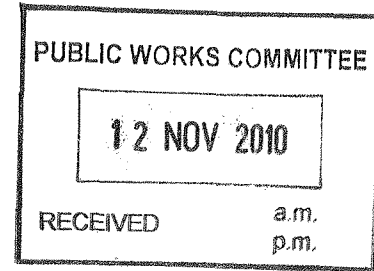


Thank you for the invitation to both attend the Public Works Committee hearing into the proposed Defence Housing Authority development at Largs North, and for providing the opportunity to respond to the arguments heard at the Adelaide hearing.



We were very interested to hear the response to the committee's questioning and by and large were in agreement with the responses.

We were however surprised that two issues which were not addressed by the *South Australian Environmental Protection Authority report*. PAREPG raised those issues with the South Australian Development Assessment Commission in response to a proposal to expand the fuel farms in 2008.

1) The hazard presented by the fuel storage depots to the south of the development. PAREPG is primarily concerned that while the effect of fire at the farm has been considered blast effect of an explosion at the fuel depots has never been properly assessed.

PAREPG identified a fuel farm explosion that had occurred at Buncefield in the UK.

That explosion caused many injuries and extensive property damage to the closest residential areas some 1km from the blast.

This is no statistical outlier. Indeed we would like to draw the committee's attention to a chemical fire at the Biodiesel Plant on 24th June 2010.

Our measurements indicate that the proposed development is between 500 and 800 km from the boundaries of the nearest tank farm.

2) The exposure of nearby residents to benzene and toluene emissions from the farm is likely to be in breach of regulatory guidelines. We understand that work has been done on some fuel farm tanks which is expected to reduce the level of emissions since the time of the initial measurement. However we believe it is prudent for the effects of that work to be confirmed by measurement before further residential development is approved.

Further detail is contained in PAREPG's response to the Development Assessment Commission (attached). We would be pleased if a copy could be provided to committee members.

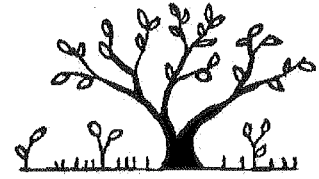
Should you require further information please feel free to contact me on

the number below.

Regards

Port Adelaide Resident's Environment Protection Group

Port Adelaide Resident's Environment Protection Group



PO Box 3122.
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RE: Application by BP Australia to construct fuel storage tanks at Birkenhead

040/V403/08

Our understanding is that the BP fuel depot is a special industry under the Development Regulations 1993 - Schedule 1 as:

The "goods stored" at the fuel depot "are likely" to "create fumes, vapours smells or gases and thereby endanger, injure or detrimentally affect the life of any person (other than any person employed or engaged in the industry) or produce conditions which are, or may become, offensive or repugnant to the occupiers of land in the vicinity".

We note two relevant principles of development control for General Industry (2) zones. Principle of development control (1) advises against development of special industry in a general industry(2) zone:

"Development undertaken in the General Industry (2) Zone should be, primarily, general industries with light industry and associated activities such as warehousing and storage in appropriate areas".

And principle of development control (2) which specifically defines exceptions :

Special Industries may be appropriate in certain parts of the zone where they can be located, designed and developed such that the industry presents NO danger to adjoining premises or nearby residential development

We note that the acceptable level of danger to nearby residential development if a special industry is to be developed in this zone is zero.

Immediately to the north of the proposed application for the storage of 50 million litres of fuel is Willochra St, Largs North. Fronting Willochra St and within 150m of nearest storage tank is the site of the former Largs North Primary School. The school has recently been sold, and a new residential development has been approved and is nearing completion.

Our argument is that the BP fuel depot presents an extremely significant danger to nearby residential development. We consider only the applicants assessment of air quality and societal risk

Air Quality

EPA measurements imply that regulatory guidelines may already be exceeded

Local residents have for some time complained about the level of emissions from the fuel storage depots. Their complaints were supported by a 12 month EPA monitoring campaign located at Jenkins St, Birkenhead approximately a kilometre south southern boundary of the of the oil storage depots.

The results of that survey are summarised in Table 1:

Chemical	Worst Case measured 30 minute average $\mu\text{g}/\text{m}^3$	Annual Average $\mu\text{g}/\text{m}^3$	Maximum Guidelines $\mu\text{g}/\text{m}^3$	% of maximum guidelines
Benzene	53.4	7.8	16 (Annual average)	49%
Toluene	559.4	15.3	1000 (30 min Average)	56%

Table1: Summary of EPA monitoring at Jenkins St Birkenhead.

The EPA found that peak values were consistent with emissions from the Birkenhead fuel depots. Worst case and annual averages are shown, and are compared to the guidelines provided in the EPA report. In both cases emissions measured are ~ 50 % of the guidelines supplied by the EPA.

The important point to note is that these values were measured ~ 1 km from the site.

It is reasonable to expect that values in residential areas adjacent to the fuel storage site are approaching, and may well be exceeding accepted maximum guidelines.

We urge the commission to seek appropriate advice on the likelihood that residential areas adjacent to the site are exposed to emission levels close to or in excess of accepted guidelines.

Emission modelling

Modelling was performed for only the two proposed tanks containing automotive diesel fuel, and results are supplied for adjacent residential and industrial sites. We would like to make two points in this regard:

- The Gaussian modelling technique relies on distance from the source to distribute and “average out” fluctuations in the levels of pollutants. In this case the distance from the source is very small in atmospheric terms, and consequently the predicted peak value of pollutants is underestimated.

In other words, under these circumstances the predictions of the model are unreliable.

- The context of the surroundings are probably a more reliable guide. It seems probable that emission levels adjacent to the site are approaching the regulatory guidelines. Yet the modelling, which predicts levels from only two two tanks, is of the order of ten thousand times less than the guidelines.

Consider for a moment that there are 100 storage tanks at Birkenhead and modelling was performed on the total. Then the predicted emission levels might be 50 greater.

Clearly there is a discrepancy, and either the modelling technique, or it's assumptions need to be questioned.

A plausible explanation is that emissions from tanks on the Birkenhead sites are higher than what might be assumed for new infrastructure. This implies that the current storage infrastructure has depreciated in some way.

Risk

In contrast to the air quality assessment, which was applied to only two tanks, risk assessment has been applied to the site as whole. The approach taken in the risk assessment is to:

1. Examine the consequences of a fire, then
2. Estimate the probability of a fire occurring,
3. Determine a societal risk.

We have addressed these components by comparing a recent oil terminal catastrophe at Buncefield in the UK, with the circumstances at Birkenhead.

The Buncefield experience (BBC News, Hemel Today)

Buncefield was the site of an oil depot fire in the UK in 2005. The depot is part of the Hemel Hempstead industrial estate. The seat of the fire was situated approximately 1 km from residential areas to the north at the Woodhall Farm Estate in Hertfordshire.

The fire was caused when a tank full of petrol overflowed, forming a vapour cloud that then exploded. The effects of the initial blast were extensive. The blast itself was heard across London, and in France and the Netherlands. The ensuing fire was not able to be extinguished for 32 hours and at one stage controllers were concerned that foam supplies in London would be inadequate.

43 people were injured. The effect on residents of the Woodhall farm estate was traumatic:

The couple's two-year-old daughter, Ellis-Rose, was in bed with them on Sunday morning when they were woken with one of their patio doors flying inwards and shattering all over the bed. Another pane fell out of its frame whole, and the blast left the frame twisted and hanging into the room. The rush of air blasted right through the flat, part of an L-shaped block near the fuel depot, and buckled the front window.

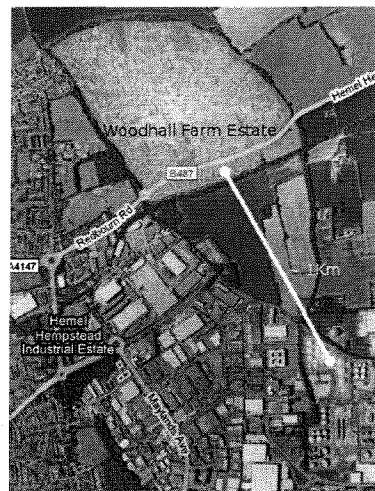


Fig 1: The seat of the Buncefield depot fire was approximately 1km from residential areas

Damage from the Buncefield blast and fire is reported to be £ UK 1bn. As the post disaster enquiries unravel it is becoming clear that the probability of such events occurring is not remote. The BBC identified a number of oil depot fires that have occurred internationally:

Disturbing parallels between the Buncefield fuel depot explosion and fires abroad have challenged the insistence of the UK onshore oil industry that the accident was a one-off.

BBC News: Buncefield parallels drawn abroad

The situation at Birkenhead

The fuel depot at Birkenhead is distinguished by its proximity to residential areas. The northern most tank in BP's northern section is less than 150m from a new residential area just north of Willochra St, and at another site further south the separation distance is even less where storage tanks about the Victoria Rd boundary, just north of Wills St.

In addition the fuel storage sites are scattered over a large area, and interspersed with other industries. A number seem to be disused.

The layout a Birkenhead is unusual if not unique. Our inspection of Google satellite images of Australia and Europe found that fuel storage areas are generally compact, and invariably separated from residential areas by significant distances.

Our understanding is that in recent years a number of facilities have developed leaks, and that significant work is required to prevent the discharge of petroleum contaminants into the Port River. In addition we believe a number of tanks close to the river have been decommissioned in recent years.



Fig 2: The nearest fuel tank at Birkenhead is less than 150m from residential area at Largs North. Location of the proposed tanks is shown in red

Consequences have been underestimated

PAREPG's view is that the consequences of a catastrophe have been grossly underestimated by the applicants risk assessment as:

- The consequences of an explosion have not been considered. In the Buncefield example significant damage was caused by the effects of the initial blast. It was fortunate that residential areas were not closer to the explosion, and that adjacent industrial facilities were not occupied as the blast occurred on a Sunday morning.
- The effects of a blast at Birkenhead would be much more severe. Damage to residential areas is likely to be greater as Birkenhead residential areas are within 150m rather than 1 km of the the fuel depots.

The risk assessment bases it's consequences on a damage zone of 200m, whereas the Buncefield experience demonstrates that blast damage occurred at more than 5 times this distance. Similarly in the case of fire injuries caused by smoke inhalation are likely to be higher at Birkenhead.

Risk assessment

The hazard assessment considers industry wide data on the probability of failure (p33). Industry wide aggregates ignore variation in the condition of plant and equipment. It seem reasonable to assume that facilities with aged and possibly poorly maintained equipment or a history of failure are more likely to fail than might be expected of the industry wide average.

The available evidence indicates that the Birkenhead facilities fall into the higher risk category as:

- We understand that a number of direct fuel leaks of various magnitudes have occurred into the Port River. Time does not permit the us to lodge a freedom of information application to obtain the relevant information from the EPA, but we urge the commission to seek that information from the Environmental Protection Authority.

One such leak was publicly reported in 2005:

Mobil confirms Birkenhead fuel leak

Posted Fri Dec 16, 2005 12:25pm AEDT

Mobil has confirmed that a problem with a delivery line at its Birkenhead storage facility resulted in a fuel leak several weeks ago.

Independent MP Nick Xenophon revealed the problem, saying fuel has been leaking from the underground pipe for up to six weeks.

Despite an assurance from the company that authorities including the Environment Protection Authority (EPA) were notified, an EPA spokesman said this morning it is not aware of the problem at Birkenhead but will look into it.

Mr Xenophon says Mobil has been pumping a contaminated mix of fuel and water into a spare tank and he is demanding to know how much environmental damage has been caused.

Mobil spokesman Alan Bailey says it is impossible to know how much petrol has leaked into the ground.

"I don't think there's any way you can tell that," he said.

"There is hydrocarbon contamination under the ground in all these sorts of facilities."

Mobil says once the leak was detected early last month, the line was promptly isolated.

ABC News <http://www.abc.net.au/news/stories/2005/12/16/1532489.htm>

We note that the Buncefield explosion was caused by a leak lasting 40 minutes, whereas this particular leak at Birkenhead went undetected for "up to six weeks".

- Emissions from the fuel depots which affect air quality are common place. Once again we are unable to obtain logs of complaints or corrective action taken by the EPA in time for this submission, but understand the problem is substantial, and urge the commission to seek that information from the Environmental Protection Authority..
- PAREPG's critique of the air quality analysis presented above supports the argument that the level of emissions is higher than that expected from industry standard equipment, which implies that the equipment from these depots is older, more in need of maintenance and hence more likely to fail.

Societal Risk

Firstly, we have demonstrated:

1. The potential consequences of a catastrophe at the fuel depot are much wider than assessed by BP Australia's consultant JBS Environmental. Under the protocol suggested by the applicant a more detail evaluation is required.
2. The risks of an accident occurring are higher than suggested.

Which leads to the conclusion that the level of societal risk is higher than that presented. We do not have sufficient quantitative information to assess the increased level of risk, but that does not invalidate our assertion.

Secondly the level of societal risk which is presented as adequate, has questionable validity within society. Who is to say what level of death, injury or property damage is acceptable at what level of risk. The applicant provides no evidence to support the implied assertion that that societal risk level is invariant across all societal strata and all geographic locations?

Societal risk seems to be a convenient engineering construction that does not have a demonstrated social currency.

Relationship to the Port Adelaide Enfield Development Plan

In our opening statement we referred to principle of development control 2.

Special Industries may be appropriate in certain parts of the zone where they can be located, designed and developed such that the industry presents NO danger to adjoining premises or nearby residential development

We have demonstrated that this special industry does present a danger to adjoining residential areas. That danger is not quantified. The applicant argues that the danger is quantifiable, but not significant. However even from the applicant's perspective the level of danger is higher than that of comparable residential developments, and which implies that a statement that there is NO danger to nearby residential development is false.

We have presented evidence that the level of danger is significantly higher than that estimated by the applicant, and believe that the level of danger would be unacceptable to the majority of fully informed people.

In addition we have considered council wide principles of development control.

72 Where industrial areas abut residential areas light industrial development should be located near the residential area to minimise the nuisance to householders

This principle is not fulfilled. Tanks are clearly visible from adjacent residential areas, and general industry areas abut the new residential areas

74 Industries should not cause nuisance through the emission of excessive noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit, oil, or intrusive light to any premises located on an abutting site and within any residential zone.

The EPA's Jenkins St monitoring report provides adequate evidence that such nuisances exist. That report can be supplemented by examination of the EPA complaints register, together with EPA requirements for improvements to the facilities.

8 Development in localities having a bad or unsatisfactory layout, or unhealthy or obsolete development should improve or rectify those conditions.

The propose development will not improve the unsatisfactory layout of this industry. The development is proposed for the extreme northern boundary of the most northerly fuel storage facility. If approved the opportunity for contracting facilities away from residential development will be lost. Worse still is the likelihood that as old facilities are renewed they will tend to cluster around more recent development, which is adjacent to residential areas.

Industry Objectives

Objective 25: *Development at the interface between industrial activities and sensitive uses that is compatible with surrounding activities, particularly those in adjoining zones. Where industrial zones already adjoin residential areas, it is appropriate that those industrial activities with lower potential for off-site impacts be located on the periphery of industrial zones.*

Some types of commercial development are also suitable on the periphery of industrial areas as they can perform a separation role between housing and industry. Consideration should also be given to the appropriateness of, and design treatments required, for other land uses located in close proximity to industrial locations. Separation distances can be utilised as a trigger for more detailed assessment to ensure that impacts can be minimised.

This objective is clearly violated by the proposed development. The proposal is incompatible with surrounding activities, has an extremely high potential for off site impacts and should not be located on the periphery of the site.

Objective 26: The separation of industrial and residential land uses, except as provided for by objective numbered 34.

This objective is also violated as the separation of land uses is clearly compromised by siting the largest storage volumes on the boundary of the site.

The most obvious principle that this development violates is the siting of such a dangerous element close to residential areas. Good planning practice would seek to encourage such hazardous development as far from residential areas as possible.

We believe the proposal is clearly at significant variance with the development plan, and encourage members of the Development Assessment Commissions to recommend its rejection.

We would like to have the opportunity of appearing before the commission.

Yours sincerely

Port Adelaide Resident's Environment Protection Group

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