Know

- ***Strategic Approach to International Chemicals Management (SAICM)***
- ***BAHAI declaration***
- ***Convention on the Rights of the Child***
- ***NICNAS Community Engagement Charter***

# Drivers for change

- *It is estimated that around one in three of all occupational diseases recognised in Europe each year is due to exposure to hazardous chemicals.*
- *A wide range of chemical residues are now found in human breast milk with Australia showing some of the highest levels.*
- *Environmental monitoring is showing chemical residues extensively in the environment. Air, water and soil.*
- *38 000 industrial chemicals available for use in Australia have not been adequately (if at all) assessed for human health and environmental impacts.*
- *Little (if any) chemical volume and use data (critical for exposure assessment) has been available in Australia to ensure public, worker and environmental health protection.*

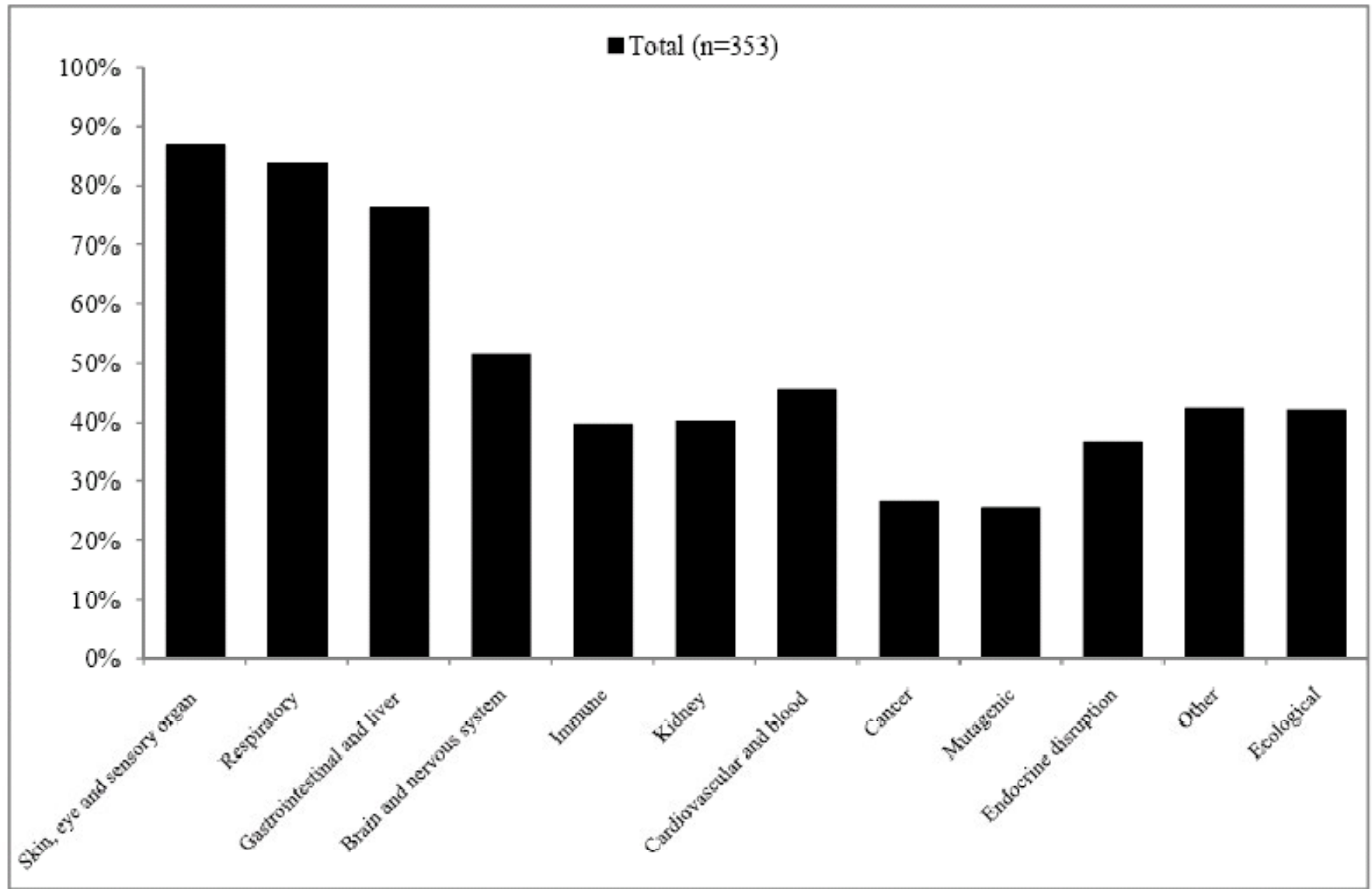
# Chemicals in LNG processing

- 944 products used in LNG processing
- 632 chemicals identified
- 353 only have CAS numbers

*Natural Gas Operations from a Public Health Perspective*

*Theo Colborn\*, Carol Kwiatkowski, Kim Schultz, Mary Bachran*

Figure 2. Profile of Possible Health Effects of Chemicals with CAS Numbers used in Natural Gas Operations



# Air pollution

- Gas field produced ozone has created a serious air pollution problem similar to that found in large urban areas, and can spread up to 200 miles beyond the immediate region where gas is being produced.

*Ref -The Endocrine Disruption Exchange*

# Mercury

Mercury is a persistent and bio-accumulative toxin. It affects the kidneys and the neurological development particularly of children and the unborn. It is currently the subject of international negotiation to establish a legally binding global treaty.

It is estimated that 20-30 metric tonnes of mercury are recovered yearly from natural gas wastes in the European Union (Maxson,2006).

Ref- Hylander and Meili (2003), Maxson (2004, 2006), Brooks and Matos (2005), NRDC (2006), UNDESA/SD Comtrade (2006) and US ITC trade Statistics.

# Chemicals at every stage

- **Condensate tanks** – Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylene
- **Construction Activity** – Dust and particulates which are precursors to Ozone formation
- **Dehydraters** – significant quantities of VOC's, Benzene and Toluene
- **Engines** – diesel or gas/petrol release CO, NO<sub>x</sub>, PAH's, heavy metals, formaldehyde, BTEX and can contribute to Ozone/smog
- **Flaring** – benzene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs, including naphthalene), acetaldehyde, acrolein, propylene, toluene, xylenes, ethyl benzene and hexane. Researchers in Canada have measured more than 60 air pollutants downwind of natural gas flares.

# Chemicals at every stage contd.

- **Fugitive emissions** – unintentional releases of gases. Methane, VOCs and hydrogen sulphide
- **Pits** - acids, biocides, surfactants, solvents, lubricants, plus VOC's, benzene, toluene and hydrogen sulphide
- **Vehicle** -NO<sub>x</sub>, carbon monoxide, and sulfur dioxide, as well as particulate matter. These compounds combine with VOCs to form ground-level ozone (smog).
- **Venting** – massive release of VOC's and hazardous chems (if flaring is not used)

## Criteria Air Pollutants – Current Ambient Air Quality NEPM Standards

	Pollutant	Averaging period	Maximum concentration	Goal within 10 years maximum allowable exceedences
1	Carbon monoxide	8 hours	9.0 ppm	1 day a year
2	Nitrogen dioxide	1 hour	0.12 ppm	1 day a year
		1 year	0.03 ppm	none
3	Photochemical oxidants (as ozone)	1 hour	0.10 ppm	1 day a year
		4 hours	0.08 ppm	1 day a year
4	Sulfur dioxide	1 hour	0.20 ppm	1 day a year
		1 day	0.08 ppm	1 day a year
		1 year	0.02 ppm	none
5	Lead	1 year	0.50 $\mu\text{g}/\text{m}^3$	none
6	Particles as $\text{PM}_{10}$	1 day	50 $\mu\text{g}/\text{m}^3$	5 days a year
7	Particles as $\text{PM}_{25}$	1 day	25 $\mu\text{g}/\text{m}^3$	
		1 year	8 $\mu\text{g}/\text{m}^3$	

# Health Effects of Air Emissions – Carbon Monoxide

## Range of health effects

- Cardiovascular effects in healthy adults
- Cardiovascular effects in people with ischemic heart disease
- Neurobehavioural effects in healthy adults
- Foetal effects

No evidence for threshold for effect.

# Health Effects of Air Emissions – Nitrogen Dioxide

## Range of health effects

- Decreases in lung function
- Increases in respiratory illness
- Increases in hospital admissions and emergency department attendances for respiratory and cardiovascular disease and asthma
- Some evidence for increases in mortality

No evidence for threshold for effect.

# Health Effects of Air Emissions – Ozone

## Range of health effects

- Mortality
- Reduced lung function in healthy adults and children
- Exacerbation of asthma
- Increases in respiratory symptoms
- Increased airway responsiveness
- Airway inflammation

No evidence for threshold for effect.

# Health Effects of Air Emissions – Sulfur Dioxide

- Exposure to SO<sub>2</sub> creates acute irritant response
- Leads to coughing, wheezing, sputum production, increased incidence of respiratory infections, aggravation of asthma and COPD
- Asthmatics particularly sensitive to SO<sub>2</sub> and respond very quickly (minutes)

No threshold observed for adverse effects

# Health Effects of Air Emissions – Particulates

PM<sub>10</sub> and PM<sub>2.5</sub> health effects:

- Increases in mortality, hospital admissions and emergency department attendances (respiratory and cardiovascular causes)
- Aggravation of existing disease (respiratory and cardiovascular causes)
- Increases in respiratory symptoms and decreases in lung function

No threshold observed for adverse effects

# Nano-particles

- Particles that measure less than 100 nanometres = 100, 000<sup>th</sup> of a one metre.
- DNA strand = 2.5 nanometres
- Pass directly through human membranes into the blood and organs.
- Inhaled nanoparticles can pass the blood brain barrier.
- Nanopollution is more toxic than standard pollution.
- Nanoparticles can travel long distances intact.
- Nanoparticles are unregulated in Australia.

# Benzene

- Known human carcinogen
- Long-term exposure associated with increased incidence of bone marrow depression and leukaemia (acute myeloid leukaemia)
- Recent meta-analyses found association with increased incidence of Non-Hodgkins' Lymphoma (2008)
- International air quality standards currently stand at 1.5 ppb as annual average. Adopted by EU and UK air quality strategy.
- No known threshold for carcinogenic effects.

# Goals not limits?

**Table 2: Monitoring investigation levels**

Column 1 Pollutant	Column 2 Averaging period	Column 3 Monitoring investigation level	Goal
Benzene	Annual average*	0.003ppm	8-year goal is to gather sufficient data nationally to facilitate development of a standard.
Benzo(a)pyrene as a marker for Polycyclic Aromatic Hydrocarbons	Annual average*	0.3ng/m <sup>3</sup>	8-year goal is to gather sufficient data nationally to facilitate development of a standard.
Formaldehyde	24 hours#	0.04 ppm	8-year goal is to gather sufficient data nationally to facilitate development of a standard.
Toluene	24 hours# Annual average*	1 ppm 0.1 ppm	8-year goal is to gather sufficient data nationally to facilitate development of a standard.
Xylenes (as total of ortho, meta and para isomers)	24 hours# Annual average*	0.25ppm 0.2 ppm	8-year goal is to gather sufficient data nationally to facilitate development of a standard.

\*For the purposes of this Measure the annual average concentrations in Column 3 are the arithmetic mean concentrations of 24-hour monitoring results.

***Inquiry Rec 20: The Committee recommends that the Government, as a matter of priority, develop and finalise air emission guidelines specific to WA and that these should include VOC's and standards for multiple chemical exposure. Alcoa Inquiry 2004***

# What about our kids? *“We are not little adults!”*

- **Children are more vulnerable to pollution than adults.**
- **Children have developing brains and bodies**
- **Disruption to these windows of development can have life long impacts**
- **Children are now born with a body burden of chemicals including pesticides, BPA, phthalates and PBDE's**
- **Standard toxicological risk assessments assume children are “little adults”. Safety margins generally reflect that children have the same reactions to chemicals as adults, just on a smaller scale. This is incorrect.**
- **In 2004, the EU Ministerial Conference on Children's Environmental Health identified air pollution, unsafe water conditions and lead exposure as the main culprits in the death and disabling of children in Europe.**

# Can regulation fail?

- Waste Control hazardous waste fire 2001
- Alcoa World Alumina-Wagerup health and environment impacts 2004
- Esperance Port Lead contamination 2007

# Waste Control Fire



## **Chemical Storage at the Waste Control Site:**

- From the time of the first regulatory agency inspection did not comply with regulations; and
- At no time was in complete compliance with either the DEP or DME licence conditions.

(Finding 12. p29, Bellevue Hazardous Waste Fire Inquiry 2002)



**Toxic industries such as this have not only impacted on the health of residents and the natural environment , but have created the potential for a toxic ghetto and continued threats to the local social and environmental communities.**

**(Chairpersons foreword, p xiii. Bellevue Hazardous Waste Fire Inquiry 2002)**

# Alcoa Wagerup/Yarloop

**In its Triennial Review...Alcoa reported that in 2002, the refinery received a total of 1590 complaints. The majority of these complaints related to odour.**

**Health complaints reported by Alcoa workers were remarkably similar to those reported by the surrounding community.**

**Alcoa and CSIRO identified 261 substances emitted from the refinery.**

**The assessment of chemical mixtures is not a requirement of EIA in WA.**

***(Alcoa Refinery at Wagerup Inquiry 2004)***



# Esperance

- **Industry regulation by the Department of Environment and Conservation is grossly inadequate**
- **There were critical failures by the EPA, the DEC and Magellan Metals P/L to implement DoH recommendations and advice in the environmental approval processes associated with the events that are the subject of this inquiry.**

***(Inquiry into the Cause and Extent of Lead Pollution in the Esperance Area 2007)***

# Esperance Lead contamination



- thousands of bird deaths, (9,500)
- contamination of the marine environment
- contamination of the general town environment
- contamination of rainwater tanks along the route and in the town
- elevated blood lead levels in mine and port workers
- elevated blood levels in 81 children and adults of the Esperance community
- Only approximately one third of children in Esperance under the age of five years were included in the original blood testing; 81 out of 600 had elevated lead levels and only half of the children with elevated levels had follow up blood tests.

## *Health Impact Assessment- What are we waiting for?*

- Rec 8. The EIA process as contained in the EP Act 1986 be expanded to:**
- **Incorporate a health impacts assessment where appropriate; and**
  - **Involve the Health Department of WA in the process of the health impact assessment.**

*(Bellevue fire Inquiry 2002)*

- Rec 29. The Committee recommends that the Government review legislation and make necessary amendments to ensure that the Dep't of Health has a formal role in advising the Environmental Protection Authority in relation to the assessment of projects that may impact on public health.**

*(Alcoa Refinery at Wagerup Inquiry 2004)*

- Rec 10. The Committee recommends that there be a legislative requirement for the Department of Health to conduct a health impact assessment as part of the Environmental Assessment Process.**

*(Inquiry into the Cause and Extent of Lead Pollution in the Esperance Area 2007)*





# Global Community Monitoring

[www.gcmonitor.org](http://www.gcmonitor.org)

WA Bucket  
Brigade

Wagerup

# *Alliance for a Clean Environment Inc*

Promoting Community Right to Know and Environmental Health and Justice

[www.ace-wa.org](http://www.ace-wa.org)

[www.ntn.org.au](http://www.ntn.org.au)



*Pride of Australia Award (environment) winners 2007*

# Submission ideas.

- The LNG hub will be the largest source of benzene and VOC air pollution in Australia.
- The government does not have air quality standards for the protection of public health in Australia for Benzene or VOC's.
- Children are disproportionately affected by pollution compared to adults.
- Many of the chemicals used in LNG processing have not been assessed for long term human health or environmental impacts.
- Reports submitted to the EPA show that the NEPM for Ozone will be exceeded.
- How can the EPA assess the predicted air quality impacts without critical background air quality field data?
- As the project proponent, can the WA government provide the regulatory oversight the proposal needs?
- Can the WA government policy of industry self regulation provide long term protection for the public interest, human health and environmental protection?