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Where there's smoke there's industry

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A KEY strategic issue surrounding the proposed Tamar Pulp Mill is the underlying concern regarding contribution to an existing air quality problem in the valley.

Consequently considerable spin has been put into the measurement and blame apportionment of air quality problems in Launceston. Whilst Launceston's PM10 exceedences did drop to only 2 for 2006 (up to 31 July) many questions still remain about the cause-and-effect driving this outcome and the methods of measurement and their relevance.

When Kim Booth (Bass Green) stood up in parliament on Wednesday 18 October to put forward a motion seeking an investigation into the industrial sources of air pollution in Launceston, it was a telling sign that both the Government and Liberal Party banded together to immediately defeat the motion. It's strange how greed makes common bedfellows of political opponents.

Stranger still is the very-quiet announcement one week after this motion that the Federal Government will provide $760,000 to four companies in Launceston (including Gunns Ltd timberyard Invermay) so that the emissions from their industrial boilers can be better controlled. Of course no one has commented on why four companies who make multi-million dollar profits every year have been allowed to legally contribute to Launceston's air pollution for so long and have never been required to put their hands in their own pockets to address the problem. Indeed the same companies appear to be exempt from fines under local and state regulations. As revealed in the Sunday Tasmanian (5 Nov 2006), the deliberate omission of "secret" heavy industry measured emission data from the Gunns IIS on the basis of "commercial-in-confidence" highlights the political imperative to hide industrial contributions to the Tamar valley air-shed from the public. (CSIRO shreds pulp mill plan)

Regardless, the offering of the grants, and their acceptance, form a tacit and belated acknowledgement by the Federal Government that industrial sources of air pollution in Launceston have been overlooked by the State. Indeed the Labor-Liberal motion in state parliament clearly points to the ongoing and conscious denial of the problem.

Matching trend data with occurrences

A politician bearing a graph is always a worrying development. When Paula Wreidt exclaimed the virtues of Launceston's air quality on ABC TV in June, even the ABC TV "journo" was convinced that, without doubt, Launceston's air quality has now met NEPM standards! Yet again the Government and media regurgitated the myth that air quality degradation has been precisely and solely sourced to domestic woodheaters despite the absence of reliable chemical speciation studies. Is this some form of new Essential Science (ES) that we were previously unaware of?

As described in the Sunday Tasmanian a few weeks ago, the available PM10 exceedence data for Launceston show an "apparent" decline from 50 to 13 exceedences (days above 50 microg/m3 for PM10 particles) between 1997 and 2002 followed by an "apparent" increase to 26 exceedences in 2003. On the 4 June 2006 the reported exceedences in the newspaper article was 14 for 2005, although this now seems to have mysteriously declined to 13 exceedences in their present data! As at 31 July 2006, only 2 exceedences had been officially recorded. In summary there has been a general declining trend since 1997, with some significant variation in recent years. Hobart air quality data show a similar trend except for the fact that no data are published after 20 June 2004!

Given that the data are collected hourly, it is intriguing that aggregate data are not published daily. In contrast the Fraser Valley air quality authority (Vancouver) consists of 35 stations which record air quality in hourly segments with daily publication of the results on their website!

Whilst the State Government will have us believe that the improvement in Launceston's air quality is solely related to domestic woodheater control, it would appear that (based on the limited data available) much of the decline in exceedences occurred well before the Launceston Woodheater buyback scheme commenced in July 2001. Another observation is that (whilst on a reduced scale) the same apparent decline has occurred in Hobart. Why would this be the case if Hobart did not also have a Woodheater buyback scheme?

The answer to this may be simple — clearly the apparent decline is only partly related to the woodheater buyback scheme (at best). Both trends must be influenced by common factors which a) affected both cities and b) commenced well before 2000. Indeed similar trends have been documented in NSW, Sweden, UK and USA. We know that PM10 measurements are highly influenced by prevailing meteorological conditions and station siting — particularly wind velocity, direction and humidity. State-wide meteorological conditions may therefore have had an influence. However the most significant and recent change in state, national and global air pollution trends has been the influence of improved vehicle combustion and fuel.

Road transport (combustion of fuels) is one of the most significant sources of PM10 according to the UK Department of Environment, Food and Rural Affairs. By 1990 road transport emissions in the UK superseded coal burning power stations and road dust as the most prolific source of PM10. However the period 1990-1999 has seen a rapid decline in road transport emission PM10 in the UK, largely driven by both the uptake of unleaded fuel and improved (low SO2 and NOx) diesel vans and trucks. In the UK PM10 emissions from road transport sources have declined by 46% over this period with a further 45% decline predicted over the next decade ... total emissions from petrol cars and light goods vehicles declined dramatically over the decade due to the phasing out of leaded petrol and the penetration of cars fitted with three-way catalysts in the car fleet ... Air Quality Strategy, Department of Environment, Food and

Rural Affairs, UK. Between 1991 and 2000, PM10 emissions from road and urban transport in the UK almost halved (from 26 to 14 kilotonnes and it is now expected to have declined to around 11 kilotonnes — this is driven only by unleaded fuel and low NOx and sulphur vehicles.

In contrast it is interesting to note that Australia's official measure of air pollution contributions, the National Pollution Inventory (NPI), only assigned 8% of Launceston's air pollution to vehicle exhausts! This illustrates the inherent problems with the NPI where air pollution sources are assigned based on a biased system of weighted estimates from local authorities and self-reported estimates from industry (constrained to municipal boundaries). Apart from the fact that the NPI has not been updated for some years, the additional bias of human influence makes the system totally unreliable. A clear example of this is the fact that Launceston is only one municipality within the Tamar Valley air shed. In total about 102,000 people breathe the same air throughout the valley and of the 332,000 registered vehicles in Tasmania approximately 80,000 (20 times greater than the number of woodheaters) reside in the Tamar Valley air-shed. It beggars belief that this number of vehicles, including about 500 log trucks every 24 hours, only contribute 8% of Launceston's air pollution. This is to say nothing about the contribution made by a large number of heavy industries in the valley including an aluminium smelter, a manganese smelter, several timberyards, several small foundaries, a ball-bearing factory, a gold mine and, until recently a fibre-board plant and an oil-fired power station.

In addition to this the recent revelation of the exclusion of Bell Bay industrial pollution measurements from the Gunns IIS raises questions as to why these data may be considered "corporate in confidence" whilst the self-reported data from these industries in the NPI is on the public file. As measured data from these industries is reported to state government departments, there must be a clear knowledge of any discrepancy between measured pollution data presented to the state and self-reported data recorded to the NPI.

Lead free fuel was introduced to Australia in 1986 but it was only the national push in the late 1990's to eradicate leaded petrol by January 2002 that hastened the uptake of unleaded fuel. In Tasmania the period between 1998 and 2002 was characterised by large-scale market dumping (offloading) of leaded vehicles as consumers prepared for the leaded petrol "D-Day" of January 2002 when Lead Replacement Petrol (LRP) became readily available. This is represented in the Launceston PM10 data which shows a steep decline in emissions from 1996 to 2002 (73% reduction). Consequently there is a greater correlation between Launceston PM10 reductions and the phase-out of leaded fuel than there is with the introduction of the heater buy-back scheme. It is arguable that the "apparent" trend noted in the limited Tasmania data may in fact be significantly influenced by vehicle fuel change and in summary it appears that the $2.04 million buy-back scheme June 2001 to June 2004 may have had a limited impact on PM10 levels in Launceston.

Reading the smoke signals

With the AMA now coming on-side to call for a total ban on domestic woodheaters in Launceston, it is clear that the Government line to solely point the finger of blame at the humble domestic woodheater has been reinforced by the voice of "authority". The only problem is that medical doctors, in general, have no more training in the chemistry and mechanics of air pollution measurement than the average bricklayer or banker.

A University of Tasmania study in 2005 constitutes the only reasonable attempt to chemically define the source of Launceston's air pollution. The study measured the chemistry of woodsmoke emitted from three woodheaters burning under different conditions and then compared these results with 20 actual ambient air samples collected in Launceston. The study concluded that classical source-typing based on the chemistry of Polycyclic Aromatic Hydrocarbons (PAHs) could not produce any reliable results.

However the three test woodheaters did emit a reliable series of woodsmoke bio-markers defined from gas chromatography and mass-spectroscopy. But the 20 ambient air samples collected in Launceston did not contain any of these woodsmoke bio-markers, with the exception of one marker — levoglucosan! Levoglucosan is a benzene-ring chemical marker found in wood as a function of remnant plant sugars and the presence of this single marker in Launceston air samples was used to estimate that woodsmoke contributed between 50 and 100% of Launceston's air pollution (a large variance).

Since this study Levoglucosan has been used as a marker by at least three other research teams based in Israel, Ottowa and Washington — however in all these studies it was used as a marker to identify woodsmoke generated by either bushfires or agricultural/forestry burning. In addition to this Levoglucosan was also found in smoke emitted from industrial boilers (Dayton and Bursey, 2002). Consequently the presence of Levoglucosan does not differentiate between like biomass sources.

In a more interesting study in New Zealand, a series of chemical biomarkers were measured in three cities that suffer air quality problems (Wang et al, 2006). Ambient air samples from the City of Christchurch, which shares a similar problem to Launceston, were found to contain Levoglucosan. However the researchers isolated key steroids from which they could define that, despite the presence of Levoglucosan, the major contributor to air pollution in Christchurch (60%) was in fact petroleum-based (vehicle exhaust). Christchurch has an estimated 38,000 domestic fuel heaters (between 5 and 9 times as many as Launceston) and it is estimated that 124 people die prematurely in Christchurch every year as a result of poor air quality. Despite this, coal and not wood, is a more popular domestic fuel source in New Zealand and it is the combination of vehicle exhausts and coal burning which cause much of the problem in Christchurch.

As the Tamar Valley is surrounded by forest coups where burnoff is routine and as Launceston City Council is one of the few municipalities in Australia which still allows backyards and rural burning, the use of this single woodsmoke marker to apportion pollution sources remains problematic.

Getting the right data

Particulate matter measurements are highly variable depending on both station siting, elevation and prevailing wind conditions. Indeed nephelometer readings are known to be inaccurate where influenced by fog and humidity, hence the siting of the [single] station at foggy Ti Tree Bend is questionable.

The NEPM only requires state governments to record Nephelometer readings, based on the Tapered Elemental Oscillation Measure (TEOM). This methodology is now regarded as a somewhat poor measure of air quality largely

because it requires the weighing of filtered particulate matter (mass) and not the number or dimensions of particulate matter. As many airborne pollutants naturally degrade within hours due to factors such as ultra-violet radiation (sunlight), the mass of particulates weighed using TEOM will be biased towards those particulates with greater longevity, as found in wood burning (eg. levoglucosan). Consequently Nephelometers should be frequently calibrated to account for such variations (particularly local variations). In a cross-calibration study of nephelometers in Ireland, Scotland and England, none where found to produce comparable results within acceptable error margins owing to calibration problems.

However in Australia there is no enforcement or checking of nephelometer calibration. Whilst nearly all government and private laboratories in Australia require annual third-party accreditation under the National Association of Testing Authorities (NATA), the NEPM is unique in that it has devolved NATA accreditation to state authorities who are only required to "audit" air quality measurement stations once every two years.

It is more than likely that the apparent variation in Launceston's PM10 readings over the past 10 years is strongly controlled by these factors. Indeed the LCC Air Quality working group notes that the "apparent" improvement in air quality in 2004 may be due to the strong north-westerly winds in that year. More to the point, the Government is still only measuring PM10 size particles, despite the NEPM requirement to also measure the more dangerous PM2.5 particles.

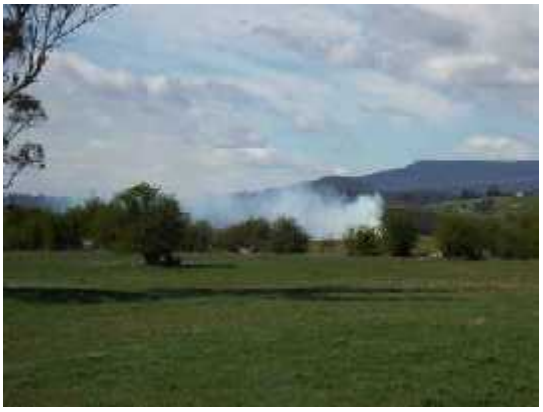
Don't stand downwind

The history of environmental data "management" in Tasmania is long and sordid. The now famous Cape Grim station on the NW coast of Tasmania is a joint operation between the BoM and the US NOAA. The site was selected as a global baseline station to measure changes in air quality — an apparently logical choice as the westerly winds reaching Cape Grim would be unaffected by any activities in onshore Tasmania. However NOAA's preferred site for the station in 1993 was actually Hartz Mountain west of Geevestown. As air quality improves towards Antarctica, NOAA wanted to site the station at Hartz but was obstructed by the Tasmanian Government. The then Government argued that it could not build sealed roads around the proposed site due to "environmental" issues. Ten years later this argument seems to have disappeared with the sealing/resealing of roads and construction works at the nearby Tahune Airwalk. With the value of hindsight we now know that any air quality measurements at Hartz Mountain would be profoundly influenced by forestry activities now underway in the Picton River Valley (immediately adjacent to Hartz Mountain) and the nearby Weld Valley — a lot of levoglucosan but not a wood heater in sight! This would be especially problematic for the government as the data are being accessed, monitored and reported by a third party! Potentially very embarrassing. The siting of air quality stations is critical in getting the "right results" — perhaps a factor in the recent move of Hobart's air quality station to a more "representative" location.

Now is the winter of our discontented breathing

The Government beat-up on the improved quality of Lanunceston's air (based on the single measure of PM10 exceedences only) is more likely to be a harbinger relating to both he Environmental Management and Pollution Control Regulations (aka. Smoke police) and the looming decision of the RPDC with regards to the pulp mill. Apart from the obvious questions relating to why this story was reported by the ABC without any basic research or validation, the question of the overall relevance of the data remains. The entire murky business of air quality measurement in Tasmania also speaks volumes for our elected representatives (Labor and Liberal) who have knowingly disregarded the health of their constituents in favour of the few people to stand to make a large amount of money from this travesty.

Earlier Cephissus: Oh, yeah Paul; and Lifting the smokescreen



Smoke from the Gunns sawmill burn

Cephissus Dry

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